Proceedings of International Analytics for Management And Economics Conference, HSE University – Saint Petersburg, September – December, 2020

AMEC
ANALYTICS FOR MANAGEMENT
AND ECONOMICS CONFERENCE

NATIONAL RESEARCH
UNIVERSITY
SAINT PETERSBURG

Table of Contents

Table of Contents

Track: Leadership in Russia and Global Context
Chairpersons: Romie Frederick Littrell and Jasenko Ljubica

Leadership is at the center of the success and failure of endeavors of organizations, reflecting and driven by societal culture to create and maintain organizational culture. Effects of culture on leader and follower opinions, attitudes, beliefs, and behaviors have long been a rich source of understanding of theory and practice in organizational theory and organizational behavior. In this stream of AMEC for this year scholars from different countries including Russia, Norway and Iceland will present their studies that deal with different types of leaders, leader values and behaviors and gender roles in leadership in Russian and global contexts, as well as a presentation of the paper dealing with research methods in leadership research, namely exploring response sets as a cross-cultural variable in large scale leader behavior studies.

Are Leadership Traits Drivers of Sustainability Values: Does National Culture Matter?

Gillian Warner-Søderholm – BI Norwegian Business School, Norway Gillian.warner.soderholm@bi.no

Inga Minelgaite – University of Iceland, Iceland

Romie Frederik Littrel – National Research University, Higher School of Economics, Russia

Jasenko Ljubica – National Research University, Higher School of Economics, Russia

Keywords: effective leadership, sustainability analytics, scale development

1. Introduction

The purpose of this paper is threefold. First, we present our multi-level research model of sustainability values and culturally contingent ideal leader behavior. Secondly, we outline our forthcoming global analytics research project: **Follower endorsed effective leadership and sustainability project'** (FEELS). Finally, we invite researchers interested in joining this international collaboration project to apply to be country collaborators for their host country.

2. Research Design, Methodology and Data Analysis

Using processual logic, a stepwise procedure was used to develop our multi-level research model of multiple antecedents to sustainability values in ideal leadership. In order to develop a measurement instrument for follower endorsed effective leadership and preferred sustainability practices, we first refined and validated the most widely used leader Behavior measurement instrument, LBDQXII, into a more parsimonious instrument for assessing cognitive templates of preferred leader Behavior across cultures. The 100-item LBDQXII survey was administered to 6451 participants from 14 countries. Data was used to refine a 50-item survey. The new, shorter survey instrument is a valid and reliable tool for assessing preferred leader Behavior. The second step in this study was to carry out a review of the extant literature on sustainability measures, with over 300 items identified to measure sustainability. Q-sorting techniques were applied to select and refine a set of valid and reliable sustainability measures. Pilot tests were carried out in a number of countries and the preliminary results indicate that national culture plays a moderating role in the relationship between ideal leader traits and sustainability values

3. Results/Findings and Discussion

This project corresponds to calls to firstly shorten the well-established leader Behavior instrument into a measurement tool that is reliable and valid across cultures and languages. Secondly, it addresses the call to map sustainability values across national cultures. The 'FEELS' (**Follower endorsed effective leadership and sustainability**) measurement instrument can be administered by both private and public organizations, contributing to greater understanding of what moderates sustainability values within the organization or within society. Most leadership instruments are overly long, which hinders data collection opportunities. This newly developed instrument with just 60 items can lead to better response rates and easier applicability in organizational settings. We detail a triangulation approach to scale reduction methodology, namely judgmental, validity, and reliability methods. This can offer insights to both practitioners and scholars regarding quality and optimal length of any survey tool, both in and beyond management.

4. Conclusion, Contribution and Implication

We offer a call for researches interested in becoming CCIs (country collaborative investigators), to join us in our study of follower endorsed effective leadership and sustainability values in their own host country.

5. References

Available upon request

Toxic leaders in Russian organizations

Aleksandr Sukharev – National Research University, Higher School of Economics St. Petersburg, Russia

afsukharev@edu.hse.ru

Aleksandra Kovach – National Research University, Higher School of Economics St. Petersburg, Russia

kovachalexik@gmail.com

Keywords: toxic people, leadership, managers, Russian companies

1. Introduction

Handling toxic people is a functional role of all managers, although not all of them are having a right skill and will to find such toxicity and not to make ones by themselves. Toxicity comes with challenges that leaders offer to their employees: deadlines, high expectations, etc. Challenges are correlate with personal issues: parents, children, living conditions and health problems. Of course, HR department should avoid toxic employees and conduct different interviews and tests before hiring a person. But in some cases, the toxicity extends from higher levels of the company, the people who manage the workers. In this research Russian companies considered the managerial toxicity. It is interesting, what types of toxicity are most common among the leaders of Russian companies and whether foreign metrics can be used in Russian reality.

2. Theoretical Background and Literature Review

Toxic managers can be considered a subgroup of harmful leaders that either adopt behavioral traits or act alone. One of the causes of negative work environment may be the consequence of toxic management style. It can take the form of micromanaging, intimidation, arrogance, or lack of competence of superiors. In the long run, this phenomenon can lead to extremely destructive consequences for the effectiveness of both individuals and the entire company.

In general, it is difficult to determine from the outside whether everything is peaceful inside the organization or not. The heads of companies being the most influential people in the team are often not the most educated and kind. However, if the head of the company is the main source of infection of the environment, employees are being under everyday stress, which may grow into hate of their own work and decrease in energy. So, toxicity can be spread at different levels of the organizational structure and have diversity of consequences. The status of toxicant is significant factor of defining problem-solving process. The higher the position of such a person, the more global distribution of destructive behavior. Recent studies show that quitting work with a toxic boss can be difficult considering many reasons. Excuses can be based on psychological emotional exhaustion, as this makes it impossible to forecast a more positive experience in the future.

Elements such as a strong leader in a negative sense, subordinate followers, and the desired environment create a so-called toxic triangle. They interact with each other and lead to even more adverse consequences. The responsibility for negative consequences lies not only with toxic leaders, but also with their willing followers. These employees can be divided into conformists, who are likely to have low self-esteem and psychological maturity, and supporters who share a destructive position. One of the most valuable textbooks contributed to the field is "Who's That Sitting at My Desk? Workship, Friendship, or Foe?" written by Jan Yager in 2004. This literary source contains 14 types of people who poison the work environment, based on 400 responses from a questionnaire and more than 100 detailed interviews. In recent decades, there has been a trend towards a more detailed study of this topic, which indicates the growing interest and usefulness of research on this phenomenon, as well as its practical application.

3. Research Design, Methodology and Data Analysis

The research allows to acquire information about toxicity among managers in Russia and how Yager's types of toxic employees' suit into Russian reality. During the investigation, qualitative data was collected. The research process reviews on companies from people that were working there.

Reviews data was collected from different sites like "Pravda Sotrydnikov" or "O Trude". Comments about several big Russian companies: "Evroset", "Gazprom", "OZON", "Toyota Russia" and "MTS". Over 1000 reviews were collected. As it obvious to see, most of sites have same structure and here comes only a problem of copying this amount of reviews in one file to further analysis. Parsing was used to collect data from the website with reviews and detailed comments of former or current employees of such large companies. After that step we set words and combine some meanings that are special for topic of research. and connection that describe toxic behavior and used Leximancer 5.0 to conduct content analysis.

4. Results/Findings and Discussion

In results the most common are "dismissals" (увольнения) was found in 212 reviews which connected with others like "must" (должен) with 131 mentioning's, "force to" (заставляют, требуют) 85. These words often used Control Freaks and Manipulators. This information gives an idea of the methods used by managers in Russia, and that most of them are toxic and offensive. In Russia, there are problems with payment and long working hours.

5. Conclusion, Contribution and Implication

This study provides the most frequent types of toxic workers on leading position in a Russian company. Reviews show that Control Freak and Manipulator are the most widespread than the rest of types. Based on content analysis, was revealed that control and payday intimidation are most standard problem that employees face according to reviews of companies. We proved that these classifications are working, most of types that we described in literature review exist in Russian reality and functioning in the same way. They are stick to the same behavior pattern and do harm to employees as foreign studies say.

This study differs from others since not only types of toxic people and ways to deal with them were considered but focus on identification the most frequent groups of harmful people in the workplace. For this reason, the investigation can be more useful and valuable for companies in successful poison control activities.

Firstly, from research, managers are the most common toxics, so ordinary employees should not be afraid to claim boss as toxic, not blame yourself but develop this problem into some authorities that can do something like different unions and media.

Moreover, results should be helpful for HR specialists, in literature review we stated that HR department is a first barrier in front of toxicity. They can focus on this kind of them more and develop better questions, tests, and interviews to identify of such people.

Finally, managers can adjust their behavior to certain standards and avoid falling into a toxic pit that destroys the effectiveness of employees and the organization.

6. References

Abbajay, M. (2018, September 7). What to Do When You Have a Bad Boss.

Appelbaum, S. (2007). Toxins in the workplace: Affect on organizations and employees. Corporate Governance International Journal of Business in Society, 17-28.

Durre, L. (2010). Surviving the Toxic Workplace: Protect Yourself Against Coworkers, Bosses, and Work Environments That Poison Your Day. McGraw-Hill Education.

Mehta, S., & Maheshwari, G. C. (2014). Toxic Leadership:Tracing the Destructive Trail. International Journal of Management (IJM), ISSN 0976 – 6502(Print), ISSN 0976 - 6510(, 18-24.

Padilla, A., Hogan, R., & Kaiser, R. (2007). The toxic triangle: Destructive leaders, susceptible followers. The Leadership Quarterly, 176-194.

Pelletier K., K. J. (2018). The toxic triangle in academia: A case analysis of the emergence and manifestation of toxicity in a public university. 405-432.

Row, H. (1974). Obedience to authority: an experimental view. Harper Perennial Modern Classics.

Usman, M. (2018, September). Organization?, How to Manage Toxic Employees in an Organization? Nilore: National Centre for Physics.

Wright, E. E. (2015). Toxic Management Styles: The Problem, Prevention, and Cure. Trengaws Publishing.

Yager, J. (2004). Who's That Sitting at My Desk? Workship, Friendship, or Foe? Hannacroix Creek Books.

Response Set as a Cross-Cultural Variable: Recent Empirical Data from Cross National Samples

Romie Frederick Littrell – National Research University, Higher School of Economics St. Petersburg, Russia rlittrell@hse.ru

Gillian Warner-Søderholm – BI Norwegian Business School, Oslo, Norway

Inga Minelgaite – University of Iceland, Iceland Reykjavik, Iceland

Jasenko Ljubica – National Research University, Higher School of Economics St. Petersburg, Russia

Keywords: national culture, response bias, response sets

1. Introduction

Various versions of the Leader Behavior Description Questionnaire (LBDQ) have been used in hundreds of research studies over the past fifty years. Since 1991, the LBDQ XII and the LBDQ have been used in several cross-national-culture studies.

2. Theoretical Background and Literature Review

However, the psychometric properties of the LBDQ XII have not been investigated in a cross-cultural context. Results of studies using the LBDQ XII in several national languages are investigated, and some problems with the reliability of the items defining the LBDQ XII factors from items using Likert scale ratings are identified. Item and factor score data for the LBDQ XII were analyzed across samples from 21 countries.

3. Results/Findings and Discussion

Results indicate that response patterns to the items defining the factors are sensitive to sampling differences, and while this is a useful finding, the fact that the differences lead to difficulties in statistical comparisons of dimension scores across samples is a concern as to what studies are actually measuring, individual and group differences or differences in response sets.

4. References

Available upon request

Gender Does (Not) Matter: The Job Role Congruity Theory of Leader Behavior across Cultures

Jasenko Ljubica – National Research University, Higher School of Economics St. Petersburg, Russia
jasenko01@net.hr

Romie Frederick Littrell – National Research University, Higher School of Economics St. Petersburg, Russia

Gillian Warner-Søderholm – BI Norwegian Business School, Oslo, Norway

Inga Minelgaite – University of Iceland, Iceland Reykjavik, Iceland

Keywords: leader behaviors, gender, culture, role congruity

1. Introduction

Gender role stereotypes whereby both masculine (i.e. agentic) or feminine (i.e. communal) traits and leadership styles and behaviors are argued as ideal and effective have long been the subject of leadership research. Congruently, the findings are mixed and inconclusive, with evidence supporting both sides of gender as well as context-contingent leader behavior viewpoints. Building upon the latter stream, in this paper we argue that job-related contextual (e.g. culture) and contingency factors, and not gender, determine the ideal, i.e. most effective way to lead, which we refer to as job role congruity theory of leader behavior.

2. Theoretical Background and Literature Review

Gender roles, as social roles, are enduring aspects of culture and function as a normative constraint that denotes generally accepted types of behavior, that is, men are expected to behave like culturally defined men, and women are expected to act like culturally defined women (Prince-Gibson & Schwartz, 1998; Rokeach, 1973; Eagly 1987; Eagly & Karau, 2002). Historical, psychological, evolutionary, role-learning, and socio-cultural theories of gender differences postulated that men emphasize agentic-instrumental (assertiveness, confidence, self-reliance), whereas women emphasize expressive-communal (nurturing, supportive, and emotionally expressive) traits and behaviors (Feather, 1988; Prince-Gibson & Schwartz, 1998; Rokeach, 1973).

Much of the leadership research on gender is concerned with the extent to which there are differences between the behavior of male and female managers, and how desirable and effective such behaviors are in their job and wider social and cultural contexts. "Agentic" stereotypic male qualities and behaviors have historically been more aligned with stereotypic views of managerial roles, versus "communal" stereotypic female qualities. Leaders across cultures were, thus, believed to possess a wide range of abilities stereotyped to men that enable them to behave in ways that contribute to the success of their organization, whereby women were stereotyped as lacking in leadership ability.

In the last few decades, however, cross-cultural research on gender roles in leadership indicates greater congruence between perceptions of women as successful managers and stronger endorsement of agentic and task-oriented leadership characteristics for women. Organizational scholars also proposed that as organizations across the globe become faster paced, globalized environments, a more feminine style of leadership is needed to emphasize the participative and open communication needed for success (Hitt, Keats, & DeMarie, 1998; Rosener, 1995). Consequently, female leaders were argued as more inclined to fill this need than men.

In parallel with male vs. female advantage in leadership roles, much of the literature indicates the absence of differences, i.e. convergence in leadership behavior between the genders across cultures. In example, researchers found that no differences between the genders were evident in perceptions of effective

leadership by subordinates (Johnson, Murphy, Zewdie & Reichard, 2008), and that, in contrast to the historical gender-stereotypic view on leader behaviors, female and male leaders did not differ in interpersonally oriented and task-oriented leadership styles (Eagly & Johnson, 1990).

This evidence on gender congruity of leader behaviors was argued to reflect societal and contingency influences. Social rewards accrue when the presumed behaviors of a group's members align with the demands of relevant social-cutural roles. In contrast, devaluation results when characteristics misalign with role demands. Thus, if the leadership context is feminine, then leader behaviors perceived as preferred in such context should be those stereotypically characterized as feminine and women should be seen as better leaders then men, and vice versa.

Eagly and Karau (2002) further proposed that leaders can also display expectancy-confirming behaviors in certain environments. Eagly and Carli (2003) found that female leaders entering a traditionally male dominated occupation adopt a more controlling and autocratic leadership style, mimicking the dominant style of males. Vice versa, a male manager might adopt a more egalitarian and participative style in a predominantly female occupation (Eagly & Carli, 2003). Eagly (1990) also argued that despite performing socially expected and preferred leader behaviors, gender expectations still operate, often producing role incongruity for women in socio-culturally male leader roles and vice versa, which stimulate leader cognitive dissonance. When the dissonant element is a behavior, the individual can change or eliminate the behavior. Hence, men and women leaders may change behavior to reflect social role expectations. Both males and females can, thus, be successful in the managerial leader role while behaving congruently with both feminine and masculine norms.

Building on these postulates, we view preferred leader behavior as social, and not gender-contingent, residing in observer attribution. We acknowledge that no single leader behavior is "best" for all settings and argue that contextual and situational attributes likely determine what optimal (combination of) behaviors would be. We believe that both genders are capable of enacting behaviors stereotypically assigned to a specific gender, whether male or female, and that leaders can vary their behaviors while being effective through different contexts. We therefore argue that no gender differences in displayed preferred leader behavior exist and that job-related contextual (i.e. culture) and situational factors determine the best way to lead, for which men and women are equally competent and display behaviors contingent to the given context. We refer to this line of argumentation as the *Job Role Congruity Theory of Leader Behavior*.

3. Research Design, Methodology and Data Analysis

In this study we use data from a large-scale global study comparing managerial leader behavior preferences across societal cultures (Littrell, 2013). We obtained data from ten samples of business people and business students in eight countries totaling in 3500 participants. We adopt a positivist and quantitative methodological approach employing two standardized and validated survey instruments with a 5-anchor Likert scale to assess subjects' opinions, attitudes, and beliefs concerning leader behaviors, gender and cultural values.

To analyze the data we employ standard descriptive and analytical statistical techniques as implemented in SPSS® version 26. Pearson product-moment correlations were calculated for the relationships between the sample means of countries involved in the study, and the overall sample, for Hofstede's seven cultural value dimensions and leader behavior dimensions. To further test the explanatory and predictive power of independent variables (i.e. culture, gender) we employ regression, hierarchical regression and ANOVA tests.

4. Results/Findings, Discussion

The findings of our study show that cultural and gender effects on preferred leader behaviors are marginal. Culture, gender affect but do not define them. These findings indicate the importance of engaging in future

investigations of the various contextual and contingency (e.g. cultural, societal, organizational, personal and interpersonal) factors and their inter-dynamics, to advance the understanding of the determinants of managerial leader behaviors across cultures.

5. Conclusion, Contribution and Implication

Our study indicates that national culture and gender influence but do not define preferences for leader behaviors and congruently their effectiveness. These findings put forth the need to shift the focus of future studies from singular effects to multilevel cultural, organizational, and individual dynamics that shape leader behaviors. Research with such focus is much more likely to significantly contribute to the understanding of the leader behavioral phenomenon cross societal cultures, as well as provide more effective practical guidelines and recommendations.

6. References

Eagly, A. H. (1987). *John M. MacEachran memorial lecture series; 1985.Sex differences in social behavior: A social-role interpretation.* Lawrence Erlbaum Associates, Inc.

Eagly, A. H., & Carli, L. L. (2003). The female leadership advantage: An evaluation of the evidence. *The Leadership Quarterly, 14*(6), 807–834. https://doi.org/10.1016/j.leaqua.2003.09.004

Eagly, A. H., & Johnson, B. T. (1990). Gender and leadership style: A meta-analysis. *Psychological Bulletin, 108*(2), 233–256. https://doi.org/10.1037/0033-2909.108.2.233

Eagly, A. H., & Johnson, B. T. (1990). Gender and leadership style: A meta-analysis. *Psychological Bulletin, 108*(2), 233–256. https://doi.org/10.1037/0033-2909.108.2.233

Eagly, A. H., & Karau, S. J. (2002). Role congruity theory of prejudice toward female leaders. *Psychological Review, 109*(3), 573–598. https://doi.org/10.1037/0033-295X.109.3.573

Eagly, A. H., & Karau, S. J. (2002). Role congruity theory of prejudice toward female leaders. *Psychological Review, 109*(3), 573–598. https://doi.org/10.1037/0033-295X.109.3.573

Feather, N. T. (1988). Values, valences, and course enrollment: Testing the role of personal values within an expectancy-valence framework. *Journal of Educational Psychology, 80*(3), 381–391. https://doi.org/10.1037/0022-0663.80.3.381

Hitt, M.A., Keats B. W., DeMarie, D. M. (1988). Navigating in the new competitive landscape: Building strategic flexibility and competitive advantage in the 21st century. Academy of Management Perspectives. 12(4), 22-42. https://doi.org/10.5465/ame.1998.1333922

Johnson, S. K., Murphy, S. E. Zewdie, S., Reichard, R. J. (2008) The strong, sensitive type: Effects of gender stereotypes and leadership prototypes on the evaluation of male and female leaders. Organizational Behavior and Human Decision Processes, 106(1), 39-60, https://doi.org/10.1016/j.obhdp.2007.12.002.

Littrell, R. F. (2013). Explicit leader behavior: a review of literature, theory development, and research project results. Journal of Management Development, 32(6): 567-605. https://doi.org/10.1108/JMD-04-2013-0053

Prince-Gibson, E., & Schwartz, S. H. (1998). Value priorities and gender. *Social Psychology Quarterly, 61*(1), 49–67. https://doi.org/10.2307/2787057

Rokeach, M. (1973). *The nature of human values.* Free Press.

Rosener, (1995). America's competitive secret: utilizing women as a management strategy. Oxford Univ. Press, NY.

Track: Technology upgrading in emerging and catching-up economies
Chairperson: Slavo Radosevic and Anna Fedyunina

Technology upgrading is the process of enhancing technological capabilities of firms, sectors, regions or countries. The failure or ineffectiveness of technology upgrading is the key issue in understanding the nature and problem of economic growth for emerging and catching gup economies. The range of empirical innovation have shown that technology upgrading is a crucial distinction between the countries that successfully overcame the growth slowdown of middle-income countries. Within that context this session aims to explore several issues of innovation-based growth in emerging and catching up economies with particular emphasis on Russia and India and focused on digitization, open innovation, transformation of R&D system and technology adoption

Cooperative strategy in the age of open innovation: selection of partners, geography and duration

Valeriya Vlasova – National Research University Higher School of Economics, Moscow, Russia

Vitaliy Roud – National Research University Higher School of Economics, Moscow, Russia

Keywords: open innovation; innovation strategy; collaborative innovation; geographical proximity; duration of cooperation; industry-science linkages; manufacturing

1. Introduction

The generation of knowledge and ideas is a network phenomenon. If a single invention and its successful implementation can happen in isolation, then regular and systematic activities to develop and implement innovations are impossible without cooperation. Co-operative interactions between different actors are the core of modern models of innovative activity of firms and the basis of a systematic approach to innovation in the country (Chesbrough, 2003; Dahlander and Gann, 2010; Laursen and Salter, 2006).

2. Theoretical Background and Literature Review

In contrast to the ideal situation in which all actors implement the best strategies, in reality interactions in branched innovation networks remain exotic. Using data from surveys of Russian manufacturing enterprises, this paper studies the phenomenon of cooperation in innovation. The purpose is to examine the influence of the "openness" of cooperation strategy on firms' innovation output. Specifically, it focuses on the cooperation networks configurations, including selection of partners, their geographical proximity and duration of interaction, and their effects on firms' innovation potential, i.e. the ability to develop new to market innovation, and to participate in global value chains.

3. Research Design, Methodology and Data Analysis

The analysis is based on data of two surveys of Russian manufacturing enterprises conducted by Institute of Statistical Studies and Economics of Knowledge (ISSEK HSE) in 2015 and 2018. It continues the tradition of studying cooperation in Russia (e.g., Simachev et al., 2015; Simachev et al., 2014) using the innovation survey micro data. The survey design introduces the Oslo Manual-compliant metrics of innovation (OECD/ Eurostat, 2018), making the results comparable with international and interpretable in the context of international experience.

4. Results/Findings, Discussion

The results show, that cooperation takes an important place in innovation strategies of Russian manufacturing enterprises. The most common interaction model is vertical cooperation, characterized by one-off contracts with regional and national suppliers and customers. International network cooperation is weak and requires the development of permanent long-term relations and involvement of R&D organizations and/or universities into innovation process. At the same time, manufacturing enterprises demonstrate the general low interest in creating new to market innovation (20.7%) and entering foreign markets (23.8%).

5. Conclusion, Contribution and Implication

Regarding "openness" towards cooperation in innovation, the analysis reveals a significant positive impact of extensive networking on the firms' innovation capabilities and output. The main difference between "advanced" innovators (i.e. creating new to market innovation and exporting their products) is the ability to establish and maintain long-term links and the intensive interaction with science. Enterprises involved

17

in industry-science cooperation are more likely to focus their strategies on innovation creation, creation and dissemination of intellectual property.

6. References

Available upon request

Analysing the Antecedents of Technology Adoption: A Study of Senior Citizens

Arun Sharma – University Business School, Guru Nanak Dev University, Amritsar, India

Poonam Sharma – Department of Commerce & Business Administration, Khalsa College, Amritsar, India

Keywords: Digital Payment, E-economy, Technology adoption, Technological acceptance.

Abstract: The world has always been a connected yet fragmented one. But the advent of digital technology has enabled a momentous upward shift in global growth prospects. The states are focusing upon connecting and integrating all parts of the economy with digital connectivity. The advancements in information and communication technologies have given a paradigm shift to the way economic activities are being conducted in the twenty first century era. Information systems research has for a long examined individual's acceptance of intention or usage of new technological innovations. The present study delves upon the antecedents of technology adoption for older persons. The empirical analytic results validated the revised UTAUT2 model framework with effort expectancy, price & trust emerging as the strongest dimensions marking a significant impact on user acceptance of technology adoption. The practical implications for the same are provided.

1. Introduction

Originally designed as an information conduit, soon people realized the unbridled powers of the Internet. Technological innovations enables the service providers to provide services quickly, cost effectively and directly without the use of a traditional middleman agency. The resulting benefits turns out to be less proliferation, better service delivery, effective communication, greater convenience, revenue growth, and cost reductions. Figure I illustrate the basic concept underlying user technology adoption model.

Figure I: Basic concepts underlying User Acceptance Models
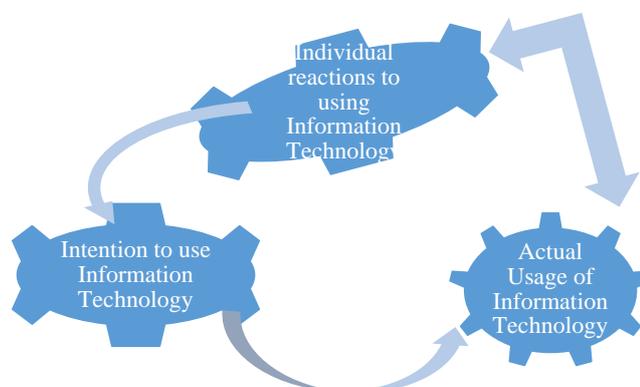
Source: Venkatesh et.al, 2003

2. Theoretical Background and Literature Review

A number of research efforts have contributed to the development of the conceptual framework of technology adoption and its determinants. Among them important ones are being Theory of Reasoned Action (TRA), Technology Adoption Model (TAM), Theory of Diffusion of Innovation (DOI), Unified Theory of Acceptance and Use of technology (UTAUT) Perceived of Innovating (PCI) and Theory of Planned Behavior (TPB). Some of the theories that constitute user's intention to use technology such as Technology Acceptance Model (TAM), Diffusion of Innovation (DOI), Perceived Characteristics of Innovating (PCI), Trust and Perceived Risk, were empirically tested in e-commerce adoption research (Pavlou, 2003; McKnight et al., 2002).

Davis et al. (1989) found no significant effect of subjective norm on intention while Taylor & Todd (1995) did find a significant effect. Venkatesh & Davis (2000) argued that in voluntary situations, subjective norm significantly influenced perceived usefulness as the users gained direct experience with a system over time, thus they relied less on social information. While in mandatory situation for inexperienced users, subjective norm has a direct effect on intention to use as a result of information circulation by referents. Social influence has been acknowledged as an important factor influencing behavioral intention (Malhotra & Galletta, 1999; Venkatesh & Davis, 2000; Venkatesh & Morris, 2000). The role of intention in predicting the behavioral action i.e. usage has been well defined and established by certain research studies (Ajzen 1991; Sheppard et al. 1988; Taylor and Todd 1995). Belanger and Carter (2008) suggested two types of trusts in e-context, firstly, trust of the internet, and secondly, trust of the government. Thus citizen must have confident in both the government as well as the technologies concerned (Carter and Belanger, 2005). However, no study specifically capturing the determinants across senior citizens in India specifically was observed. Accordingly the present study attempts to understand the factors underlying intention and actual usage of e-payment initiative by senior citizens in India.

3. Research Design, Methodology and Data Analysis

Venkatesh et al. (2012) developed UTAUT2 model from their UTAUT approach of 2003 to conceptualize from the organizational context into a consumer environment. Accordingly, UTAUT2 adds three constructs to UTAUT to adapt it to consumer usage context- *Hedonic Motivation, Price* and *Habit*. The present study builds upon the UTAUT2 (Unified Theory of Acceptance and Use of Technology 2) platform developed by Venkatesh et al. (2012) along with certain relevant determinants – trust & service quality deemed appropriate for a consumer usage environmental context.

Figure II: UTAUT2 Model (Venkatesh et al., 2012)
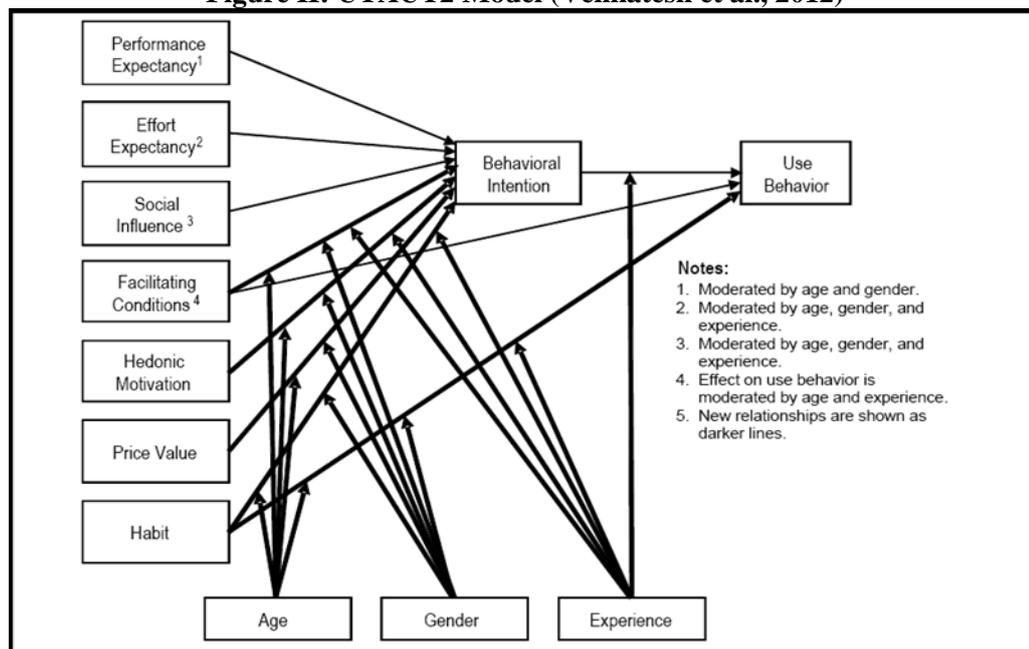
The dimension of trust also contributes in citizen's intention to use electronic delivery system. In e-payment context, service quality might also be an important factor to explain citizen's acceptance of e-service delivery mechanism. Hence, service quality constitutes an important determinant of intentional behavioral usage in an e- adoption context. In extending the UTAUT2 model with adaption, approach suggested by Venkatesh et al. 2012 has been followed namely:

(1.) Integrating of new relationships into the UTAUT2.
(2.) Design of the new proposed model.

20

The following hypothesis has been tested:

$H_0(1)$ = There is no significant impact of performance expectancy on behavioral intention to use.

$H_0(2)$ = There is no significant impact of effort expectancy on behavioral intention to use.

$H_0(3)$ = There is no significant impact of social influence on behavioral intention to use.

$H_0(4)$ = There is no significant impact of facilitating conditions on behavioral intention to use.

$H_0(5)$ = There is no significant impact of hedonic motivation on behavioral intention to use.

$H_0(6)$ = There is no significant impact of price on behavioral intention to use.

$H_0(7)$ = There is no significant impact of habit on behavioral intention to use.

$H_0(8)$ = There is no significant impact of trust on behavioral intention to use.

Universe & Sample Size

The data has been collected from a sample of 277 individual respondents using a well drafted questionnaire. Five point likert scale was employed for obtaining opinion on the specified set of statements ranging from "Strongly Agree" (with a score of 5) to "Strongly Disagree" (with a score of 1).Non–probability convenience Sampling has been used as a sampling tool to select the target population. A total of twenty five variables were taken from the literature to form part of the questionnaire. A total of 400 questionnaires were distributed, out of which valid responses for 277 were obtained. The survey was conducted in the three major cities of Punjab : Amritsar (100 units), Jalandhar (100 units) and Ludhiana (100 units) along with UT of Chandigarh during the month of January-March, 2020.

4. Results/Findings, Discussion

The scale was found to be reliable and consistent (alpha = .782). The appropriateness of factor analysis was examined in terms of Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (.821) and Bartlett test of sphericity in terms of presence of significant correlations among variables. Hair et al. (2015) state that "factor loadings in the range of + .30 to + .40 are considered to meet the minimal level for interpretation of structure". Hence, all the variables with factor loading of 0.50 or above have been considered. All factors accounted for 74.89 per cent of total variance have been extracted. The exploratory structure delivered by factor analysis was confirmed using the confirmatory analysis approach. For the said purpose, the structural model was built using AMOS 21.0. The application of CFA validates the exploratory model structure (CMIN/DF = 2.972 ; p-value = 0.000). All the major fitness indices (CFI (.923); GFI (.905); NFI (.889); RMSEA (.069)) were found to be appropriate. The factor structure was found valid and reliable. All the four constructs had composite reliability above the threshold level of 0.7. Similarly, convergent validity was established in terms of all values of AVE being greater than 0.5 (except facilitating conditions).

5. Conclusion, Contribution and Implication

The present survey results mark an attempt in understanding the citizens' aspiration and acceptability of 'going digital'. The factor analytic results presented six important dimensions that mark a bearing on the acceptability of digital payment module among the survey respondents. 'Performance expectancy' has emerged out as the most important factor defining the possible choice for making digital payments rather than use of hard cash. It defines respondents' use of digital facility primarily as a mean of increasing efficiency to their work. 'Social Influence' or peer pressure including impact of important others has turned out to be another important factor. Respondents felt that peer influence or social pressure motivates them to use digital methods. Similarly, 'Price', Service quality', 'Facilitating Conditions' and 'Trust' – in service provider and internet inn general itself have been found as another important dimensions marking a significant impact on respondents use and choice of digital payment module. However, Hedonic motivation, habit and effort expectancy has not been found as the dimensions affecting behavioral intention to use technology. The present results, thus add to the growing body of literature on digital economy and

technology acceptance modules by incorporating citizens perceived attitudinal characteristics in the empirical work.

Limitations & Future scope of Research

The present study is subject to limitations imposed by the external environment as well as the methodology employed which are being stated as under:

- The validation of revised UTAUT2 model into different contextual environment needs to be accomplished in future initiatives.
- Primary data collection approach was employed. With this approach, there always stays a gap between what is being asked by the researcher and what is being responded by the respondent.
- The time frame and the resources allowed only for a small set of respondents (400),which could be further enhanced in the future efforts to solicit wider samples, thereby, improving its reliability and validity to a further extent.

6. References

Ajzen, I. (1991). The Theory of Planned Behaviour. Organizational Behaviour and Human Decision Processes, 50 (2), 179-211.

Bélanger, F., & Carter, L. (2008). Trust and risk in e-government adoption. The Journal of Strategic Information Systems, 17(2), 165-176.

Carter, L., & Bélanger, F. (2005). The utilization of e-government services: citizen trust, innovation and acceptance factors. Information Systems Journal, 15, 5-25.

Davis, F.D., Bagozzi, R.P. & Warshaw, P.R. (1989). User acceptance of computer technology: a comparison of two theoretical models. Management Science, 35, 982–1003.

Iwaarden, J.V., Wiele, T.V.D., Ball, L. & Millen, R. (2003). Applying SERVQUAL to Web sites: an exploratory study. International Journal of Quality & Reliability Management, 20(8), 919-935. DOI 10.1108/02656710310493634

Kelman, H. C. (1958). Compliance, Identification, and Internalization: Three Processes of Attitude Change. The Journal of Conflict Resolution, (2:1), 51-60.

Malhotra, Y., & Galletta, D. (2005). A multidimensional commitment model of volitional systems adoption and usage behavior. Journal of Management Information Systems, (22: 1), 117-151.

Mayer, R. J., Davis, J.H., & Schoorman, D. (1995). An Integrative Model of Organizational Trust. Academy of Management Review (20:3), 709-734.

McKnight, H. D., Choudhury, V., & Kacmar, C. (2002). Developing and Validating Trust Measures for ecommerce: An Integrative Typology. Information Systems Research (13:3), 334-359.

Parasuraman, A., Zeithaml, V.A., and Malhotra, A. (2005). **"E-S-QUAL: A Multiple-Item Scale for Assessing Electronic Service Quality". Journal of Service Research. 7:213.** DOI: 10.1177/1094670504271156

Pavlou, P.A. (2003). "Consumer Acceptance of Electronic Commerce: Integrating Trust and Risk with the Technology Acceptance Model". International Journal of Electronic Commerce, Vol. 7, No. 3, pp. 101-134.

Schaupp, L.C. & Carter, L. (2005). "E-voting: from apathy to adoption," The Journal of Enterprise Information Management Science, 18(5), pp.586-601.

Taylor, S., and Todd, P. A. (1995). Assessing IT Usage: The Role of Prior Experience, MIS Quarterly 19 (2), pp. 561-570.

Venkatesh, V., and Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. Management Science, 46(2) 186-204.

Venkatesh, V. and Morris, M. G. (2000). Why don't' Men ever Stop to Ask for Directions? Gender, Social Influence, and Their Role in Technology Acceptance and Usage Behavior. MIS Quarterly, (24:1), 115-139.

Venkatesh, V., Morris, M.G., Davis, G.B., and Davis, F.D. (2003). "User Acceptance of Information Technology: Toward a Unified View". MIS Quarterly, Vol. 27, No. 3, pp. 425-478.

Hidden Champions: What are the most digitalized industries in Russia and Why?

Anna Fedyunina – National Research University Higher School of Economics, Moscow, Russia, National Research University Higher School of Economics, St. Petersburg, Russia afedyunina@hse.ru

Yuliya Averyanova – National Research University Higher School of Economics, St. Petersburg, Russia

Yurii Simachev – National Research University Higher School of Economics, Moscow, Russia

Mikhail Kuzyk – National Research University Higher School of Economics, Moscow, Russia

Keywords: digitalization, automation, manufacturing, Russian economy

1. Introduction

Recent analysis shows that while digitalization is one of the most important determinants of labor productivity in Russia and most digitalized firms demonstrate higher growth, there is a large and narrowing gap between and within sectors (Simachev et.al., 2020). But what are the industry differences in digital transformation? And what are the transmission channels for digitalization among industries in Russia?

2. Theoretical Background and Literature Review

Digitalization has been a major, global trend in economics since 2010. Digitalization is defined as the exploitation of digital opportunities, different technologies (e.g. cloud technologies, sensors, big data, 3D printing) that opens possibilities to develop new products, providing digital services embedded in a product and business models (Abou-foul et al. 2020). Empirical evidence suggests that digitalization has a direct positive effect on a firm's performance (Abou-foul et al. 2020). However, researchers suggest that a gap in digital technologies remains significant across industries (McKinsey, 2019), most advanced, digitalized sectors are media and finance; among the laggards are pharmaceuticals, and most of manufacturing industries. Empirical evidence on digital divide and its determinants across manufacturing industries remains scarce. In this paper we aim to fill this research gap. Our main research question is what are the transmission channels affecting digitalization across manufacturing industries in Russia?

3. Research Design, Methodology and Data Analysis

The study uses the database created as part of the project "Russian companies in the global economy" (RUFIGE) carried out by National Research University Higher School of Economics in 2018. There are more than 45 items on the questionnaire covering firms' basic characteristics, market positioning, investments, R&D and innovation activity. More specifically, respondents were asked whether they implemented digital technologies (such as automation – robotics and digitalization - cloud technologies, big data, IoT, AI, VR, 3D printing, etc.) and what are the barriers for digital technology adaptation.

During empirical analysis, we distinguish between two types of digitalization – automation and digitalization *per se*, since we believe they might have differential determinants at the industry level and require different transmission channels. First, automation enabled by robotics and AI improves efficiency, safety and creates new types of digital and virtual labor (McKinsey Global Insitute, 2017; Valenduc, Venramin, 2017). Second, digitalization of processes other than automation boosts "the value co-creating ability of those interactions by enhancing (through easier accessibility and efficiency), extending (beyond the core exchange of goods and services) and enriching them (through greater data intensity)" (Autio, Thomas, 2016). Despite the fact that any kind of automation requires elements of digitalization and digitalization, in turn, requires some elements of automation, we believe that both, digitalization and automation, are of different importance for manufacturing industries and have different opportunities for adoption in Russia which is in line with (Zemtsov, 2018; Simachev et.al., 2020).

At the first step, in order to estimate digital divide, we run a model that estimates an effect of belonging to each particular industry on probability of implementing digital technologies, while controlling for firm,

territory and market (local/global) characteristics. This allows us to find out industry specifics and discuss a typology of manufacturing industries in adoption of digital technologies taking into account industry openness and technology intensity. At the second step, we explore the role of transmission channels for adoption of digital technologies between and within Russian industries and their covariates with industry dummies. Regression analysis is carried out using Probit and Logit regression.

4. Results/Findings and Discussion

Our preliminary results show that there is a statistically significant relationship between firm's size, age, export orientation and adoption of digitalization and automation, where larger, younger and export intensive firms tend to adopt digital technologies. To some extent, this explains what industries are the most digitalized. We find that electronic machinery is the most digitalized industry among manufacturing sector, while wood processing and furniture – are the least ones. However, we do not find statistically significant differences in the adoption of digital technologies among other industries. This is in contrast with a conventional view that the most digitalized industries are medium-to-high-tech, including not only electric machinery and equipment, but also motor vehicles, manufacture of office machinery and computers, optical, medical and other equipment. These findings raise the importance of factors that boost digitalization.

Regression results of the second stage of the analysis allow us to estimate the role of transmission channels. We consider the role of changes in characteristics of final demand, technological upgrading of suppliers, connections with research institutions and the intensity of intra-industry competition. Previous evidence suggests that while old large firms keep connections with Russian research institutions and such connections intensively work as transmission channels for adoption of digital technologies, small and medium-sized enterprises mostly gain from higher intra-industry competition with foreign firms and follow changes in the demand patterns of their customers. We expect to get the results in line with previous findings. In particular, we expect to find that the most digitalized Russian industries are those that have strong forward linkages with final demand (that serve as transmission channels), especially, on foreign markets. Regarding the result of statistically insignificant differences among most of manufacturing industries in the adoption of digital technologies, we argue that weak technological upgrading among suppliers and relatively low intra-industry competition do not stimulate digitalization in those industries.

5. Conclusion, Contribution and Implication

This study demonstrates the digital divide among Russian manufacturing industries and the factors that affect firms' adoption of digital technologies. In contrast to the conventional view, our empirical work shows that there are no statistically significant differences in the adoption of digital technologies among most of the manufacturing industries apart of the most digitalized – electric machinery and the least one – wood processing and furniture. And this is primarily because of inertia in structural changes in demand and technology upgrading in supply industries in Russian economy. These results allow us to discuss state policy on the adoption and diffusion of digital technologies in manufacturing sector.

6. References

Erkko Autio & Llewellyn D. W. Thomas, 2018: Ecosystem value co-creation. Proceedings, 2018, https://doi.org/10.5465/AMBPP.2018.15913abstract

McKinsey Global Institute. (2017). Technology, Jobs, and the Future of Work. Briefing Note Prepared for the Fortune Vatican Forum, available at: https://www.mckinsey.com/featured-insights/employment-and-growth/ technology-jobs-and-the-future-of-work (accessed on 13 August 2020).

McKinsey Global Institute. 2019. Twenty-five years of digitization: Ten insights into how to play it right, available at: https://www.mckinsey.com/business-functions/mckinsey-digital/our-insights/twenty-five-years-of-digitization-ten-insights-into-how-to-play-it-right (accessed on 13 August 2020)

Mohamad Abou-foul, José L. Ruiz-Alba & Anabela Soares (2020): The impact of digitalization and servitization on the financial performance of a firm: an empirical analysis, Production Planning & Control, DOI: 10.1080/09537287.2020.1780508

Valenduc, G., & Vendramin, P. (2017). Digitalisation, between disruption and evolution. Transfer: European Review of Labour and Research, 23(2), 121–134. https://doi.org/10.1177/1024258917701379

Zemtsov, S. P. (2018). Potential Robotization and The Economy of Ignorance in Russian Regions In XIX XXI April International Academic Conference on Economic and Social Development. HSE Publishing House. (In Russ.)

Simachev Y.V., Fedyunina A. A., Kuzyk M. G., Daniltsev A. V., Glazatova M. K. & Averyanova Y. V. 2020, 'Rossiya v global'nom proizvodstve [Russia in Global Production]' in XXI April International Scientific Conference on the Development of Economy and Society, HSE Publishing House, pp. 1-147. (In Russ.)

Researchers and Technicians in R&D in Post-Soviet Countries: Challenging Innovation Development

Aybek Tursunov – National Research University Higher School of Economics, St. Petersburg, Russia
atursunov@hse.ru

Keywords: innovational development, knowledge management, institutional approach, human capital

1. Introduction

In order to improve the prospects for innovative development, each country develops its unique competitive advantages and invests in strengthening economic development. Unique competitive advantages along with economic and social factors foster R&D development potential by supporting human capital and innovative infrastructure development. Which is represented in global arena as high tech export potential. The post-Soviet countries represent a close circle of countries that had experience of joint scientific and technical cooperation, which allows us hereby to consider them in order to increase the efficiency and mutually beneficial scientific and technical cooperation. Thus, here we aim to seek for economy high-tech sectors specialists' development which could be formed in the context of new industrialization, based on the innovation agenda and sustainable development for the post-Soviet countries. Despite the prevailing share of agricultural products, the benchmarks of industrialization indicate the formation of an export-oriented country, when the export of high-tech products and R&D results in this direction is effective for the economic growth (Sandu & Bogdan, 2014).

This article examines the research question of innovative development strategy possibilities for post-Soviet area human capital, dividing it into two parts. Namely human resources that generates scientific development (researchers) and contributes to development (technical specialists), which allows to make strategic foresight to lean towards the development of one or to balance both sides. Relating abovementioned influence for High-technology export changes. In other words, the built regression models distinguish important factors for further development and make decisions for further innovative development plan and strategies. As far as, the perspective of considering human potential and its formation in R&D, influences innovational development in direction of sustainable development (Volkery et al., 2006).

2. Theoretical Background and Literature Review

Using data on Europe's regional human capital in the 19th and 20th centuries, Claude Diebolt and Ralph Hippe (2019) found that regional human capital is a key factor in explaining current regional differences in innovation and economic development. Gary S. Becker (2002) in "The Age of Human Capital" argues that human capital drives technological innovation and the high-tech sector. Research by Murad Dakhli and Dirk De Klerk (2004) from 59 different countries found a positive relationship between human capital and innovation. The innovative development strategies, infrastructure investments and highly qualified specialists' development according to Volkery et al. (2006) could be indicators of development effectiveness, while export potential is accessed as indicator of an established innovation development policy. Sanjaya Lall (2010) researching patterns of developing countries exports` structure and performance, argues that export structures, being path-dependent and difficult to change, have important implications for growth and development.

The literature on the relationship between high-tech products export and human capital aimed to achieve efficiency in innovative development is viewed by researchers as differences in specialization and technological potential, as well as in the quality of products and technological intensity of development (Furman et al., 2002). This analysis complements abovementioned studies, by considering human resources for economic growth and innovations potential, which also allows sustaining sustainable development goals.

3. Methodology and Data

Analyzed data include the World Bank Indicators, as well as the UNESCO Institute for Statistics, the United Nations Statistics Division, the International Monetary Fund and the World Intellectual Property Organization indicators such as: the number of researchers and technical specialists per million of the population, the amount of use of intellectual property (fees), the R&D expenditure shares in GDP, the number of scientific articles, patent applications, for trademarks, and the export of high-tech goods in shares of exports of industrial products and the amount of exports for all fifteen post-Soviet countries for the period from 2000 to 2018.

Using the constructed tree econometric models, we assume formation human resources development picture and a model for institutional development, which will later play a role in the development of these resources. Where first and second models describes researchers and technicians' development in R&D, third model reveals thought high-tech export influence formation and motivation for both mentioned type specialists. As an absorption capacity, the research potential development and R&D developments will be closely related to increase opportunities (Gloet & Terziovski, 2004) to introduce and disseminate modern technologies, and this is especially important for the post-Soviet countries, which are faced with the task of forming a national innovation system and identifying weak and strengths for direction and contribution to innovative development.

4. Results and Discussion

Accordingly, the factors such as income from intellectual property and investments, government spending on development and research, and partly the produced amount of high-tech products are reliable at influencing human resources in R&D formation. There are also correlated reasons for the partial influence of manufactured high-tech products and intellectual property usage payments, which could be considered as other regions attractiveness and human capital outflows. Through the analysis, we noticed that the development of researchers and technology specialists is not balanced, and the imbalance causes lags in innovative development, as it is reasoned such specialists outflow out of the post-Soviet region. The innovative infrastructure development and strengthening innovative development policies would help to balance human resources and lead to the possibility of effective knowledge management. Showing it as the main innovative development problem for regions, requiring plans/strategies for innovative development initiatives. This is due to the fact that in the post-Soviet area earlier was based on fundamental research, and their export was not considered, and this was remained obsolete in institutions. Followed to a lack of technology specialists involved in R&D production processes to negative effect in the export of high-tech products.

In other words, on the one hand, for the development of specialists, the innovation ecosystem should have geographic proximity to the corresponding infrastructure and on the other hand, for the high-tech export development neighboring countries should also strive to have an effective strategy and infrastructure for innovational development.

5. Conclusions

A prerequisite for the strategies transition and transformation involve the transition to the institutional approach development and to the strategic policy management, such clustering, which determines needs not only for efficient use of resource potential, but also for better conditions (Pozdnyakova, 2016) for researchers and technical specialists working in R&D projects. The implementation of joint projects and collaboration between countries will create mutual platforms for the effective innovative potential development and strengthen the ties among development process participants forming cluster networks among post-Soviet countries. Furthermore, right strategic investments on innovational development and technology transfer facilitation would increase the high-tech export between these countries and enable sustainable development goals achievement, such as "Build sustainable infrastructure, promote inclusive and sustainable industrialization and stimulate innovation."

Conclusions could be drawn deriving from weak export oriented technical specialists` potential and research capacity, which are persistently depend on building innovation infrastructure institutions and conditions, might be prompted thought existing institutional approach directed to clustering economy.

6. References

Sandu, S., & Bogdan, C. (2014). Impact of R&D and Innovation on High-tech Export. Procedia Economics and Finance, 15, 80–90. https://doi.org/10.1016/S2212-5671(14)00450-X

Volkery, A., Swanson, D., Jacob, K., Bregha, F., & Pintér, L. (2006). Coordination, Challenges, and Innovations in 19 National Sustainable Development Strategies. World Development, 34(12), 2047–2063. https://doi.org/10.1016/j.worlddev.2006.03.003

Furman, J. L., Porter, M. E., & Stern, S. (2002). The determinants of national innovative capacity. Research Policy, 31(6), 899–933. https://doi.org/10.1016/S0048-7333(01)00152-4

Gloet, M., & Terziovski, M. (2004). Exploring the relationship between knowledge management practices and innovation performance. Journal of Manufacturing Technology Management, 15(5), 402–409. https://doi.org/10.1108/17410380410540390

Pozdnyakova, U. A., Popkova, E. G., Kuzlaeva, I. M., Lisova, O. M., & Saveleva, N. A. (2017). Strategic Management of Clustering Policy During Provision of Sustainable Development. In E. G. Popkova, V. E. Sukhova, A. F. Rogachev, Y. G. Tyurina, O. A. Boris, & V. N. Parakhina (Eds.), Integration and Clustering for Sustainable Economic Growth (pp. 413–421). Springer International Publishing. https://doi.org/10.1007/978-3-319-45462-7_40

Track: Strategic Responses of Entrepreneurs and Entrepreneurial Organizations to Catastrophic Events
Chairperson: Galina Shirokova

At the beginning of 2020 the international spread of COVID-19 has made a profound negative impact on the global economy in a short period of time, putting a third of the global population on a lockdown as a measure to slow down the spread of the virus. The spread of COVID-19 around the world has drastically changed consumer behavior due to quarantine measures, increasing unemployment and a creating a shift in overall purchasing behavior. Most of the industries indicated significant decrease in business activities with transport and travel being affected the most (McKinsey, 2020). Scholars from different countries, Russia, USA, Canada, will present a wide range of studies that deal with the responses of entrepreneurs and entrepreneurial organizations to catastrophic events, particularly the COVID-19 pandemics.

Business under Pandemic: Coronacrisis Consequences, Possibilities of Support

Nataliya Kravchenko – Institute of Economics and Industrial Engineering SB RAS, Novosibirsk State University

Almira Yusupova – Institute of Economics and Industrial Engineering SB RAS, Novosibirsk State University yusupova_a@mail.ru

Keywords: Pandemic; business reaction; state support; perspectives appraisal;

1. Introduction

Pandemic COVID – 19 very quickly spread over almost all countries having detrimental impact on people's lives, social communications and economic activities. Situation in the world could be described as "ungovernable uncertainty" or in terms of Snowden "chaotic context" (Snowden, 2007)

Scale of economic consequences depends on many factors including time and speed of decease spread, structure of national economy, existing health care system etc.

Governments of all countries use different schemes and instruments of support addressed to entrepreneurs and population. Reaction of community and business on suggested limitations and support measures is rather controversial. However positions of companies, their changing strategies and expectations are monitored and discussed by many researchers and experts. We present empirical study of Russian companies under pandemic environment. Our basic aim is to define main consequences of coronacrisis and possible models of companies' behavior.

2. Theoretical Background and Literature Review

A number of papers, surveys and trackers dealing with pandemic behavior of business and people appeared during last months. It should be pointed out that McKinsey & Company (COVID-19: Implications for business, 2020) presented the results of the survey of ASEAN countries focused on postpandemicfuture of the businesses. Most of the leaders consider that large-scaled changes within their companies are inevitable. The survey of 2290 companies conducted in May showed that 41% of companies expected to meet decrease of demand and 54% decrease of profit. Most enterprises planned to produce narrowerrange of products comparing with previous period.

Several trackers are designed to helps businesses to understand their positions and possibilities of development. Top consulting companies did special studies in order to forecast future development of world economy. Four main stages including Reaction, Resilience, Recovery and New Reality were suggested as main steps of after pandemic development (COVID-19: Business and economic implications.. 2020).

Broad discussion of coronacrisis influence on Russian business was organized in Novosibirsk State University in May 2020 (Webinar "The Russian and World Economy Against the COVID-19… 2020). New rules restricting business activities and communications were widely introduced, the perspectives of future were very uncertain at that time. The discussion revealed certain differences in positions of companies. Activities of some industries were practically stopped. Such cases deal with restraints, private medicine, and venture funds. At the same time in other industries many small business tried to survive on their own looking for new market segments which appeared under pandemic (production of masks, sanitizers etc.). Companies dealing with life support products and services as well as with food didn't feel any significant changes at all. While most business met serious problems and general decrease of demand selected economic segments demonstrated even strong sales growth. Video games production could be mentioned as an example.

3. Research Design, Methodology and Data Analysis

Our research is based on empirical evidence collected from Russian companies via specially arranged two-stepped survey. Due tolimited number companies under study our research could be defined as a qualitative one.

Special survey of companies was aimed to define ways of businesses' reaction on the consequences of restrictive policy, models of survival under new environment, appraisal of state support measures and perspectives of future economic development.

The first round of the survey was arranged in May and included 42 companies; the second one took place in August and was based on 15 companies. Collected data provide information for comparison of understanding and appraisals during the period of several months.

Our sample included mainly Siberian companies however few representatives of other regions were presented also. Mostly small and medium size financially strong companies which are not included in lists of backbone enterprises formed the sample. Therefore collected data indicate understanding and behavior of "ordinary" rather successful SMEs.

Questions of the survey were related to restrictive regime and pandemic consequences, support measures suggested by the government as well as to views of perspective development. Some results are presented below.

4.   Results/Findings, Discussion

Data presented in table 1 show that in May most of the companies felt demand decrease. In August this decrease was understandingly followed by production decrease. Besides these problems many companies suffered from failures of supply and payments.

Table 2 data indicate that during the whole period most companies preferred to use defensive and information measures as well as to switch to distant model of employment.

It is interesting to note that despite the fact that in August restrictions were cancelled or changed to less strict many companies were uncertain about their future and therefore had to cut costs related to development. Share of companies which decreased investment and innovations related costs significantly increased in August comparing with May.

In May 57% of companies developed complex strategies which included more than 3 directions. In August this share increased and reached 60%.

The majority of companies in the sample didn't get state support. In May most firms didn't apply for such support while in August many of them applied and faced rejection. Most "popular" support measures include postponement of reports and taxes and decrease of insurance payments.

Most companies consider that state support is not significant. It is interesting that measures which were not "popular" got higher grades.

Table 1

Negative consequences of pandemic and state support measures directed to coronavirus spread prevention (% of companies which met hem)

	May	August
1 Stop of activities	21,4	26,7
2 Decrease of production	28,6	**46,7**
3 Decrease of employees number	14,3	20,0
4 Decrease of demand	**47,6**	**33,3**
5 Failures of foreign supply	28,6	6,7
6 Failuresof payments from consumers	**42,9**	**33,3**
7 Social intensity increase	21,4	33,3
8 Nothing from listed above	4,8	20,0

9 Other	31,0	6,7

Table 2

Activities of management under crisis, %of companies

	May	August
1 Createdanticrisisheadquarteranddeveloped plan of activities under pandemic	45,2	33,3
2 Informed staff about situation and plan of activities	**78,6**	**66,7**
3 Provided defense measures for staff	**71,4**	**80,0**
4 Applied for state support	16,7	13,3
5 Transferred staff to part time positions	31,0	40,0
6 Decreased investment programs	16,7	33,3
7 Decreased R&D and innovations costs	7,1	26,7
8 Changed products' range	11,9	6,7
9 Expanded application of digital technologies	35,7	40,0
10 Switched to distant forms of job	**64,3**	**60,0**
11 Other	16,7	0,0

Companies which applied for the state support point on strong bureaucratic barriers related to such support. However in August share of companies which considered that it is impossible to get support had decreased.

Table 3

Perspectives appraisal: period of negative consequences overcoming, % of companies

	May	August
1 Up to the end of 2020	35,7	20,0
2 After one year from isolation regime cancelling and coronavirus spread stop	31,0	53,3
3 After two or more years	14,3	6,7
4 Unlikely in foreseeable perspective	7,1	6,7
5Other	16,7	13,3

Most of the companies are considerably optimistic and consider that crisis consequences could be overcome in middle term period already (Table 3). Unfortunately share of strong optimists which hope to return to normal life in short term period decreased.

General characteristics of companies (their size and financial status) were compared with the indicators of their behavior under research.

5. Conclusion, Contribution and Implication

It is very important to understand how businesses react on crisis consequences, what behavior models they chose and how they foresee future. Our empirical study showed that most of the companies have to

overcome strong barriers related to production and financing decrease. Existing state support is not sufficient and difficult to obtain. Most of the companies are rather uncertain about their future. Never-the-less the companies mainly act in order to find the solution and transform the situation and there are some positive practices (example) in new reality.

6. References

Snowden DJ, BooneME, 2007. A leader's framework for decision making. HarvardBusiness Review. 85 (11), 68.

COVID-19:Implications for business, 2020. Executive Briefing. https://www.mckinsey.com/business-functions/risk/our-insights/covid-19-implications-for-business#

COVID-19: Business and economic implications Protecting your staff and business during volatile times. https://home.kpmg/au/en/home/insights/2020/03/business-implications-of-covid-19-coronavirus.html How are companies responding to the coronavirus crisis?https://www.weforum.org/agenda/2020/03/how-are-companies-responding-to-the-coronavirus-crisis-d15bed6137/

Webinar "The Russian and World Economy Against the COVID-19 Pandemic in 2020" (N.A. Kravchenko, A.T. Yusupova) (2020). Region: ekonomika i sotsiologiya [Region: Economics and Sociology], 2 (106), 303–307.

Fixed or flux? A case study of entrepreneurial cognitive frames during pandemic

Tatiana Stettler – Kent State University, Ohio, USA tstettle@kent.edu

Galina Shirokova – National Research University Higher School of Economics, St. Petersburg

Keywords: entrepreneurial cognition, cognitive frames, sense-making, perspective-taking, COVID

1. Introduction

Business owners make decisions about the continuation or termination of a firm based on a complex intertwining between the business environment and their own motivation and goals (Wennberg & DeTienne, 2014). Their perceptions of the internal and external environment play an important role in this process. With vast amount of information to analyze, they struggle to make sense of it, align and reconcile potentially contradictory insights. Sensemaking begins with chaos as "an undifferentiated flux of fleeting sense impressions" (Weick, Sutcliffe, & Obstfeld, 2005). To understand how entrepreneurs perceive the world, we suggest looking at their cognitive frames as mental templates, which "individuals impose on an information environment to give it form and meaning" (Walsh, 1995). A cognitive frame acts as a filter that admits certain bits of information into the strategizing process, excludes others (Porac & Thomas, 2002), and shapes the interpretation of the value and usefulness of experiences (Eggers & Kaplan, 2013).

2. Theoretical Background and Literature Review

Prior research has emphasized the importance of integrating cognitive and institutional perspectives in entrepreneurship (Cornelissen & Clarke, 2010). The former perspective focuses on the cognitive characteristics of individual entrepreneurs – which represent an internal or inner environment in which decisions are made. Whereas the latter perspective emphasizes cultural and symbolic realms of meaning construction and locates entrepreneurship within a social context: an external or outer environment (Mitchell et al., 2014; Cornelissen & Clarke, 2010). Yet it remains unclear how various information processing modes and individual cognitive frames shape individual perception of complexity. In this study, we build on and advance the work on dynamic entrepreneurial cognition (Vahidnia et al., 2017), cognitive psychology (Anderson, 2020) and decision- and sense-making (Maitlis & Christinson, 2014).

We propose a theoretically derived typology of individual cognitive frames and visualize it in a three-dimensional system of mental coordinates with a multitude of possible states. Specifically, we present a cognitive frame as a cognitive anchor in information processing that describes individual's preferable cognitive perspective. The construal-level theory (Trope & Liberman, 2010) suggests that individual's typical reference point is the self in the here and now, yet an individual may also transcend from that point. We argue that entrepreneurs regularly move in a cognitive space formed by the three axes: time, distance and sense. *Time* describes the dominant temporal orientation along the past-future continuum. This axis is in line with Gavetti and Levinthal's (2000) forward-looking and backward-looking perspectives. The second dimension, *distance*, illustrates the prevailing scope of a person's sense of self along an "I-vs.-we" continuum and is in line with the social identity theory (Tajfel & Turner, 1979). The third dimension - *sense* - describes individual's cognitive orientation on a continuum between rational and emotional. Prior research has also explored this dimension: Allinson and Hayes (1996) introduced a measure of cognitive style along the intuition-analysis continuum, while Baron (2008) explored the role of affect – feelings and emotions – in the entrepreneurial process.

Further, we suggest utilizing Boolean logic to describe relationships between the poles of each axis (Brown, 2012). Developed by George Boole, this approach defines sets and subsets in discrete (binary) form. Boolean logics has been applied in mathematical modeling in various fields from biology and physics to social sciences. We rely on three logical operators (or gates): AND, XOR, NOT. AND operator represents a *conjunction* and can be visualized as an intersection between two data points. Individuals processing information using this gate perceive similarities between states, for example, on the time-axis when they view past in conjunction with future. XOR logic gate implements an 'exclusive or' and represents a form of *disjunction* between two states. We use this notation to describe a complementary, jet

mutually exclusive perspective. Individuals processing information using this gate attend to the disruptions between states more than to their similarities; for example, when they perceive differences between past and future. NOT operator implements a logical *negation*. Individuals processing information using this gate take a focused approach and attend to only one of the decision-making poles, for example, on the time-axis this may be the present. Moreover, individuals may hold multiple positions simultaneously (meta-orient themselves) or switch several perspectives during information processing. We argue that the opportunity space emerges as a three-dimensional system of mental coordinates from the combination of three cognitive axes (time, distance, sense) and three logical gates (conjunction, disjunction, or negation) which together create an exponential number of possible cognitive states. Metaphorically, human cognitive 'vision' can be impaired by individual myopic and astigmatic conditions and that different types of 'glasses'–either short- or long-sighted–may sharpen individual perceptions.

3.   Research Design and Preliminary Results

We conducted semi-structured interviews with 24 entrepreneurs asking them about their perceptions of the situation, the scope and sequence of their actions. After coding and content analyzing these interviews, we identified individual configurations and cognitive movements between the frames and within the 3-dimensional space.

Our typology of cognitive structures presents a multitude of cognitive glasses through which business owners make sense of the environment, as well as adjust and revise their business and personal goals. Moreover, we observe that most entrepreneurs have dominant cognitive frames that they use to process incoming information.

4.   References

Allinson, C. W., & Hayes, J. (1996). The cognitive style index: A measure of intuition-analysis for organizational research. Journal of Management studies, 33(1), 119-135.

Anderson, J. R. (2020). Cognitive psychology and its implications. Macmillan.

Baron, R. A. (2008). The role of affect in the entrepreneurial process. Academy of Management Review, 33(2), 328-340.

Brown, F. M. (2012). Boolean reasoning: the logic of Boolean equations. Springer Science & Business Media.

Cornelissen, J. P., & Clarke, J. S. (2010). Imagining and rationalizing opportunities: Inductive reasoning and the creation and justification of new ventures. Academy of Management Review, 35(4), 539-557.

Eggers, J. P., & Kaplan, S. (2013). Cognition and capabilities: A multi-level perspective. Academy of Management Annals, 7(1), 295-340.

Gavetti, G., & Levinthal, D. (2000). Looking forward and looking backward: Cognitive and experiential search. Administrative science quarterly, 45(1), 113-137.

Maitlis, S., & Christianson, M. (2014). Sensemaking in organizations: Taking stock and moving forward. Academy of Management Annals, 8(1), 57-125.

Mitchell, J. R., Mitchell, R. K., & Randolph-Seng, B. (Eds.). (2014). Handbook of entrepreneurial cognition. Edward Elgar Publishing.

Tajfel, H., & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. G. Austin & S. Worchel (Eds.), The social psychology of intergroup relations (pp. 33-47). Monterey, CA: Brooks/Cole.

Thomas, H., & Porac, J. F. (2002). Managing cognition and strategy: Issues, trends and future directions. Handbook of strategy and management, 165.

Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological distance. Psychological review, 117(2), 440.

Vahidnia, H., Chen, H. S., Mitchell, J. R., & Mitchell, R. K. (2017). Entrepreneurial action research: moving beyond fixed conceptualizations. The SAGE Handbook of Small Business and Entrepreneurship, 38-59.

Walsh, J. P. (1995). Managerial and organizational cognition: Notes from a trip down memory lane. Organization science, 6(3), 280-321.

Weick, K. E., Sutcliffe, K. M., & Obstfeld, D. (2005). Organizing and the process of sensemaking. Organization science, 16(4), 409-421.

Wennberg, K., & DeTienne, D. R. (2014). What do we really mean when we talk about 'exit'? A critical review of research on entrepreneurial exit. International Small Business Journal, 32(1), 4-16.

The consequences of fiscal load increase for entrepreneurship: difference-in-differences approach

Evguenii Zazdravnykh – National Research University Higher School of Economics, St. Petersburg
ezazdravnykh@hse.ru

1. Introduction

Theoretical models in economic predict that an increase of the fiscal load on entrepreneurs reduces the entrepreneurial activity (Da Rin, Di Giacomo, Sembenelli, 2011). However, if an economy has a poor institutional environment, the increase of the fiscal load on business won't change the entrepreneurial activity (Torrini, 2005). Notice, the latter point of view is verified using a cross-country sample suffering from certain econometric problems.

In order to check if an increase in fiscal load reduces an entrepreneurial activity, this study investigates the effect of the rise in fixed payments for sole-proprietors for twice in 2013 and the twofold decline in these payments in 2014 on entrepreneurial activity in Russia. The paper considers consequences of this decision for various sides of entrepreneurship: the presence of small and medium enterprises in an economy, the new business entry, and the employment in the small and medium enterprises.

2. Theoretical Background and Literature Review

Theoretical and empirical studies show that the rise of fiscal payment (or taxes) can lead to a decrease or increase of entrepreneurial activity (Bruce, Schuetze, 2004).

First, when individuals choose between self-employment and paid-work, they compare the expected utility of each occupation. In turn, the expected utilities is a function of risk and expected net income (gross income minus taxes and fiscal payments). The government can decrease the expected income increasing taxes of fiscal payments redistributing individuals between two occupations. For example, when the fiscal load of self-employment is bigger than that of the paid-workers, individuals will prefer paid-work over self-employment (Baliamoune-Lutz, 2015; Cullen, Gordon, 2007; Parker, 2018).

Empirical studies confirm this theory showing a negative correlation between the amount of fiscal payment of self-employed and entrepreneurial activity (Bruce, 2000; Stenkula, 2012). Thus, when the government changes the fiscal load, it changes the share of self-employed over the labour force.

Second, when the government rises fiscal payment, it can motivate entrepreneurs to fire employees and work as solo self-employed. The liquidity-constraint theory states that any increase of taxes of fiscal payment decreases the entrepreneur's financial resources. When they don't have a sufficient amount of money to cover costs, they can fire employees (Burke, Fitzroy, Nolan, 2000; Carroll, Holtz-Eakin, Rider, Rosen, 2000). The labour-leisure choice theory argues that self-employed make a choice between work and leisure comparing the utility of each option. If self-employed values working time more than that that the leisure time, in case of rising fiscal load it will fire workers and work as solo self-employed. However, if self-employed values leisure time more than the working time, it will decrease the salary of employees and replace them with less costly working force. The former example indicates the negative correlation between fiscal load and entrepreneurial activity, the latter one assumes a positive (or not) correlation between the amount of fiscal payment and the working force (Carroll, Holtz-Eakin, Rider, Rosen, 2000).

The mentioned theories show a negative association between the fiscal load and entrepreneurial activity and empirical studies confirm this point of view. However, these studies use data from high-income countries with a good institutional environment (Belitski et al., 2016; Torrini, 2005). There is a gap in knowledge if these theories work in middle-income countries with poor institutions.

3. Research Design, Methodology and Data Analysis

In order to verify the mentioned theories, this study investigates the case of Russia. Russians have to register the legal entity (LLC or corporation) or sole-proprietorship to start a business in a legal way. In the 2013 year, the Government of Russia risen twice fiscal payment of sole-proprietorship and did not change these payments of legal entities. In the 2014 year, it decreased the fiscal payment of sole-proprietorships and didn't change the payments of legal entities. Thus, the government conducted a natural quasi-experiment which can show if the rise of the fiscal load decreases the entrepreneurial activity and if the decline of fiscal payments can boost the activity of entrepreneurs.

This study uses the Difference-in-Differences approach. There are two treatments: the year of 2013 and 2014. The control group is sole-proprietorships, the treatment group is legal entities.

The data comes from the regional statistics meaning that the unit of observation is a region. The dependent variables are the number of start-ups (from the Russian Federal Statistical Service and Federal Tax Service), the number of employees (the Russian Federal Statistical Service), and the total number of firms (both sole-proprietorships and legal entities).

In addition, we use the control variables: the rate of unemployment, income per capita, the share of employees with a tertiary degree, the share of employees in the mining sector, the share of employees in the manufacturing sector.

4. Results and Discussion

Results of this analysis show that because of a sharp rise in the fixed payments the number of sole-proprietors was went up and there was a dramatic fall in the number of the new business entry. In addition, employment in small and medium firms also was decreased by the decision to make payments higher. The decrease in fixed payment in 2014 couldn't compensate for the negative effects of the past year among small businesses. Despite the various measures to support entrepreneurship, the new business entry continued to decline but the speed of this decline became lower than in the 2013 year. Moreover, the number of small firms continued to decrease in 2014.

However, there were positive effects. The employment in small and medium enterprises increased in 2014 compared to the 2013 year and reached the level of the 2012 year. Thus, the decrease in fixed payments became an incentive to compensate only some falls in the 2013 year. The results show that entrepreneurs have a very rapid response to the fiscal load increase and they have a slow response for the decrease in taxation.

Our findings are consistent with the mentioned theories (Baliamoune-Lutz, 2015; Cullen, Gordon, 2007; Parker, 2018) and they are not consistent with theory meaning that the rise of fiscal payments cannot decrease the entrepreneurial activity in countries with the poor institutional environment (Torrini, 2005). They show that the rise of fiscal load on entrepreneurs can decrease the start-up activity and job creation. Russian entrepreneurs can observe poor policy institutions, however the institutions related to the tax system can be sufficiently strong to support the paying taxes.

5. Conclusion, Contribution and Implication

This study shows that entrepreneurs demonstrate a rapid response to the 'negative' changes in the business environment: for example when the government raises the fiscal payment. The start-up activity falls downs and entrepreneurs fire employees.

The response of entrepreneurs to the 'positive' policy decision is slow compared to the response to the rise of fiscal payments. Hence, it is difficult to compensate for the consequences of mistaken decisions of economic policy cancelling wrong laws and regulations.

6. References

Da Rin, M., Di Giacomo, M., & Sembenelli, A. (2011). Entrepreneurship, firm entry, and the taxation of corporate income: Evidence from Europe. Journal of public economics, 95(9–10), 1048–1066.

Torrini, R. (2005). Cross-country differences in self-employment rates: the role of institutions. Labour Economics, 12(5), 661–683. https://doi.org/10.1016/j.labeco.2004.02.010

Bruce, D., & Schuetze, H. J. (2004). Tax policy and entrepreneurship. Swedish Economic Policy Review, 11(2), 233–265.

Baliamoune-Lutz, M. (2015). Taxes and entrepreneurship in OECD countries. Contemporary Economic Policy, 33(2), 369–380.

Cullen, J. B., & Gordon, R. H. (2007). Taxes and entrepreneurial risk-taking: Theory and evidence for the US. Journal of Public Economics, 91(7–8), 1479–1505.

Parker, S. C. (2018). The Economics of Entrepreneurship (2-е изд.). https://doi.org/10.1017/9781316756706

Bruce, D. (2000). Effects of the United States tax system on transitions into self-employment. Labour economics, 7(5), 545–574.

Stenkula, M. (2012). Taxation and entrepreneurship in a welfare state. Small Business Economics, 39(1), 77–97.

Burke, A. E., Fitzroy, F. R., & Nolan, M. A. (2000). When less is more: distinguishing between entrepreneurial choice and performance. Oxford Bulletin of Economics and Statistics, 62(5), 565–587.

Carroll, R., Holtz-Eakin, D., Rider, M., & Rosen, H. S. (2000). Income taxes and entrepreneurs' use of labor. Journal of Labor economics, 18(2), 324–351.

Belitski, M., Chowdhury, F., & Desai, S. (2016). Taxes, corruption, and entry. Small Business Economics, 47(1), 201–216.

Responses of SMEs to the challenges caused by Covid-19 in the Russian tourism market

Marina Efremova – National Research Lobachevsky State University of Nizhny Novgorod

Marina Sheresheva – Lomonosov Moscow State University m.sheresheva@mail.ru

Lilia Valitova – Lomonosov Moscow State University

Keywords: tourism, COVID-19, sustainable development, state support, Russia

1. Introduction

The tourism industry was among the first hit by the COVID-19 pandemic (Sheresheva, 2020). Due to the spread of COVID-19, thousands of tours all over the world had to be interrupted, and those planned for later dates had to be canceled or postponed. Social distancing requirements, restrictions on movement, and closed borders have led to an almost complete disappearance of demand for tourism and hospitality services and a drop in the incoming flow of payments in April-May 2020 to almost zero.

The aim of the paper is to present preliminary results derived by the team conducting the research project "Sustainable development of small and medium-sized businesses in the face of big challenges" funded by the National Research Lobachevsky State University of Nizhny Novgorod. In particular, the responses of Russian small and medium enterprises to the challenges caused by Covid-19 in the tourism market are in the focus. Since many experts claim that the pandemic is more likely to affect small businesses than large ones, it is important to understand SMEs' ways to survive, their assessment of the state support measures, and probably their opinion on opportunities and new niches arising in new conditions of pandemic and post-pandemic world.

2. Theoretical Background and Literature Review

The global COVID-19 pandemic and an unexpected recession of a dangerous magnitude have provided strong reasons to look at the Sustainable Development Goals (SDGs) (Bobylev & Grigoryev, 2020). The evolution of the disease and its economic impact is highly uncertain which makes it difficult not only for policymakers to formulate an appropriate macroeconomic policy response but also for industry actors, especially SMEs, to find ground for sustainable development. The UN Department of Economic and Social Affairs, giving comments on the Goal 8 (Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all) especially admits that tourism is facing unprecedented challenges.

In spring 2020, the world tourism industry collapsed. All participants in well-established, often cross-border value chains have found themselves in a dramatic situation of "an aggregate supply shock resulting from contagion containment measures with restrained demand and mobility" (Bénassy-Quéré et al. 2020). In such conditions, tour operators, travel agents, carriers, and other participants in the tourist services market suffered serious losses. The assessment of expected consequences for tourism industry actors differs from completely negative scenarios to relatively weighted ones (Baum, Hai, 2020; Jordà et al., 2020; McKibbin, Fernando, 2020).

3. Research Design, Methodology and Data Analysis

To assess the overall conditions in the industry, we considered a number of information sources on the situation in the tourism and hospitality industry. These are the official Rosstat data on statistical reporting forms; sectoral cash flows monitoring of the Bank of Russia; data on tax reporting forms from the Federal Tax Service; information from the register of small and medium businesses of the Federal Tax Service and the register of tour operators; Sberbank indices of consumer activity.

To collect empirical data, we used questionnaires and expert interviews.

The survey presented in the paper was conducted in August 2020. At the first stage, an online questionnaire was used. Then 81 questionnaires were sent by e-mail to the websites of enterprises that are members of the Nizhny Novgorod Region Hoteliers Association and the Nizhny Novgorod Tourist League, 38 and 43 questionnaires respectively. The survey questions aimed to obtain from enterprises data on the following positions: assessment of the current financial situation; ways to cope with the consequences of the pandemic; peculiarities of interaction with staff, customers, and contractors in pandemic time; prospects for post-pandemic business development; characteristics of the particular business.

The final sample size was 63 tourism and hospitality businesses. The sample is represented by top managers (49%), sales managers (38%), marketers (13%). At the second stage, in order to verify the survey results, we conducted expert interviews with representatives of the largest tourism and hotel enterprises.

4. Results/Findings and Discussion

The data collected in August 2020 are currently being processed; preliminary results are as follows:

- 95% of the surveyed firms rated the scale of their business decline as significant and critical. Thus, the drop in sales for 60% of respondents was in the range of 40-60%, for 16% the decrease in the volume of services provided was more than 80%.
- 75% of enterprises interrupted operations during the pandemic, but 40% retained their staff. 20% of travel agencies did without a reduction in wages, 80% introduced a reduction in wages, a shorter work schedule, and a transfer to unpaid leave.
- The surveyed firms consider a number of anti-crisis measures, including a forced staff reduction (52%) and a change in the strategy/concept of business development (44%). A quarter of the surveyed firms think of reducing wages; the same number of firms in the sample, on the contrary, are going to keep their staff but take a loan to pay salaries to employees. A third of the respondents are going to "improve customer focus", which implies both the professional personnel skills development and a more broad range of services provided.
- 25% of respondents consider the wider use of digital technologies as an important tool to overcome the crisis. At the same time, only 50% of the surveyed travel agencies were able to switch, partially or completely, to online services; the specifics of their business and the lack of technical resources did not allow the rest to do this.
- 70% of firms were unable to convert their business to serve other areas, in spite of the fact they had plans to change the business concept.
- Among the state support measures that SMEs managed to take advantage of, they mentioned (in descending frequency order) direct subsidies (65%), tax incentives (35%), loans (30%), and rental incentives (14%). For 21% of the respondents, state support was effective and solved some of the current problems (such as paying salaries, renting and maintaining offices, paying bills), but 72% of firms admit that state support was insufficient and ineffective.

5. Conclusion, Contribution and Implication

The preliminary results, on the one hand, confirm the unprecedentedness of the situation in which SMEs in the tourism industry find themselves, on the other hand, they show that SMEs have proved to be quite resilient in extremely difficult conditions.

Despite the difficulties that hinder business development, among which are lack of funds, insufficient government support, and uncertainty associated with the epidemiological situation, most respondents do not feel disappointed in their business and agree with the statement that they "donate short-term results and shareholder value for the long-term survival of the business". Moreover, in the difficult conditions of the

pandemic, the surveyed firms looked for additional opportunities and paid special attention to staff development and team consolidation.

The obtained results can be important for government agencies since the goals of the industry sustainable development set in the working version of the National Project "Tourism" are impracticable without the provision of sustainable development conditions healthy for numerous SMEs that form ecosystems of tourism destinations. There is a need to study more closely the problems faced by SMEs in obtaining state support in tourism during the COVID-19 pandemic, and to adjust the mechanisms for implementing state support.

6. References

Baum, T., & Hai, N. T. T. (2020). Hospitality, tourism, human rights and the impact of COVID-19. International Journal of Contemporary Hospitality Management, 32(7), 2397-2407. http://dx.doi.org/10.1108/IJCHM-03-2020-0242

Bénassy-Quéré, A., Marimon, R., Pisani-Ferry, J., Reichlin, L., Schoenmaker D., & Weder di Mauro, B. (2020). COVID-19: Europe needs a catastrophe relief plan. VOX CEPR Policy Portal. 11 March. https://voxeu.org/article/covid-19-europe-needs-catastrophe-relief-plan

Bobylev, S., & Grigoryev, L. (2020). In search of the contours of the post-COVID Sustainable Development Goals: The case of BRICS. BRICS Journal of Economics, 2 (1), 4–24. https://doi.org/10.38050/2712-7508-2020-7

Jordà Ò., Singh S.R., & Taylor A.M. (2020). Longer-Run Economic Consequences of Pandemics. Federal Reserve Bank of San Francisco Working Paper 2020-09. https://doi.org/10.24148/wp2020-09

McKibbin, W. J., & Fernando, R. (2020). The global macroeconomic impacts of COVID-19: Seven scenarios. CAMA Working paper. Australian National University, Crawford School of Public Policy, Centre for Applied Macroeconomic Analysis http://www.sensiblepolicy.com/download/2020/2020WorkingPapers/2020_19_CAMA_COVID19_mcKibbin_fernando_0.pdf

Sheresheva, M.Y. (2020). Coronavirus and tourism. Population and Economics, 4(2), 72–76. https://doi.org/10.3897/popecon.4.e53574

Entrepreneurial Responses to Crisis Events: A Variance-Based View

Oleksiy Osiyevskyy – Haskayne School of Business University of Calgary, Canada oosiyevs@ucalgary.ca

1. Introduction

Today's business environment is characterized by high levels of uncertainty, instability, and turbulence (Schilke, 2014; Wright et al., 2005), which were severely amplified in 2020 by the COVID-19 pandemics and resulting global economic recession. The performance and survival of any firm in this crisis context depends mostly the ability to adapt through maintaining the fit between the employed strategies (markets, products, operations) and the environmental characteristics (e.g., Zajac et al., 2000). From a broad perspective, to maintain the fit with the environment, a firm can employ a combination of generic strategies, exploration and exploitation (Osiyevskyy et al., 2020; March, 1991). Exploration allows the firm to create completely new opportunities, knowledge, and competencies, whereas exploitation focuses on the utilization of its existing opportunities, knowledge, and competencies (Uotila, 2017).

Employing the variance-based view of strategic entrepreneurship (Osiyevskyy et al., in press), implying the need to consider the impact of adaptation strategies not only on the mean of the resulting performance, but also on its variability (Shirokova et al., 2020; Osiyevskyy et al., 2020), this study discusses the expected results of employing entrepreneurial strategies (e.g., exploration) and nurturing their antecedents (e.g., entrepreneurial orientation and effectuation) in response to crisis events.

2. Theoretical Development and Propositions

Organizational exploratory learning (or simply exploration) is a major component of strategic entrepreneurial actions (Ireland & Webb, 2009). Exploration implies active, deliberate search for novel opportunities for developing valuable new competencies or entering new lucrative markets. In the original study, March (1991) famously defined exploration as "search, variation, risk-taking, experimentation, play, flexibility, discovery, and innovation," as opposed to exploitation that implies "refinement, choice, production, efficiency, selection, implementation and execution" (p. 71). Exploitation focuses on continuing and refining the existing business approach through the utilization of existing knowledge, while exploration aims at discovering and creating entirely new knowledge. The insights of a high number of existing studies usually converge on the view that in stable time exploration strategy results in incurring non-trivial costs, e.g., for testing new markets or research and development, as well as occasional losses from negative feedback from new and potential customers (Mudambi and Swift, 2014). Also, exploration results in opportunity costs due to diverting the resources from exploitation (i.e., leveraging current capabilities) to the slow and costly processes of learning and developing the new capabilities. Admittedly, exploration occasionally results in positive performance thanks to the infrequent discovery of new valuable opportunities; yet, these benefits are highly uncertain and impossible to assess in advance (Lavie et al., 2010). As such, the pursuit of entrepreneurial exploration strategy tends to enhance the variability in firm performance (Uotila, 2017), while also reducing the mean.

A crucial enabler of strategic entrepreneurship within established and new firms is the entrepreneurial orientation (EO) (Kantur, 2016). It is the organizational frame of mind, culture, strategy-making practices and processes that place innovative venturing (be it new products, new services, new markets, or new business models) at the cornerstone of short- and long-term business development (Dess & Lumpkin, 2005). Similarly, the effectuation decision-making logic (Sarasvathy, 2001) is conducive to exploratory learning, thanks to the facets of experimentation and flexibility. As such, both entrepreneurial exploration and its antecedents (entrepreneurial orientation, effectuation) destabilize and reduce the firm performance in stable times, implying a risky departure from established ways of doing business and the necessity to develop new competencies:

Proposition 1a: In stable times, strategic entrepreneurial actions (e.g., exploration) and their enablers (e.g., entrepreneurial orientation, effectuation) have a negative impact on a firm performance and positive impact on the variability of performance distribution.

The lowering of the mean and boosting of the variability of performance distribution predictably implies high chances of getting to the zone of left-hand-side outliers, beyond the minimal performance needed to maintain the firm's operations. As such, the in stable times the entrepreneurial actions and their enablers increase the failure risk of the firms:

Proposition 1b: In stable times, strategic entrepreneurial actions (e.g., exploration) and their enablers (e.g., entrepreneurial orientation, effectuation) have a negative impact firm survival.

At the same time, the positive performance outliers are also likely to be found among the entrepreneurial firms:

Proposition 1c: In stable times, strategic entrepreneurial actions (e.g., exploration) and their enablers (e.g., entrepreneurial orientation, effectuation) have a positive impact on the likelihood of the firm becoming a positive performance outlier.

Yet, during the period of unfavorable and unpredictable changes in the external environment, this logic substantively changes. Moreover, while crises present dangers to firm survival and performance, they also may create potentially beneficial opportunities upon which firms may capitalize (Beliaeva, Shirokova, Wales, and Gafforova, 2018). Firms may respond to a crisis by either proactively addressing the environmental changes through bold, radical initiatives (employing explorative actions) or initiating internal adjustment actions aimed at incremental and reliable adaptation to the environmental pressures (adopting exploitative actions).

When a firm is severely affected by an exogenous shock (such as an economic crisis), it must find a way of effective adaptation to new conditions through shifting the resources from supporting the old capabilities that are becoming obsolete. In such contexts, the allocation of scarce resources towards an explorative search for new technological knowledge or markets becomes a preferred strategy, allowing building and leveraging new valuable capabilities. Not surprisingly, the vast literature on exploration argues for and demonstrates the superiority of an exploration strategy in dynamic and hostile environments (e.g., Posen and Levinthal, 2012). In fact, several studies have shown that while firms, in general, tend to reduce explorative strategies under economic crises, adopting explorative alignment can help firms to overcome the crisis and improve their innovation performance as well as turnover recovery (Paunov, 2012). However, the uncertainty and ambiguity inherent in crisis situations (Sarkar and Osiyevskyy, 2018) are also likely to amplify the inherent uncertainty of the exploration activities; hence, strengthening their variance-boosting property. As such, we predict that:

Proposition 2a: In times of crisis, strategic entrepreneurial actions (e.g., exploration) and their enablers (e.g., entrepreneurial orientation, effectuation) have a positive impact on a firm performance and positive impact on the variability of performance distribution.

With respect to survival, in times of crisis the entrepreneurial actions become double-edged sword, having a negative impact through their variance-boosting property, yet also demonstrating a positive impact through increasing the mean of the resulting performance distribution. Here, the crucial factors becomes managing the downside risks, through, e.g., enacting the affordable loss principle of effectuation:

Proposition 2b: In times of crisis, strategic entrepreneurial actions (e.g., exploration) and their enablers (e.g., entrepreneurial orientation, effectuation) have a negative impact firm survival, which gets weakened and turns positive with rising levels of effectuation.

Finally, the chances of getting right-hand-side, positive performance outliers are rising during the variance-boosting, turbulent events:

>*Proposition 2c:* In times of crisis, strategic entrepreneurial actions (e.g., exploration) and their enablers (e.g., entrepreneurial orientation, effectuation) have a positive impact on the likelihood of the firm becoming a positive performance outlier.

At the level of analysis above a particular firm (e.g., national economy), the entrepreneurship-driven mortality of left-hand-side outliers represents the selection process, allowing to increase the average performance of the system as whole:

>*Proposition 3:* At the economy level, the level of strategic entrepreneurial actions of individual firms have a positive impact on overall performance. This effect becomes more pronounced during the crisis-induced additional variability of the outcomes of entrepreneurial actions.

3. Discussion and Conclusion

The study enriches our understanding of the role of entrepreneurial actions (namely, exploration) during the crisis times. Our contribution can be viewed through the lenses of strategic fit, where firms' strategies provide better performance when allow to discover a better alignment with the external environment (e.g., Zajac et at., 2000). The embraced variance-based view of strategic entrepreneurship (Osiyevskyy et al., in press) perspective allows deriving the predictions of employing entrepreneurial strategies (e.g., exploration) and nurturing their antecedents (e.g., entrepreneurial orientation and effectuation) in response to crisis events, at the firm and economy level.

4. References

Beliaeva, T., Shirokova, G., Wales, W., & Gafforova, E. (2020). Benefiting from economic crisis? Strategic orientation effects, trade-offs, and configurations with resource availability on SME performance. International Entrepreneurship and Management Journal, 16(1), 165-194.

Dess, G. G., & Lumpkin, G. T. (2005). The role of entrepreneurial orientation in stimulating effective corporate entrepreneurship. Academy of Management Perspectives, 19(1), 147-156.

Ireland, R. D., & Webb, J. W. (2009). Crossing the great divide of strategic entrepreneurship: Transitioning between exploration and exploitation. Business horizons, 52(5), 469-479.

Kantur, D. (2016). Strategic entrepreneurship: mediating the entrepreneurial orientation-performance link. Management Decision.

Lavie, D., Stettner, U., & Tushman, M. L. (2010). Exploration and exploitation within and across organizations. Academy of Management annals, 4(1), 109-155.

March, J. G. (1991). Exploration and exploitation in organizational learning. Organization science, 2(1), 71-87.

Mudambi, R., & Swift, T. (2014). Knowing when to leap: Transitioning between exploitative and explorative R&D. Strategic Management Journal, 35(1), 126-145.

Osiyevskyy, O., Shirokova, G., & Ritala, P. (2020). Exploration and exploitation in crisis environment: Implications for level and variability of firm performance. Journal of Business Research, 114, 227-239.

Osiyevskyy, O., Sinha, K.K., Shirokova, G., & Ehsani, M. (in press). Holistic View of Strategic Entrepreneurship's Results: Estimating the Implications for Performance Mean and Variability. Forthcoming in The Handbook of Strategic Entrepreneurship.

Paunov, C. (2012). The global crisis and firms' investments in innovation. Research policy, 41(1), 24-35.

Posen, H. E., & Levinthal, D. A. (2012). Chasing a moving target: Exploitation and exploration in dynamic environments. Management Science, 58(3), 587-601.

Sarasvathy, S. D. (2001). Causation and effectuation: Toward a theoretical shift from economic inevitability to entrepreneurial contingency. Academy of management Review, 26(2), 243-263.

Sarkar, S., & Osiyevskyy, O. (2018). Organizational change and rigidity during crisis: A review of the paradox. European Management Journal, 36(1), 47-58.

Schilke O. (2014). On the contingent value of dynamic capabilities for competitive advantage: The nonlinear moderating effect of environmental dynamism. Strategic Management Journal, 35(2), 179-203.

Shirokova, G., Osiyevskyy, O., Laskovaia, A., & MahdaviMazdeh, H. (2020). Navigating the emerging market context: Performance implications of effectuation and causation for small and medium enterprises during adverse economic conditions in Russia. Strategic Entrepreneurship Journal, 14, 470-500.

Uotila, J. (2017). Exploration, exploitation, and variability: Competition for primacy revisited. Strategic Organization, 15(4), 461-480.

Wright, M., Filatotchev, I., Hoskisson, R. E., & Peng, M. W. (2005). Strategy research in emerging economies: Challenging the conventional wisdom. Journal of management studies, 42(1), 1-33.

Zajac, E. J., Kraatz, M. S., & Bresser, R. K. (2000). Modeling the dynamics of strategic fit: A normative approach to strategic change. Strategic management journal, 21(4), 429-453.

Social Entrepreneurship Under Environmental Stress

Sergey Anokhin – Herberger Business School St. Cloud State University, USA sanokhin@stcloudstate.edu

1. Introduction

The influence of the external environment on social entrepreneurship has been considered an imperative research topic by scholars. In the present study, we address this research need by adopting a broad view of social entrepreneurship as a process that involves the creation of new organizations with an explicitly dominant social mission. Though the mainstream entrepreneurship literature has long studied commercial venture creation, research dealing with this topic in the social entrepreneurship literature has been scarce at best.

Gnyawali and Fogel (1994) provided a comprehensive framework of the "entrepreneurial environment" which they defined as the combination of economic, sociocultural, and political factors and the availability of support services that influence people's desire and ability to start a new venture. Several subsequent studies found that favorable entrepreneurial environments enticed commercial venture creation. In the present study, we posit that those same environmental factors will also influence the creation of social ventures, albeit in a different manner.

2. Theoretical Background and Literature Review

In this study, we adopt the Gnyawali and Fogel's (1994) framework that focused exclusively on the "entrepreneurial environment," which they defined as the combination of economic, sociocultural, and political factors and the availability of support services that influence people's desire and ability to start a new venture. The authors proposed a framework for entrepreneurial environments consisting of five dimensions: government policies and procedures, socioeconomic conditions, entrepreneurial and business skills, financial support to new ventures, and nonfinancial support to new ventures. Their framework clearly divides the entrepreneurial environment factors into demand and supply dimensions. Specifically, government policies and procedures and socioeconomic conditions are demand dimensions found to affect the availability of opportunities to start a new venture. On the other hand, entrepreneurial and business skills, financial, and nonfinancial support to new ventures are supply dimensions since they determine the available pool of skilled entrepreneurs and the available resources to exploit a new venture opportunity.

We propose that in the social venture creation context, the influence of some of those dimensions is different from that exerted on commercial ventures. Specifically, whereas the new venture creation literature emphasizes that poor socioeconomic conditions and disadvantageous government policy suppress commercial venture creation rates, we argue that such situations will entice the creation of social ventures due to the increased demand for the services that these organizations provide. On the other hand, we propose that the supply dimensions—entrepreneurial and business skills, financial support to social ventures, and nonfinancial support to social ventures—will influence commercial and social ventures in a similar way, because their availability provides the necessary resources for business creation. That is, the availability of skills and support in general, will boost social venture creation rates.

Overall, our study advances five hypotheses:

H1: Government austerity in dealing with social issues will be positively related to social venture creation.

H2: Poor socioeconomic conditions will be positively related to social venture creation.

H3: Educational attainment will be positively related to social venture creation.

H4: The availability of financial support will be positively related to social venture creation.

H5: The availability of nonfinancial support will be positively related to social venture creation.

3. Research Design, Methodology and Data Analysis

We test these hypotheses at the macro-level. The population for the present study consists of all 88 counties in the state of Ohio and covers the post-dot.com crisis period from 2003 to 2007 with the effective sample size of 352 county-year observations. Data was gathered from a number of reputable secondary sources.

We used social venture creation rate as our dependent variable and calculated it as a ratio of new nonprofit organizations in the county to the population of active nonprofits. As a proxy for government policies and procedures, we looked at government austerity in dealing with social issues. We operationalize it by assessing the reduction of transfer payments for each the county. This variable represents county population dependence on the government support. Importantly, the variable is "reverse-coded" where larger values of transfer payments correspond to lower government austerity. We account for socioeconomic conditions by measuring the unemployment rate and the income level of the population in the county. We expect that as unemployment rates increase, more social ventures are created. Economic conditions are also proxied with per capita income in constant U.S. dollars. Entrepreneurial and business skills were operationalized as the percent of the adult population with a bachelor's degree or above. To capture financial support to social ventures, we use total deposits as a proxy for the availability of financial assistance for nonprofits. To capture nonfinancial support to social ventures we counted the number of colleges in the county that offered courses in nonprofit management, had a degree in nonprofit management, or a center to assist nonprofit organizations.

We also included a number of control variables. Specifically, we controlled for the county population growth, county innovativeness, and the structure of industry measured as the number of establishments per 100 people. In addition, we included the county distribution of the 200 largest (or flagship) companies as a control. Finally, property, sales, and income tax rates were included as they may impact the viability of establishing a commercial or social venture in the county.

We employed random effects estimation to adequately account for unobserved county-level effects that may bear on social venture creation, and corrected our estimates for the first-order autoregression in the disturbance term using methods derived from the work of Baltagi and Wu (1999).

4. Results/Findings and Discussion

Transfer payments have a negative statistically significant relationship to subsequent social venture creation rates (β=-1.37, p<.10). The result confirms our expectation that a decrease in government spending results in increased social venture creation rates, lending empirical support to Hypothesis 1. The unemployment rate is positively and significantly related to social venture creation rates (β=.88, p<.01). This provides partial support for Hypothesis 2 since higher unemployment rates reflect poor socioeconomic conditions. Per capita income is also positively (although marginally) significantly related to social venture creation dynamics (β=.10, p<.10). This is contrary to our Hypothesis 2 that suggested the negative relationship between these variables, since lower income results in poor socioeconomic conditions.

At the same time, none of the supply variables reached statistical significance and directional support was found only for the nonprofit programs representing non-financial support. Thus, Hypotheses 3, 4, and 5 cannot be backed up with empirical evidence.

Some of our results were unexpected. Thus, we uncovered evidence that the effect of income level on social enterprise startup rates is positive. This result suggests that income level may, in fact, be a supply-side variable, as most nonprofits depend on donor contributions which tend to increase as income levels increase (Cernak et al., 1994). The non-significant results with respect to the supply-side factors can be attributed to the variables' operationalization. For instance, entrepreneurial and business skills were measured with the share of the population with a bachelor's degree regardless of the area in which the degree was obtained. Therefore, it is not an accurate measure of the specific entrepreneurial and business skills. Similarly, due to data availability financial support for social ventures was proxied by the total deposits in the county which may not effectively reflect the resources available to support social ventures. Finally, nonfinancial support had to be operationalized with a time invariant measure, since data on the start day of the nonprofit management program was not readily available.

5. Conclusion, Contribution and Implication

Overall, our results suggest that social venture creation is driven by opportunities to alleviate social problems in inhospitable environments—as demonstrated by unemployment and transfer payments influence—and by the availability of financial resources—as demonstrated by the income level influence. As such, our study contributes to the social entrepreneurship literature by providing a framework and an empirical test of how environmental factors influence social venture creation.

It also poses some implications for government policy. Our results show that social entrepreneurs respond to precarious environmental conditions by creating social ventures to address social problems. However, the results also suggested that the lack of financial resources availability can stop them from successfully creating the firm. The government could implement programs to support this type of organizations. Assuming that social ventures are effective at alleviating social ills, investing in them may, in the long run, reduce government spending on welfare. Additionally, social ventures are likely to need continuous support until sustainability is achieved. Even if the social ventures are created under resource constraints, the lack of support can affect their survival.

6. References

Available upon request

Track: Innovations in the banking sector
Chairperson: Alexander Karminsky

Changes in the banking sector in recent years have contributed to the development of the provision of banking services based on innovative technologies, modern methods and models of banking business management, aimed at increasing the competitiveness of credit institutions at the micro and macro levels. The traditional range of services provided by banks today cannot fully satisfy the needs of the client. There is a need to introduce new services and, accordingly, to develop methods for their provision. These facts create incentives for domestic credit institutions and the banking system as a whole to intensify the use of banking innovations.

Banking ecosystems in Russia and their modeling

Voytov Nikolay – National Research University Higher School of Economics, Moscow, Russia
nvvoitov@gmail.com

Karminsky Alexander – National Research University Higher School of Economics, Moscow, Russia

1. Introduction

To some extent, ordinary banking business has reached its natural limits of effectiveness which means that banks had explored all possible means to make money in their own niche. This statement is coined by adhering to the following assumptions:

1) Return on assets of the global banking industry remains constant
2) Share of both net interest and non-interest income in all assets of banks remains constant
3) The spread between cost of funds and credit is ever narrowing

Bearing in mind these three grim omens, it becomes eventually possible to formulate the following hypothesis: the larger the bank, the more actively it seeks to generate more profits for the shareholders and ultimate beneficiaries.

What is more, banks are challenged by an existential threat of the fintechs, as these tiny financial startups gain an ever-increasing market segment share of B2C and parts of B2B traditional banking business. Often these attempts to disrupt traditional banking are supported by monetary authorities and supervisory organs that force the participants of the industry to adapt Open APIs and other tools of open banking. As a result, proliferating fintechs create a highly competitive setting, close to the abstract notion of the perfect competition.

2. Theoretical Background and Literature Review

Thus, traditional banks with assets and portfolios worth trillions of dollars seek to solve two problems:

1) Explore new markets and services beyond core business that are closely related to financial services or tightly intertwined with them but generate higher profits
2) Develop means to deal with the swarm of fintechs

As it turns out, the notion of a "business ecosystem" that was used for the first time in the article … seems to give a comprehensive answer to both issues. The concept itself did not enjoy much attention even in the academic society up to 2014 when Alibaba did its IPO. By that time, the word "ecosystem" became widely used and quite generic. Sure, it has generated far less hype than such terms as "blockchain" or "neural networks" but still produces gigabytes of interpretations. So, not to delve endlessly into the argument about terms, we propose the following taxonomy:

Business ecosystem – an emergent or planned coordination of various producers, added value of which combined produces a focal value. For instance, an ecosystem of autonomous vehicles that consists of companies that make software, hardware, batteries, infrastructure; of institutions that develop the respective regulation and so on. Sure enough, all these actors pursue their economic and business goals, but in the long run they establish an emergent economic entity with clear rules that produces a very complex and fully-fledged good – an autonomous car.

Innovative ecosystem – a socio-spatial culture that has unique attributes such as state-of-art technologies, the spirit of entrepreneurship and swift adoption to changes. The most cliched examples are Silicon Valley and Shenzhen.

Digital ecosystem – a company or a set of companies that strives to fulfil any retail need that exists, from grocery, transportation and housing to entertainment, insurance, and banking. Still, the digital (or platform) ecosystem may narrow its specialization. For instance, there are housing ecosystems: a seamless customer experience from the stage of marketing and targeting of the plausible clients to the moment when the transaction is conducted, and the client seeks to buy an insurance or furniture. Such economic activity in the IT sphere usually comes by the name of "X as a service", and in case of digital ecosystems it is a laconic concept to describe something as an ecosystemic service. For instance, "housing as a service". Similarly, there could be elaborated such concepts as "banking as a service" or "content as a service" all of which constitute a small portion of "everything as a service" ecosystem. So, in the long run smaller (niche) ecosystems aims to enlarge their "X as a service" to the size of "X and Y as a service" either by merging other niche ecosystems or by developing their own focal good. Thus, in the long run all ecosystems eventually become competitors.

Banking as a service already embraces a wide catalogue of financial services: lending, deposits, insurance, investments, and even cellular communications. However, it is yet to be discovered if a bank is capable to build an "everything as a service" ecosystem.

3. Research Design, Methodology and Data Analysis

Model. Many research papers on this issue appeal to self-organizing nature of ecosystems. In turn, such an opinion implies that the rules of evolution to which ecosystems abide resembles those of natural evolution. So, the cluster of agent-based simulations (of bio-inspired algorithms) is the most acute methodology in this case. What is more, ABS belong to a set of heuristic algorithms which are widely used both in academic research and various industries, so there already are articulated methods and means of simulations of this kind.

4. Results/Findings, Discussion

Heuristics by its name are not a rigid scientific method nor a method to which could be applied standard operations of robustness check. It is rather a process of modelling a situation based on researcher's insights and intuition. One of the most prolific arguments in favor of this fuzzy methodology is the effectiveness of the heuristics while combatting polymorphic malware. These computer viruses do not have intrinsic signatures, so they are invisible for anti-virus software. So, the engineer writes a program that does seemingly random checks in various directories based on the engineer's intuition and experience, and finally manages to lure out the malware. Heuristics are widely adopted by research units of Facebook as the company seeks to fix all bugs both in the code and social interaction of users. To that aim FB has built an invisible layer of user-agents that replicate some actions of real people and ran a massive simulation. Company's engineers and researchers did not program any actions of agents, instead they created rules of the game and equipped agents with proxies of resources so that this simulation would help to forecast with high precision the outcomes of the real interactions among users. Consequently, it is possible to say that heuristics can produce scenarios in the situation of uncertainty which is why this method has evoked considerate interest among researchers in such areas as economics and finance, especially in the domain of portfolio management. ABS were adapted to the needs of stress-testing, allowing risk-managers and researchers to model the current portfolio as an agent and put it in a competitive simulation under various conditions. The outcome of such simulations is the quasi-optimal portfolio structure elaborated on heuristic assumptions.

That is why ABS method (which belongs to a larger cluster of heuristics) could be theoretically adopted to study the eventual scenarios of ecosystems' development. The model itself should be scalable with

customizable (modular) architecture, so that the researcher could easily change the underlying assumptions before running a new simulation. As for ecosystems that seeks to provide any consumer service imaginable, a clear and simple model could be structured: an agent (an ecosystem) each iteration of the simulation seeks to become more and more immersive, either by "acquiring" other agent-ecosystems or buy "aggressively absorbing" the market share. Immersiveness in this context is an integral characteristic that represents the quality of three pillars of ecosystem: time which a customer spends within it (time sunken), share of customers income (monetization of an individual) that is spent within the ecosystem, and virtual non-monetary barriers that impede the customer's churn (exit cost) from the ecosystem. These entities represent genotype of an agent-ecosystem in the context of an agent-based simulation. However, a genotype is an entity constituted by phenotypes or sequences of genes. In the simulation, a gene is a trait of a generic blocks of which the agents are formed, i.e. characteristics of a smaller entities that form ecosystems (single companies). Their phenotypes are constituted by proxies (genes) that represent a market share of a company, its competitive advantages, and the quality of internal processes. What is more, on this level, each gene is associated with environment's fluctuations that simulate the unpredictability of the economy (changes randomly each iteration). Then the simulation results are visualized to see how underlying assumptions of any simulation affects the outcome and to define any robust and significant results. As it turns out, all the unshattered simulations demonstrate unicity of results: the most immersive agents sought to maximize first the time sunken, then monetization and only after that to establish exit cost. This strategy seems to resemble the logic of prominent startups that first seek to conquer the largest market share possible and only after lowering their burn rates to come to positive unit economics and profit margins.

5. Conclusion, Contribution and Implication

Policy implications. At a glance, it is acknowledged that Russian banking sector is relatively highly concentrated, thus its "behemoths" make very high profits which are consequently invested in non-financial assets. The iconic example is Sberbank that has such assets as food delivery, transportation services (carsharing and taxi), maps and navigation services, healthcare, content, mobile operator, and even autonomous car division. Still, there are other examples of multi-faceted holding with assets of various industries, but only Sberbank names itself an ecosystem. The reason is quite simple: Russian bank has developed its inclusive and comprehensive instruments (universal ID, loyalty program, branding etc.) that helps to establish new positive synergies and spillover effects for customers that emerge under one compulsory condition – the customer would use only services of the Sberbank ecosystem. In the end, Russian bank strengthens its core business and start making new profits at the same time. What is more, it evolves so that it could successfully compete even with tine and agile fintechs. However, it is still an abstract notion as the Sberbank has not accomplished its ecosystem yet. So, the ultimate question "is a bank able to build its own comprehensive retail ecosystem or its doomed to stay banking-as-a-service niche ecosystem?" remains unanswered. This issue becomes even more articulated when it becomes evident that practically all huge Russian banks are building its ecosystems after Sberbank's example. In this case there are two main arguments: results of the simulation and international experience. According to the first, it is crucial for an ecosystem to create services that would attain as much attention of a customer as possible. And most of such services do not generate revenues directly. For a bank this means an unnecessary burden to sustain minimum capital requirements. On the other hand, banks today are technologically advanced companies, but they are lagging behind tech and internet companies in terms of technologies and swiftness. This, in turn, creates an unwanted lag that is usually detrimental within ecosystemic cooperation. That is why major banks in the US and China prefer roles of an exclusive financial partners (banking as a service) of comprehensive ecosystems (everything as a service) rather than building their own ecosystems. However, in Russia it is still to be determined what model fits the logic of ecosystem evolution the best.

6. References

Available upon request

Financial Innovation and Financial Risk

Egorov Andrey – National Research University Higher School of Economics, Moscow, Russia
andreyjegorov13@gmail.com

Keywords: Innovation, Digital Technologies, Efficiency, Risks, Banking

1. Introduction

Innovation has the potential for more efficient resource allocation and economic growth. Innovation should be seen as a natural aspect of the work of a competitive system. In particular, digital technologies have the potential to mitigate key market constraints and failures that impede sustainable financing. Innovation can help increase efficiency and save money in all areas of activity. But they also create new problems and risks for the entire financial system. Therefore, the ideal approach is to find the right balance between maintaining the security and reliability of the system and allowing financial institutions and markets to fulfill their functions.

For the banking sector, innovations can be divided into the following types:

1) innovations that increase the efficiency of domestic business operations. This includes artificial intelligence and blockchain, which, for example, can accelerate the processing of information about customers, partners, operations, etc. It also allows maximum automation of all processes.

2) innovations that improve service and communication with customers. This includes mobile and online banking, which, inter alia, can accelerate the bank's interactions with customers.

3) innovative products that allow you to capture new markets. For example, an online card for shopping on the Internet, or a loan in cryptocurrency.

4) innovations that change the rules and regulations in the financial sector.

5) innovations in the non-banking sector that lead to changes in demand for banking products and services.

2. Theoretical Background and Literature Review

For example, the advent of smartphones has led to an increase in demand for consumer loans.

Information technology trends and financial innovation can lead to a more efficient allocation of resources by expanding the functions of financial markets and financial institutions. For example, in the traditional model of cash transfers between the recipient and the sender, there are different stakeholders and a centralized mechanism that ensures security and reliability in the exchange of information. If transfers of foreign money are carried out, then the procedure is more complicated. The difficulty lies in the fact that this type of transfer involves high fees and difficulties in coordinating the process of exchanging information, maintaining the communication network and standardizing the messages sent and received between systems. There are two alternative models of cash transactions to solve problems with complex procedures, security and high fees:

1. There is a virtual currency that is used as a means for cash transactions abroad. The most common in the world is Bitcoin. The main technology that provides decentralized models is the "blockchain". It ensures the accuracy and reliability of transaction records, which eliminates double payments.

2. There is an alternative system "P2P (Peer to Peer)". Here, lending participants have a direct connection.

3. Research Design, Methodology and Data Analysis

The above alternative models may modify the existing money transfer model. The future model of money transfers abroad will be able to provide high security and invisibility and make money transfers at a low price.

4. Results/Findings, Discussion

Systemic Risks of Financial Innovation

The financial system helps in providing stable and effective market results to support economic growth. The purpose of their activities is to ensure the optimal distribution of savings among financial opportunities. Sometimes the financial services industry is subject to illiquidity, insolvency, and misconduct to the detriment of consumers, investors, and the economy as a whole.

Today there is a strong growth in the development of various technologies, especially digital. Every year there are more and more of them. In conditions of limited resources and capital, the introduction of new technologies is the only way to increase profits. Banks are transforming their business models, creating new products, opening new channels and this allows you to receive higher incomes at lower cost. Moreover, this positive effect can have a lag in time from one to several years. Moreover, in practice, profit in the broad sense is a risk payment. That is, the higher the profit, the higher the risks. Thus, increasing their profitability through innovation, banks become less financially stable. In particular, to ensure a greater volume of loans requires more working capital. Bank equity is limited. Therefore, banks resort to external loans. And the growth of long-term and short-term loans leads to a decrease in the share of equity in the balance sheet currency. And in case of a crisis situation, the risk of bank insolvency (bankruptcy) will significantly increase.

Innovation also affects the behavior of the population and other stakeholders. There is a growing reputation risk. For example, the digitalization of all spheres of life has led to the fact that people receive a large amount of information with minimal delay. This complicates the processing of incoming information by people. Therefore, many people most often adhere to the opinion of some "opinion leaders" on various issues in the person of an information agency or a specific popular analyst. For example, bbc, cnn, Tass, rbc and others. This saves time on checking information and its analysis. Also, people have quick access to their funds in the bank. If information from a "trusted source" about the problems of the bank appears, then within a few days the bank may lose most of its customers and observe a fall in stock prices and other securities of the bank. Moreover, the effect of the news may extend to other banks.

Technical risks also appear. Firstly, these are technical errors. Secondly, these are cyber attacks. They are produced by hackers in order to steal money or other reasons. This creates problems for the bank and its customers.

Innovation requires significant investment. Therefore, there is a risk that the introduced innovations will not pay for themselves and the bank will suffer big losses.

Together, these risks reinforce systemic risks. Banks are becoming more integrated and more sensitive to changes in the external environment, including changes in competitors. For example, bank A has a large deposit at bank B, and bank B bought back a share of shares from bank C. And if bank C has liquidity problems, a technical malfunction, or even just information about problems at bank, then bank B and bank A, and a number of other banks may suffer, because this and other chains of banks are increasingly in open or semi-open access. Upon receipt of information, customers, shareholders and other interested parties will withdraw funds to those banks that are least associated with a problem bank and / or have signs of a more stable bank.

In particular, the financial crisis of 1857-1858 was preceded by the development of mining technologies (especially gold), transport, the emergence of mortgage bonds of farmer railways and the spread of the gold standard system. This led to a fairly rapid development of joint-stock companies (which could finance large projects) and the expansion of banking activities. However, high demand for stocks and loans led to the formation of financial bubbles that burst in 1957.

The end of the Franco-Prussian war (1870-1871) and the payment of indemnities became a driver for the development of transport and industry, as well as lending to these areas. However, over-production led to the inflation of the financial bubble, which burst in 1873.

In the 20s of the 20th century, a transformation of the way of life of people took place, a transition to the Genoese monetary system, rapid urbanization, the growth of industrial holdings, the spread of conveyor production, the emergence of electricity, radio, cinema, cars, the advertising market and mass consumer lending. This led to higher prices and the accumulation of debts. In 1929, due to overproduction, prices fell, and many borrowers were unable to pay their loans and the 1929 crisis began.

One of the causes of the 1973 crisis was the spread of internal combustion engines and other technologies that used oil products in industry and everyday life. The subsequent artificial decline in oil production in the Middle East led to numerous bankruptcies.

In the 80s of the last century, the massive spread of computing technologies, which were also used in financial markets, began. Company revenues grew at a rapid pace, which subsequently led to the 1987 crisis. The trigger was a technical error, which led to a collapse in prices on exchanges and a subsequent series of bankruptcies.

In the 1990s - 2000s, securitization became widespread. It allows you to combine several liquid and illiquid assets into a more liquid and safe. However, the valuation system of these assets was imperfect. This led to the accumulation of a large number of high-risk debt obligations and the subsequent massive bankruptcy of many investors and banks in 2007-2010. Thus, throughout history, innovation has created new conditions for the banking sector and the economy as a whole. However, the process of transition to a new structure is rather painful. First, companies get new opportunities and high revenues. Then the markets overflow. Weak and inflexible (those who do not innovate) the participants drop out and the system comes into balance. This balance is disturbed by the emergence of a new generation of innovation.

Financial innovation to overcome systemic risks

One of the key challenges facing the global financial system today is mobilizing private capital to support sustainable growth and a stable financial system. There are many barriers to scaling and deploying sustainable finance. These include information asymmetries; limited analytical capabilities; mismatch of maturities; and other difficulties that investors face in fully identifying and assessing the risks associated with volatile investments and growth opportunities.

At the heart of digital finance is the ability to make data accessible and to process and analyze large amounts of complex data cheaper, faster, and more accurately. This reduces the cost of obtaining timely, relevant information related to the sustainability impacts and financial risks of investments; increases transparency; and supports government agencies to better track regulatory aspects of sustainable development. Digital technologies raise citizens' awareness of the environmental and social implications of consumption and investment patterns. This moment stimulates a more sustainable choice of behavior. In addition to increasing "financial inclusion" through wider access and use of modern financial services, digital finance opens up new sources of finance, both "from the bottom up" and by "matching" investors with sustainable investment opportunities. There is also a growing number of digital applications that, among other things, mobilize and use the capital of economic agents for sustainable technologies and business models with enormous potential to improve the environment, as well as to accelerate economic growth and job creation. These examples suggest significant potential for digital developments in driving the mobilization deployment of sustainable finance. Deliberate innovation in financial services will exert constant pressure to shape their long-term structure, business models and customer behavior.

5. Conclusion, Contribution and Implication

Due to financial innovations, it is possible to receive and process large amounts of data faster at minimal cost, which:

- increases access to information related to sustainable investments;
- helps to develop greater integration and innovation;
- expands opportunities for citizens to participate in the financial value chain;
- opens up new sustainable business models.

Digital finance facilitates the automation and availability of large amounts of data at low cost and high speed, which:

- increases opportunities for sustainable lending and investment in sustainable assets
- reduces the cost of finding information that is associated with environmental, social and financial impacts and risks
- contributes to regulatory compliance.
- open up new opportunities for integration and innovation.
- encouraging citizens to channel financial resources towards sustainable consumption choices
- opens up new sources of funding.

In digital finance and the real economy, there is an interaction between innovation. It creates new business models that make investments in sustainable sectors more efficient and profitable. This allows the financial sector to interact and align financial flows with the real economy with the sustainable development goals.

In this way, digital finance brings together sectors and stakeholder groups. There are innovative multi-party platforms for engagement at the national and international levels. They enable stakeholders to:

- coordinate
- streamline
- evaluate new system-wide protocols and regulations in the network of institutions and practices
- share best practices, cost-benefit analysis and consideration of unforeseen implementation impacts.

These opportunities are helping to better leverage digital opportunities for sustainable finance. The creation of a certain platform at the national and regional levels can become a center for convening and participating in the elements of digital finance for stakeholders:

- unifying politicians
- financial sector participants
- participants in sustainable development
- financial technology communities

There are various actions to promote digital investment that are important for sustainable financing, namely:

- integration of sustainability elements into the existing fintech ecosystem
- improved visibility and transparency of new solutions
- identifying requirements for increasing innovative pilots using blockchain and IoT

- development of standard tools and tools for translating financial procurement data.
- creation of new financial products. With their help, it will be easy to view information online and through mobile applications.
- increase in virtual technology platforms. They will bring together sustainable assets and investors
- assisting in the interaction between innovative digital finance solutions and regulators.

6. References

Schumpeter J.A., (1939), Business Cycles: A Theoretical, Historical and Statistical Analysis of the Capitalist Process, McGraw-Hill, New York

Abor, J. (2005). Technological Innovations and Banking in Ghana: An Evaluation of Customers' Perceptions. IFE Psychologia: An International Journal, 13(1), 170-187.

Abubakar, A. A., Tasmin, R. B. H. (2012). The Impact of Information and Communication Technology on Banks' Performance and Customer Service Delivery in the Banking Industry, International Journal of Latest Trends in Finance and Economic Sciences, 2(1), 80-90.

Almeida, R., and A. M. Fernandes. (2008). Openness and technological innovations in developing countries: Evidence from firm-level surveys. Journal of Development Studies 44 (5): 701–27. doi: 10.1080/00220380802009217

Ang, J. B., and S. Kumar. (2014). Financial Development and Barriers to the Cross-border Diffusion of Financial Innovation. Journal of Banking & Finance 39: 43–56. doi: 10.1016/j.jbankfin.2013.10.011

Barney, J. (1991). Firm Resources and Sustained Competitive Advantage, Journal of Management, 17(1), 99-120.

Bass, Frank M. (1969). A New Product Growth for Model Consumer Durables, Management Science, Vol. 15, No. 5, Theory Series, pp. 215-227.

Immortal E.R. (2018). Digitalization of the financial sector of the economy: who will receive digital dividends? // Economics. Taxes. Right.. No2.

Burns, A. (2009). Technology diffusion in the developing world. The World Bank and OECD, innovation and growth: Chasing a moving frontier. OECDiLibrary. doi:10.1787/9789264073975-10-en.

Chuttur, M.Y. (2009). Overview of the technology acceptance model: Origins, developments and future directions. Working Papers on Information Systems 9 (37): 9–37.

Forrer, A.S., and D.A. Forrer. (2014). Analysis of the relationship between economic cycle swings and adoption rate models of financial innovation diffusion. Journal of Business & Economics Research 13(2): 103–114

Fu, X., C. Pietrobelli, and L. Soete. (2011),. The role of foreign technology and indigenous innovation in the emerging economies: Technological change and catching-up. World Development 39 (7): 1204–1212

Hiroshi Nakaso. (2016). FinTech – Its Impacts on Finance, Economies and Central Banking // Bank of Japan November 18, URL: https://www.boj.or.jp/en/announcements/press/koen_2016/data/ko161118a.pdf (дата обращения: 20.01.2020)

Kabanda, G. (2014). Technology affordances and diffusion for mobile connectivity and applications in Zimbabwe. International Journal of Emerging Technology and Advanced Engineering 4 (6): 13–23

Kamau, D. M., Oluoch, J. (2016). Relationship between Financial Innovation and Commercial Bank Performance in Kenya, International Journal of Social Sciences and Information Technology, 2(4), 34-47.

Kamau, D. M., Oluoch, J. (2016). Relationship between Financial Innovation and Commercial Bank Performance in Kenya, International Journal of Social Sciences and Information Technology, 2(4), 34-47.

Kane, E. J. (1981). Accelerating Inflation, Technological Innovation, and the Decreasing Effectiveness of Banking Regulation, The Journal of Finance, 36(2), 355-367.

Nkem, I. S., Akujinma, A. F. (2017). Financial Innovation and Efficiency on the Banking Sub-Sector: The Case of Deposit Money Banks and Selected Instruments of Electronic Banking, Asian Journal of Economics, Business and Accounting, 2(1), 1-12.

Oksana R. Jdanova and Alexander Karminsky (2013). The diffusion of banking innovations: bank cards on Russian market. Innovative Marketing , 9(3)

Pennings, Johannes M., Farid Harianto (1992). The Diffusion of Technological Innovation in the Commercial Banking Industry, Strategic Management Journal, Vol. 13, No. 1, pp. 29-46.

Roberts, Peter W., Raphael Amit (2003). The Dynamics of Innovative Activity and Competitive Advantage: The Case of Australian Retail Banking, 1981 to 1995, Organization Science, Vol. 14, No. 2, pp. 107-122.

Rogers, E. M. (2003). Diffusion of innovations. In An integrated approach to communication theory and research, edited by Don Stacks and Michael Salwen, 1962–1995

Shabbir, M. S., Rehma, A. K., Shabbir, T. (2016). Combine Effect of Automated Services and Traditional Services Quality on Customer Satisfaction: Evidence from Banking Sector of Pakistan, Int J Econ Manag Sci, 5(327), 2, 1-8.

Silber, W. L. (1983). The Process of Financial Innovation, The American Economic Review, 73(2), 89-95.)

Suriñach, J., C. Autant-Bernard, F. Manca, N. Massard, and R. Moreno. (2009). The diffusion/adoption of innovation in the internal market. Brussels: Directorate-General for Economic and Financial Affairs Publications, European Commission; doi:10.2765/40088

Suriñach, J., C. Autant-Bernard, F. Manca, N. Massard, and R. Moreno. (2009). The diffusion/adoption of innovation in the internal market. Brussels: Directorate-General for Economic and Financial Affairs Publications, European Commission; doi:10.2765/40088

Tahir, S., Shah, S., Arif, F., Ahmad, G., Aziz, K. and Ulla, M. (2018). Are financial innovations improving performance? Analysis of technological innovations used in Pakistan. Journal of Innovation Economics and Management, 27 (3), 195-214. DOI: 10.3917 / jie.027.0195.

Victor, O. I., Obinozie, H. E., Echekoba, F. N. (2015). The Effect of Information Communication Technology and Financial Innovation on Performance on Nigerian Commercial Banks 2001-2013, International Journal of Accounting Research, 42(2437), 1-16.

World Bank. (2008). Global Economic Prospects 2008: Technology Diffusion in the Developing World. http://siteresources.worldbank.org/INTGEP2008/Resources/complete-report.pdf

Financial Innovations in CEE Countries: Trends

Arkhipova Natalia – National Research University Higher School of Economics, Moscow, Russia
nata.arkhipova@mail.ru

Keywords: financial innovations, banks, CEE countries.

1. Introduction

Financial innovations is one of the promising topics in modern banking. Its role in the business has increased tremendously over last decades, and more is expected to come.

According to OECD (2005) general definition: "An innovation is the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations". However, while this general definition of innovation works well, there is no consensus on how to define financial innovations. In some sense, the F.A. Walker's maxima on "money is what money does" might be also implemented for financial innovations as well. Indeed, while initially financial innovations were aimed at cutting costs for financial institutions and their customers, now it is one of the important parts of banking business. This is why it becomes more and more difficult to use traditional approaches to taxonomy of financial innovations – functional classification, differentiation by type, or by reasoning behind implementation. Those classifications were discussed well in a working paper by Comert and Epstein (2016).

2. Theoretical Background and Literature Review

However, provided there is no pre-agreed way to classify innovations, it was decided to study carefully what practitioners say on the topic. On the basis of various researches by consultants and auditors, which cover particular cases and businesses in different countries, the following classification was developed on the basis of the criterion which processes of banking business are affected the most because of the innovation. In some sense, this is a modification of the OECD's definition of innovations, but with strong ties to banking business process.

3. Research Design, Methodology and Data Analysis

First, product and channel innovations, which impact user experience of ultimate clients of financial institutions. Two main sub-types of innovations might be highlighted here in line with two main client types for a financial institution – retail customers and legal entities. Speaking on innovations for retail clients, the most common dimension for development in recent years is channel innovations, i.e. ways to attract customers (e.g. gamification of banking services, active presence in social mass media), or stimulate them to do banking transactions via easing access to services (e.g. mobile banking, payments via messengers, etc.). Moreover, duplicating a product or design innovation takes a few days, so banks become less and less differentiable from each other in what concerns terms and conditions of products. As a side effect of such innovations, customers do not value banks anymore, thus providing proofs for B.Gates' well-known phrase "Banking is necessary, banks are not". Financial institutions are seen now just as a utility. Moreover, in implementing such innovations banks quite often do not perform a leading role. For instance, in 2014, Bucharest's public transport operator, in partnership with two major Romanian banks, introduced contactless cards allowing customers to shop, bank and take rides on all means of public transport. The Bucharest metro operator enabled commuters to buy tickets over SMS (Deloitte, 2015).

4.   Results/Findings, Discussion

Innovations for legal entities are of a different sort. In fact, corporate customers are more conservative, than retail clients (and less protected by regulations), and so for them still old-fashioned reputation and stability of a bank matter. However, they also start demanding more from financial institutions in terms of speed and easiness of transactions – just like their personnel does. The other dimension of changes is redesign of the client-bank channel with growing degree of automatization. The main issue here is to make this channel seamless so that clients' and bank clerks' efforts are minimized. However, here the main difficulty is regulation requirements.

Second type is compliance-related innovations, which affect ways how banks comply with the available regulations. The two most well-known types of innovations in this category are Regtechs and Suptechs. While the first are the instruments to help financial institutions to deal with regulatory requirements in an automated way, the second equips the regulator with a tool to supervise financial institution more efficiently. In what concerns Suptechs, the two most prominent examples are Austria (where authorities implement so-called ABACUS system), and Mexico, which has achieved a lot on the way to implement such a monitoring and supervision instrument. It might be expected that other countries in CEE region will follow the example of Austria in the upcoming years.

The third type of innovations concern risk-management practices, and they help to improve capital and liquidity management decisions. Obviously, it covers all types of new generation scoring models, and also the very modern theme of usage of big data for assessing credit quality of corporate customers (the latter is mostly at the stage of pilot projects and experiments, but an intention to optimize managerial decisions in the area of credit risk on the basis of indirect data is evident).

Additionally, one should take into account the category of innovations which affect the whole business of financial institutions, they mostly enhance disintermediation. In particular, peer-to-peer lending is one of such innovations, and banks in this area perform as creators and operators of the platform for transactions, yet loosing net interest income. The other important dimension is easing the access to financial markets. and one of the best examples also comes from Austria, where in 2013 local bank launched a virtual version of the financial adviser, which offers multiple options for investments based on the answers on a special questionnaire. The decision-engine prepares an individual financial tailor-made offer, such as personal financial plan (see Deloitte 2015).

5.   Conclusion, Contribution and Implication

Research into the mentioned themes in CEE countries is important for two reasons: first, CEE countries' banking systems have passed several periods in their development, and they have to find their niche in a new global financial environment, and second, those countries have an opportunity to implement best innovations in class and work as a piloting regions for larger scale players. For instance, the capital of Slovakia Bratislava became the second European city (after Bristol in the UK) where people can use a local electronic currency to make payments. A mobile app enables the purchase of this currency that can later be used for payment via NFC technology in selected partner stores (Deloitte 2015).

The biggest FinTech market in Central and Eastern Europe is Poland, with an estimated turnover of €856 mn (CEE Forum 2018). However, fintech market in this country faces a set of objective difficulties: for instance, Poland has one of the lowest savings levels in CEE (1.9% of gross disposable income), number of cloud services users, both individuals and enterprises is relatively low (second lowest in the EU), and online sales channels usage by SMEs is below average (below 10% as compared to EU's 14,5%).

Financial innovations might give an impetus for creation of new businesses and re-load of types of financing existing companies, which is a long-term trend.

6. References

CEE Capital Market Leaders Forum (2018). Fintech in the CEE region https://paga.org.pl/wp-content/uploads/2019/12/fintech-in-the-cee-region.pdf

Comert, H. & Epstein, G. (2016). Finansal Yenilik Yazınındaki Son Gelişmeler. Science and Technology Policies Research Center Working Paper, No: 16/04

Deloitte (2016). Fintech in CEE: Charting the course for innovation in financial services technology https://www2.deloitte.com/content/dam/Deloitte/global/Documents/About-Deloitte/central-europe/ce-fintech-in-cee-region-2016.pdf

OECD (2005). Oslo Manual: Guidance Collecting and Interpreting Innovation Data, 3rd edition, Paris, OECD Publications

Government support for innovative business in Russia

Orlova Anna – National Research University Higher School of Economics, Moscow, Russia
anna.orlova@gazprombank.ru

1. Introduction

Today, the world economy is increasingly focused on innovative development, which contributes to the formation of a competitive economy of individual countries and the progress of the world community as a whole. For Russia, the implementation of innovation policy and the introduction of innovations in various sectors of the economy at all levels of government is a key factor in long-term economic growth and strategic positioning in the global community. The Global innovation index report, published annually by the INSEAD international business school, Cornell University, and the world intellectual property organization, assesses all countries in terms of their development, innovation, and technology. According to the reports for 2013-2019, Russia has moved from 62nd to 46th place in the global innovation index and maintains its position at approximately the same level (figure 1). Figure 1 shows the trend towards a gradual reduction in the gap between the highly developed technological economies. however, at the moment, innovation activity in Russia is not sufficiently developed.
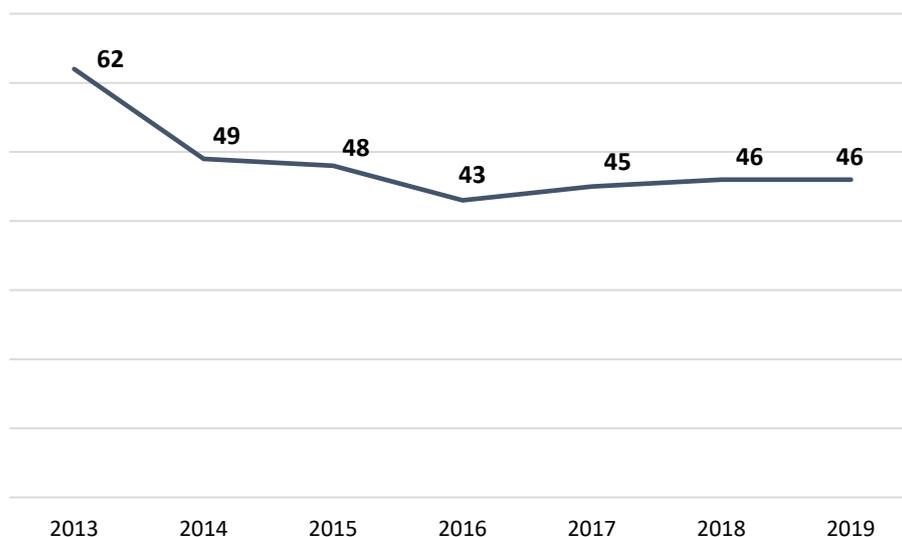
Figure. 1. Russia's position in the "Global innovation index" rating» [1]

2. Theoretical Background and Literature Review

According to the Federal state statistics service, the share of high-tech and knowledge-intensive industries in the gross domestic product of Russia is about 20%, but it has an increasing trend (Fig. 2).
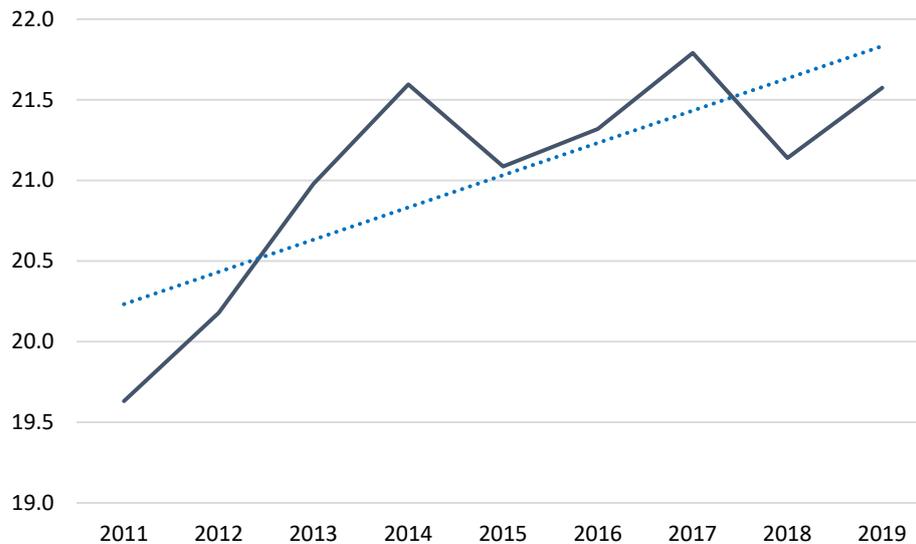
Figure. 2. The share of high-tech and knowledge-intensive industries in Russia's gross domestic product (OKVED 2 data), as % of total [2]

This trend is due to a number of factors, one of which is the support of innovation at the government level. Government support for innovation is a set of measures taken by the state authorities of the Russian Federation and the state authorities of the regions of the Russian Federation in accordance with the legislation of the Russian Federation and the legislation of the regions of the Russian Federation in order to create the necessary legal, economic and organizational conditions, as well as incentives for legal entities and individuals engaged in innovative activities [3].

The government plays an extremely important role in creating optimal conditions for innovation, maintaining a favorable innovation climate and forming a motivational basis for the development and implementation of new technologies.

3. Research Design, Methodology and Data Analysis

The role of the government in the process of innovation implementation is expressed through its regulatory and supervisory functions, including:

- ▪ Focusing and distributing funds for research and innovation.

At the same time, the concentration of resources can occur both at the state level and through the formation of special funds. The main sources used for financing innovation activities can be budget funds, funds of special extra-budgetary funds, own funds of enterprises, loans, and foreign investment.

For example, according to the Institute for statistical studies and Economics of knowledge (ISSEK) HSE "Sources of research and development funding: 2018", the main source of research and development funding in Russia is government funds – their share in total domestic research and development expenditures in 2018 was 67% (Fig. 3).
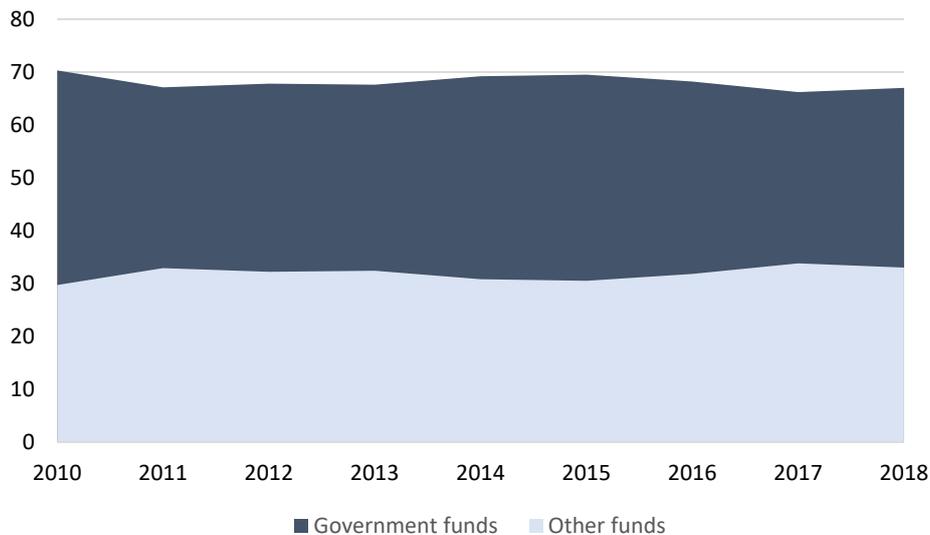
Figure. 3. Structure of research and development expenditures by funding source, % [4]

- Coordinate and manage innovation activities by developing innovation policies through innovation programs.

The main body performing this function is the Government Commission for economic modernization and innovative development of Russia, which is headed directly by the Prime Minister.

- Creation and development of a legal framework for innovation, including legal protection of the rights of business entities and the results of their discoveries by patenting and protecting intellectual property.

For this purpose, part four of the Civil code of the Russian Federation, which regulates rights to intellectual property and means of individualization, was introduced in Russia on January 1, 2008. In 2011, the Federal law "On the protection of intellectual property" was adopted and operates today.

- Development and implementation of documents defining the level of scientific and technical development, including:

  - priority areas for the development of science, technology and innovation in the Russian Federation and its constituent entities;

  - the list of critical technologies of the Russian Federation and the list of critical technologies of the regions of the Russian Federation.

- Promotion of scientific activities and insurance of venture risks.

The development of venture investments is an important factor in the innovative progress of each state. At the same time, all projects in the field of new technologies are inevitably associated with an increased level of risk. Therefore, the role of the government in this case is to encourage the inflow of venture investments and minimize venture risks. For this purpose, various support mechanisms are used (direct investment, interest rate subsidies, etc.), depending on the economic situation, the state develops the infrastructure of venture investment, creates conditions for the development of the venture industry through the creation of open joint-stock companies, regional venture funds, etc.

- Support of foreign economic activities of companies.

For example, the program of preferential lending to buyers of Russian high-tech products.

- Popularization of science, technology and innovation.

The promotion of entrepreneurship and innovation is an important factor in accelerating the development and implementation of innovations. This is achieved, for example, through the implementation of educational programs, support for mentoring systems, and the creation of development agencies and institutions.

- Development of innovative infrastructure.

Innovation infrastructure refers to the education system, innovation clusters, special economic zones, and development institutions.

The following development institutions are successfully operating in Russia:

- ✓ SKOLKOVO innovation center, an innovative complex for the development and commercialization of new technologies;
- ✓ RUSNANO development Institute, which implements government policy on the development of the nanoindustry, investing in high-tech projects and creating new production facilities;
- ✓ JSC "Russian venture company" (RVC), the state Fund of funds and the Institute for development of the venture market of the Russian Federation.
- ✓ Russian scientific Fund (regional nonprofit Foundation) engaged in grant support of scientific researches;
- ✓ The Russian Foundation for basic research (RFBR), which finances fundamental research projects;
- ✓ technoparks, incubators that provide services to innovative companies;
- ✓ Innovation promotion Fund, "VEB Innovation", offering direct financing to innovative companies;
- ✓ The Internet initiative development Fund (IRI), which provides expert resources and funding for early-stage online startups.

- Personnel, institutional and organizational support of innovation activities.
  Forms and methods of state support for innovation activities involve both direct influence and indirect influence through a variety of management tools.
 To the direct forms include the funding in the form of grants, subsidies and interest-free loans to inventors and industrial enterprises.
  The main method of direct support is government financing of innovation activities from the budget in the form of subsidies, loans, grants, loans, guarantees and allocations. The authorities create conditions for organizational and personnel support of the latest technologies, carry out project expertise and morally encourage the best inventors.
  Among the mediated forms, we can highlight the attraction of funds from private foundations and investors, preferential taxation, lending, incentives for the creation of scientific franchises and financial leasing. The list of indirect forms includes, but is not limited to, the following tools:
- ✓ Creation of venture funds aimed at protecting inventors from a high share of risk in the market.
- ✓ Reduction in fees on patents for individual innovators.
- ✓ Inclusion of promising projects in complex investment programs without financing.
- ✓ The establishment of major industrial research clusters, technopolises and technology parks with good infrastructure and simplified tax environment.
- ✓ Informational, methodological, and regulatory support for innovation activities.

Regulation

As noted above, one of the functions of the government in stimulating innovation is to develop a set of regulatory and organizational documents. The regulatory framework is recognized to create a methodological framework that serves as the basis for implementing innovation policy.

In order to regulate relations arising in the sphere of government support for innovation, the Federal law "On science and government scientific and technical policy" was adopted in Russia in 1996. The document regulates the main goals and principles, subjects, forms of providing and financing government support for innovations. The regulatory legal act defines the powers of Federal and regional authorities in this matter [5].

At the same time, the main strategic document defining the leading vectors and goals of innovation support is the strategy for innovative development of the Russian Federation. It proposes the implementation of a number of measures, including measures of state support for the creation and development of small and medium-sized businesses in the innovation sphere [6]. The strategy is developed on the basis of the Concept of long-term socio-economic development of the Russian Federation. At the moment, innovative development is a priority direction of the country's economic development strategy. The Concept of long-term socio-economic development of the Russian Federation for the period up to 2020 highlights the transition to an innovative socially oriented type of economic development as the main direction of development [7].

In 2018, Order No. 204 "On national goals and strategic objectives for the development of the Russian Federation for the period up to 2024" was signed, according to which the acceleration of technological development of the Russian Federation is set as one of the nine national development goals of the country for the medium-term period [8]. The government of the Russian Federation has developed national project passports ("road maps") that meet the goals in 12 areas, including education, labor productivity and employment support, science, and the digital economy. The Federal Executive authorities have also approved Guidelines for the development of regional projects and their passports in these areas - national development goals are translated to the regional level.

4.   Results/Findings, Discussion

The results of government support are expressed in the corresponding ratings, both international, which determine Russia's place in the world, and domestic, which reflect the competition index of the Russian Federation's regions in terms of innovation.

As noted earlier, the key international rating in the field of innovation is the "Global innovation index", according to which Russia ranks 46th among 129 countries in the world. A major jump was made in 2014 (Fig. 1). At the same time, an important role in the process of reducing the gap between Russia and the technological leaders is assigned to the effectiveness of government support measures: increasing demand for innovation, research cooperation and increasing budget spending on innovation and development.

From the point of view of internal distribution of the contribution of individual regions of Russia to innovation activity, according to the rating of innovative development of the subjects of the Russian Federation, the leaders in this area are Moscow, the Republic of Tatarstan, St. Petersburg, Tomsk and the Nizhny Novgorod region [9].

5.   Conclusion, Contribution and Implication

At the moment, sustainable, dynamic development of the economy of any state is impossible without the introduction of innovative developments and technological projects. State authorities are not the only, but one of the key subjects of direct and indirect influence on scientific and technological development and progress. In Russia, support for innovation at the Federal level is a key element of the government innovation policy and a priority vector for the development of the domestic economy. Despite the observed lag behind the leaders in this area, in general, there has been a positive trend in recent years to reduce this gap. This is evidenced by Russia's position in international ratings, as well as the expansion of forms and methods used for the development of innovation.

6. References

Global innovation index [Electronic resource]. - Access mode: https://www.wipo.int/global_innovation_index/ru/2019/ (accessed 01.06.2020)

Efficiency of the Russian economy [Electronic resource]. — Access mode: https://www.gks.ru/folder/11186?print=1 (accessed 27.05.2020)

Government support of innovative enterprises in Russia [Electronic resource]. - Access mode: https://studme.org/91218/investirovanie/gosudarstvennaya_podderzhka_innovatsionnyh_predpriyatiy_rossii (accessed 03.06.2020)

Sources of funding for research and development: 2018 [Electronic resource]. — Mode of access: https://issek.hse.ru/news/320419226.html (accessed 01.06.2020)

Federal law "On science and state scientific and technical policy" of 23.08.1996 N 127-FZ [Electronic resource]. — Access mode:

http://www.consultant.ru/document/cons_doc_LAW_11507/ (accessed 01.06.2020)

Strategy of innovative development of the Russian Federation for the period up to 2020 [Electronic resource]. — Mode of access: http://government.ru/docs/9282/ (accessed 01.06.2020)

The concept of long-term socio-economic development of the Russian Federation for the period up to 2020 [Electronic resource]. - Access mode: http://static.government.ru/media/files/aaooFKSheDLiM99HEcyrygytfmGzrnAX.pdf (accessed 02.06.2020)

Order of the President of Russia dated May 7, 2018 No. 204 "On national goals and strategic objectives of the development of the Russian Federation for the period up to 2024" [Electronic resource]. — Mode of access: http://government.ru/news/32567/ (accessed 02.06.2020)

Rating of innovative development of regions of the Russian Federation [Electronic resource]. — Mode of access: https://www.hse.ru/primarydata/rir (accessed 02.06.2020)

Method of indirect estimation of default probability dynamics for industry-target segments

according to the data of Bank of Russia

Mikhail Pomazanov – National Research University Higher School of Economics, Moscow, Russia
mhubble@yandex.ru

Keywords: *probability of default, credit risk, macro-economic modelling, industrial risks, statistical filtering, overdue debts, the Bank of Russia*

1. Introduction

Numerous global financial crises have shown that the reason for the significant increase in arrears on loans is an increase in the probability of default (Probability of Default, PD) of borrowers, and the resulting losses banks have to cover at their own expense. In order to minimize losses from the growing credit risk, any credit organizations need effective ways of quantifying the probability of default, as well as the dynamics of this probability. Stress testing requires macroeconomic models to explain this dynamic. An external benchmark is required to estimate this probability PD_i at any given time i.

The first option and the most obvious is the benchmark based on CB[1] statistics, optimal for the portfolio of individuals. As a reliable benchmark, it is wise to choose the default rate supplied by CB, such as NCB[2]. However, CB statistics almost significantly do not cover the corporate segment including the average business. In this segment, there are no full-fledged default statistics. And, even if the absolute value of the number of defaults can somehow be obtained from legal sources, the value of the denominator, which takes into account only active enterprises, credited by banks and leading economic activities, is difficult to determine. In addition, legal decisions are very late regarding the event of default. CB in Russia has historically not been directed to service the credit history of legal entities, there were no laws obliging a legal entity to keep a credit history in CB.

In practice, developed countries, where there are also problems in full-fledged statistical sources, analysts monitor the frequency of default on the reports of rating agencies of the Big Three[3], but studies on Russia are not conducted separately, too small rating coverage of the pool of corporate enterprises and groups of companies. The situation with Russian rating agencies is improving, for example, for several years the RA Expert has been publishing a matrix of defaults[4] and keeps no zero statistics of defaults since 2008, the reliability of which is increasing. However, at the moment the statistical error of the benchmark PD_i on the data Expert RA is still significant, but soon this benchmark may soon become objective.

2. Theoretical Background and Literature Review

There are sources of data for the benchmark PD_i that are not direct, but only indirect, but quite objective. These are data on the levels of reservation and the level of delinquency[5] in the banking system as a whole and in terms of industries. In article (Kuznecov K.B., et all, 2011)) several approaches were proposed for

---

[1] CB – Credit Bureaus

[2] The National Bureau of Credit Stories delivers a quarterly printed (and electronic) edition of the National Credit Bulletin to its subscribers for credit report (credit organizations).

[3] See, for example, "Annual Default Study: Corporate Default and Recovery Rates", Moodyes Report-Annual Period. Or "Default, Transition, and Recovery: Annual Global Corporate Default And Rating Transition Study", StandardandPoors Report. Period - Annual.

[4] Historical data on default levels on the rating categories of the rating scales used as of the date, the source of the Expert RA, the periodic of the report - six months.

[5] Source Bank of Russia,, «Outstanding amount (including overdue debt) of loans granted to resident legal entities and individual entrepreneurs, by economic activity and use of funds (as of reporting date)», https://cbr.ru/statistics/bank_sector/sors/

transforming these data into PD. However, there are significant drawbacks to these approaches, such as the lack of structure data, such as reserves. Namely, it is not clear what level of realized losses is hidden in the structure of reserves. This is important because PD is a probability, so you are interested in the reserve level except for the hopeless ones. The second important point is the restoration of reserves and overdue due to reverse processes of repayment of loans, exit from default, write-off, etc. This requires a meaningful model that is sensitive to dynamics. This model is proposed in this work.

There are still market methods for assessing the market probability of default based on bond, equity and CDS prices. Many of them are already classic, for example, based on the Merton model (Merton, R.C., 1974), (McSwown, J.A., 1993). KMV (currently part of Moody's Analytics) has developed hybrid approaches (Sobehart, J. R., et all, 2000), based on the market calibration of the key factor in the probability of default - Distance to Default[6] , which is an index of both a single public company and the market as a whole or its segment. A broad overview of practical and theoretical approaches is presented in the paper (Lapshin V. A., Smirnov S. N., 2012), which proposes a method of information in one assessment obtained by different ways of assessments of default probability, risk-neutral and real. Two "engineering" ways of translating risk-neutral probabilities into real ones through a communication equation derived from certain considerations are considered.

A direct method of calculating the frequency of defaults on industry and target corporate segments is not possible in the absence of statistics. The proposed work considers a model of filtering the dynamics of the probability of default of corporate companies and other borrowers based on indirect data on the dynamics of arrears supplied by the Bank of Russia. The model is based on the balance equation of aggregate and overdue debt, the missing connections of the respective time series are built by the Hodrick-Prescott filtration method (Hodrick R. Prescott E. C., 1997) (commonly known as HP filter). In retail lending segments (mortgage, consumer lending) default statistics are available and supplied by CB. This statistic validated the method presented. At the historical limited interval, validation showed that the result was credible. The resulting series of probability of default are exogenous variables for macro-economic modeling of industry credit risks.

3. Research Design, Methodology and Data Analysis

The first step is to establish a balance sheet that simulates a change in the level of arrears. This equation is

$$NPL_{i+1} - NPL_i = P_i \cdot (E_i - NPL_i) - R_i \cdot NPL_i$$

as follows: (1)

$i = 1 \dots N$, historic interval month number

E_i – debt in the industry segment

NPL_i – overdue debt in the industry segment

P_i – indicator of default rate per month i, $1 \geq P_i > 0$

R_i – Monthly recovery share indicator

The next step is to introduce functionality that filters dependencies P_i and R_i, the basic filtering requirements are pretty obvious:

Continuity P_i

The R_i convergence to the average

---

[6] Distance to Default is an indicator of the distance to default, associated with the probability that the market value of a firm's assets will fall below the value of its debt. In order to realize the face value of the debt, an equal amount of short-term liabilities is accepted plus half of the long-term liabilities derived from the balance sheet data. The model is then calibrated using the market value of the firm and the observed volatility in the price of its shares.

Filtering functionality is being built, which is analogous to the HP filter:

$$\sum_{i=2}^{N-1}\left(\ln\left(\frac{1}{P_{i+1}}-1\right)+\ln\left(\frac{1}{P_{i-1}}-1\right)-2\cdot\ln\left(\frac{1}{P_i}-1\right)\right)^2+\lambda\cdot\sum_{i=1}^{N}(R_i-RR)^2\to min_{\{P_i,R_i,i=1\dots N\}} \quad (2)$$

The model allows you to build a solution: $\hat{P}_i(RR,\lambda)$, which depends on two unknown parameters of the RR,λ.

The average annual probability of default, which is a model of the frequency of realized defaults (DF) is based on the Bayes formula

$$PD_i=1-\prod_{k=i-11}^{i}(1-\hat{P}_k(RR,\lambda))$$

Conditions for determining unknown parameters:

$\sum_{i=n}^{N}PD_i(RR,\lambda)=N\cdot PD\_TTC,$ где PD_TTC = DF *at the interval* $i=n\dots N$, $n>11$ and is defined by the economic cycle;

The number of m lows or highs of M^k, such as $PD_{M^k-1}(RR,\lambda)\geq PD_{M^k}(RR,\lambda)\leq PD_{M^k+1}(RR,\lambda)\ or\ PD_{M^k-1}(RR,\lambda)\leq PD_{M^k}(RR,\lambda)\geq PD_{M^k+1}(RR,\lambda)$

,
$k=1\dots m$ corresponds to the number of minimums or maximums observed directly or indirectly by a number of DF_i, among the possible values λ, the maximum is chosen.

The RR,λ parameters are calculated once for the overall segment (e.g. "all industries" segment) and are unchanged (i.e. constants) for sub-segments (industries).

Example:
Statistics on loans provided to legal entities - residents and individual entrepreneurs in rubles, by types of economic activity and individual areas of use of funds are used.

Initial   data:
Number of minimums m=3 (period: Oct. 2010-October 2019) PD TTC[7] (October 2010-October 2019 according to Expert RA) is 3.49%.

Result:
RR   =   34,42%
$\lambda=0,015625$

4. Results/Findings, Discussion

Validation of the model

Validation of the model should be carried out on the segment for which there is objective data on the frequency of defaults. The NCB statistical bulletin on the one hand and the data on the delay on the other are taken as supporting data. It is necessary to ensure the similarity of credit market segments. NCB data provides a time series of overdue terms of 90 days or above in retail lending, mortgage, car loans and credit card loans.

Statistics of the Bank of Russia provides information on loans provided to individuals - residents, as well as debt (including arrears) on housing loans granted to individuals- residents. If you subtract the last two rows of one of the other, you get an analogue of conventional retail loans except mortgages. NCB data on auto loans, credit cards and retail should be summarized, then this series of $\boldsymbol{PD_i}$ is compared with the data of the Bank of Russia, subject to calibration on the average PD TTC and the choice of the option of λ corresponding to an equal number of minimums (maximums) for the period of existence of open

---

[7] TTC is through the cycle a standard designation of the average long-term PD for a period no less than an economic cycle.

suppressing data (since 2012).

The result of validation is that the model (1), (2) gives the ranks of quasi-PD (indirect PD) that are close to the real DF (with a determination rate of $R^2 = 95 - 99\%$)). Therefore, there is reason to trust this model.

Industry calculations

Model (1), (2) is applied on the data of the source of the Bank of Russia "Debt, including overdue, on loans granted to legal entities - residents and individual entrepreneurs, by types of economic activity and individual areas of use of funds" provided the average PD_i average value according to the Expert RA. It is clear from the calculations that the dynamics of the probability of default is very different for different industries both in terms of the amplitude of fluctuations, and in terms of the emerging problems with overdue in the industry. From the data for 2009-2010, you can see the depth associated with the global crisis, there is a sense associated with the events of 2014-2015.

The calculations presented in Table 1 show a significant stratification of risks in industries. It is necessary to make only an important reservation that the traditional for the Bank of Russia break-up by types of economic activity is not significantly uniform, so some industries (e.g., wood processing and production of wood products) are not comparable in terms of the volume of lending and the number of enterprises (for example, the wholesale and retail trade industry has the maximum volume of activity and number of enterprises, but is not divided into sub-sectors). From 2018, credit data classified by REAC2[8] will be prepared, but the depth of the data is still too small to prepare the series.

Table 1 . The results of calculating the average PD by industry for the period April 2009 - October 2019, as well as the coefficient of variation equal to the ratio of the Standard Deviation to the Average Value.

Industry	The average	Variation Ratio (Standard Deviation to Average Value)
Total	3.6%	0.3
mining	2.4%	1,2
- extraction of fuel and energy minerals	2.9%	1.4
manufacturing industries	3.7%	0,4
-production of food products, including beverages, and tobacco	5.1%	0.3
- wood processing and production of wood products	14.0%	0.5
-pulp and paper production; publishing and printing activities	6.7%	0.7
-production of coke, oil products and nuclear materials	5.7%	1.1
-chemical production	2.2%	0.7
-production of other non-metallic mineral products	7.4%	0.8
-metallurgical production and production of finished metal products	3.6%	0.6
- manufacture of machinery and equipment	3.9%	0.5
- manufacture of machinery and equipment for agriculture and forestry	9.3%	0.8

[8] REAC2 - All-Russian economic activity classifier, https://classifikators.ru/okved

-production of vehicles and equipment	2.6%	1.1
-car production	8.0%	1,2
production and distribution of electricity, gas and water	2.0%	0.9
agriculture, hunting and forestry	4.5%	0.2
- agriculture, hunting and provision of services in these areas	4.5%	0.2
building	7.4%	0.6
- construction of buildings and structures	8.1%	0.6
transport and communication	2.5%	0.7
air transport activities, obeying and not obeying the schedule	10.5%	1,2
wholesale and retail trade; repair of vehicles, motorcycles, household goods and personal items	4.8%	0,4
real estate transactions, rental and service provision	4.2%	0.5
other activities	3.1%	0.5
to complete settlements	2.9%	0.5

On building a time series of default probabilities and preparing a macro model

Each bank has its own market niche of credit business, expressed in industry specifics. Therefore, in order to build a series of PD equivalent to the market, it is necessary to draw up the ranks of E_i , NPL_i required for the application of the PD filtering model weighted by industry shares corresponding to the bank's portfolio. The second step is to establish the average DF for a long period according to the relevant statistics of the Bank's portfolio. The third step uses a filtering model and gives the appropriate dynamics PD_i . On the fourth step is the macro model of this series.

The macro model predicts the behavior of PD_i in the future under a certain baseline scenario supplied by the bank's special analytical service or official sources (Bank of Russia, Ministry of Finance, World Bank, etc.). Table 2 presents the result of building a regression macro model, corresponding to the industry specifics of the bank's sub-portfolio.

Table 2. The characteristics of macro models built on the ranks of PD, filtered by the model (1), (2) on the data of the Bank of Russia, taking into account the industry specifics of sub-portfolios

Macro model	Basic segment	Contracted segment	The entire corporate portfolio
R^2	85,5%	84,8%	84,8%
Breusch - Pagan Stats (Breusch T. S., Pagan A. R., 1979)	7,53%	6,01%	8,85%

(norm -up to 10%)						
	Variables	Factor	Variables	Factor	Variables	Factor
	Regression free term	1,81	Regression free term	4,19	Regression free term	4,69
	GDP for the quarter, billion. ruble, current prices	−0,000052	The real salary of one worker	−4,84	The real salary of one worker	−5,75
	USD LIBOR 1 year	0,34	RTS Index	−0,00073	USD LIBOR 1 year	0,36
	The real salary of one worker	−4,05	Fixed capital investments, with a lag of 1 year	−1,50	MICEX Index,	−0,00051
	RTS Index	−0,00040			The real salary of one worker with a lag of 1 year	−1,67

Table 2 shows that macro models have a fairly high determinism ratio of R^2 with low heteroscedasticity. This is the main advantage of building a macro model on a number of PD_i, built on macro-economic data, taking into account the industry specifics of the bank's portfolio. If you directly build a macro model on the local data of the bank DF_i the determination ratio is worse.

5. Conclusion, Contribution and Implication

From the study presented in this paper, we can draw the following conclusions:

1. The model of filtering the probability of default from the data of the Bank of Russia on delay was confirmed on the data of the NCB on defaults of individuals;

2. The bank's data is updated monthly and is a reliable source including for audit;

3. The probability of default and its volatility depends significantly on the industry;

4. Portfolio segments for which a macro model is built are formed taking into account the industry

shares of their own portfolio;

5. The quality of regression macro models of market-oriented segments was quite high;

6. The proprietary DF (curve) may differ from the quasi-DF market, but you should expect a high correlation between them. There may be a significant idiosyncratic component associated with internal processes.

For small and medium-sized banks presented a method of building a macro model, based on filtering the probability of default from the data of the Bank of Russia, but taking into account the industry specifics of the bank's loan portfolio and its own average frequency of realized defaults over a long period is probably the only audited method of building a macro model, not contrary to international standards IFRS 9[9]. Trying to build a macro model on your own data may not be valid because of the low statistical significance. For large banks with sufficient default statistics to build a statistically significant exogenous series of DF_i, building a regression macro model based on it may have low discriminatory ability due to the subjective factors affecting DF.

6. References

Kuznecov K.B., Malahova T.A., SHimanovskij K.V. (2011) Metody ocenki veroyatnosti defolta otraslej ekonomiki dlya celej bankovskogo nadzora// Vestnik permskogo universiteta. EKONOMIKA, Vyp. 1(8), S.71-78 (In Russian)

Merton, R.C., (1974), "On the Pricing of Corporate Debt: The Risk Structure of Interest Rate", Journal of Finance 29, 449-470.

McQuown, J.A., (1993), "A Comment On Market vs. Accounting Based Measures of Default Risk", KMV Corporation.

Sobehart, J. R., Stein, R. M., Mikityanskaya, V., Li, L, (2000), "Moody's Public Firm Risk Model: A Hybrid Approach to Modeling Short-Term Default Risk", Moody's Investors Service (February).

Lapshin V. A., Smirnov S. N. (2012) Konsolidaciya i agregaciya ocenok veroyatnosti defolta// Upravlenie riskom. T. 61-63. № 1-3. S. 14-44. (In Russian)

Hodrick, Robert; Prescott, Edward C. (1997). "Postwar U.S. Business Cycles: An Empirical Investigation". Journal of Money, Credit, and Banking. 29 (1): 1–16 doi:10.2307/2953682

Breusch, T. S.; Pagan, A. R. (1979). "A Simple Test for Heteroskedasticity and Random Coefficient Variation". Econometrica. 47 (5): 1287–1294. doi:10.2307/1911963

---

[9]International Financial Reporting Standard (IFRS) 9 "Financial Instruments" introduced as mandatory for Russian banks from 2018. https://www.minfin.ru/common/upload/library/2017/02/main/MSFO_IFRS_9_1.pdf

Economic capital structure and bank financial risk aggregation model

Marina Pomorina – National Research University Higher School of Economics, Moscow, Russia marina-pomorina@yandex.ru

Tatyana Oberemko – National Research University Higher School of Economics, Moscow, Russia

1. Introduction

The IRM system is aimed at the comprehensive management of all banking risks. One of its most important functions is to determine the level of materiality of the impact of each bank risk on the activities of a bank, to assess the correlations of such impacts and to make decisions about the acceptable level of both individual risks and their totality.

Ultimately, in order to maintain the stability of the bank, it is necessary to ensure that all its risks are covered by its own capital since servicing the borrowed capital (attracted resources) requires regular interest payment for its use. The source of these payments is the interest and commissions that the bank receives for placing the attracted resources in income-generating assets. If the assets depreciate and / or show signs of default, the operating income flow becomes insufficient to meet the obligations on the borrowed capital, which ultimately leads to the bankruptcy of the bank.

This fact has led to the emergence and constant development of regulatory requirements for capital adequacy. Standards for such regulation for the affiliated countries are developed by the Basel Committee on Banking Supervision (BCBS) since 1988. Their very significant part is Pilar 2, which formulated **the concept of economic capital** as a more accurate assessment of the overall banking risk compared to regulatory capital.

Economic capital in Basel II is considered as an assessment of the overall bank's risk based on internal models (BCBS, 2004, P.158). The list of risks that bank must allocate capital to cover was significantly expanded in addition to CR, MR, and OR. According to Pilar 2 capital should be allocated for all types of *material risks*. The functions of identifying material risks are assigned to credit institutions.

Pilar 2 requires banks to use internal procedures internal capital adequacy assessment process (ICAAP) and defines the following structure of ICAAP:

- material risk identification;
- material risk measurement (quantification);
- material risk aggregation;
- allocation of capital by material risk types;
- maintaining compliance with the strategy and the available capital allocation.

These requirements are aimed per se at controlling the maintenance of the required capital level, which provides coverage of all risks accepted by the bank (risk-capital), as well as capital expenditures (cost-capital). Maintaining this balance is the main goal of the bank's IRM system (Fig. 1).
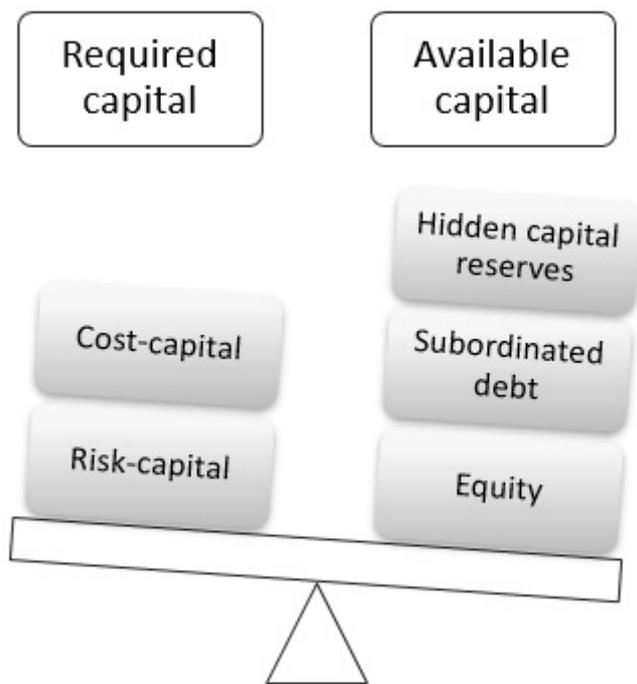
Fig.1. Proper risk – capital balance

These theses are devoted to developing the appropriate ICAAP methodological approaches for their further implementation in ICAAP procedures.

2. Theoretical Background and Literature Review

Banks' economic capital structure: financial and non-financial risks

The bank's *economic capital* can be defined as the amount of potential losses of the Bank from all types of risks it accepts, which will not be exceeded with a high level of probability (usually 99.99%).

The structure of economic capital is determined by the types of *material risks accepted by the Bank* and is shown in Fig.2.
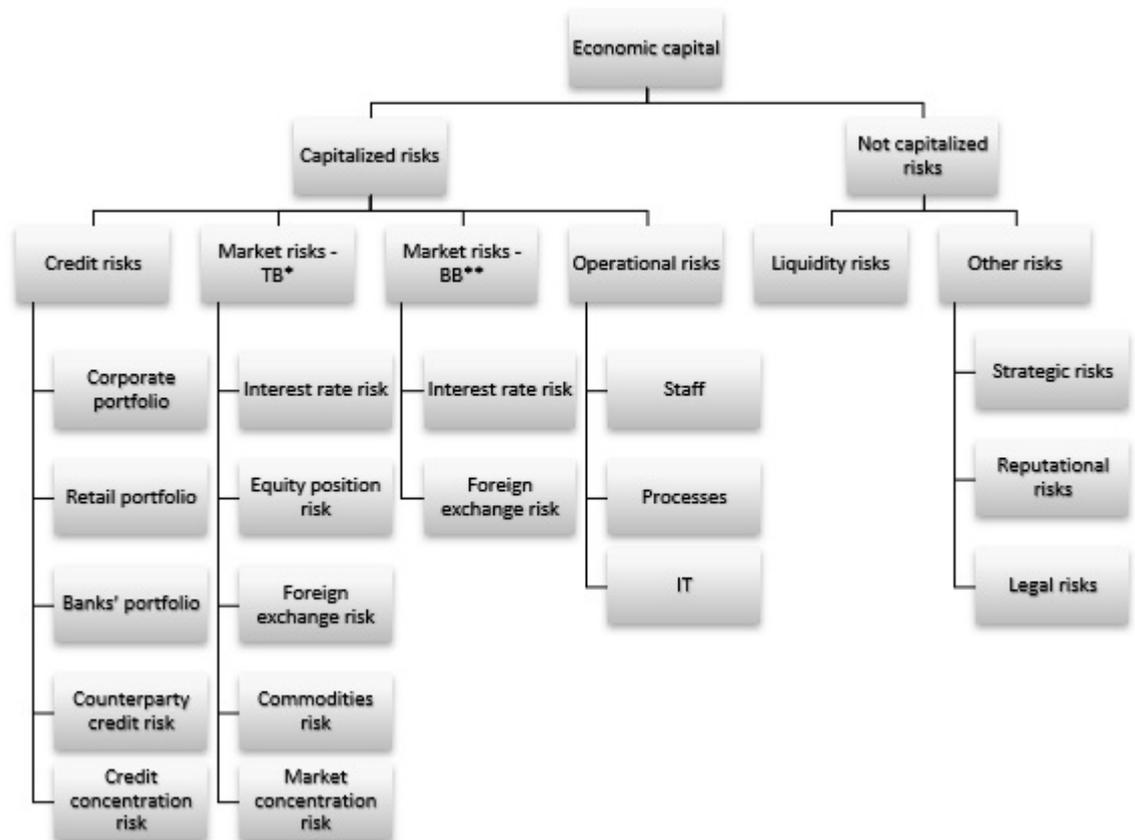
Fig. 2. The Bank's economic capital structure
* TB - Trading Book
** BB - Banking Book

The basis for assessing risk capital is the value of each individual material banking risk. The BCBS and the Bank of Russia recommend determining an approach to capital allocation based on two alternative principles (Bank of Russia, 2015, P.10, paragraph 4.9.1):

- on quantitative methods based on empirical models for risk allocation assessment. This approach should be applied at least to CR, MR and OR;
- on capital buffer allocation methods. This approach is applied to risks for which not enough historical data has been accumulated or quantitative models development is impractical due to cost and benefit mismatchas.

The question of choosing a method for assessing capital requirements for material risks is closely related to the problem of dividing risks into financial and non-financial.

The BCBS and the Russian regulator do not specify any definition for non-financial risks. In paragraph 3.3 of Directive No 3624-U, the Bank of Russia simply lists the non-financial risk types: legal risk, regulatory risk, strategic risk and the risk of loss of business reputation (Bank of Russia, 2015, P.P.6-7, paragraph 3.3).

In our opinion, non-financial risks can be defined as the external and internal impacts which directly or indirectly affect the company's value, profit, strategy, reputation, and other intangible assets. At the same time, a quantitative financial assessment of the results of such impacts is difficult due to the uncertainty of the model of the direct impact of these risks on the company's financial results and/or due to the lack of sufficient historical data on risk losses to build a statistical model.

The each type of risks or their individual components can be both regular and observable (i.e. the organization collects data on risk exposure factors and outcomes), and rare, and therefore not available for quantitative statistical forecasting.

In the first case, for minimizing the damage of risk realization, the bank builds risk management procedures based on quantitative risk distribution assessments.

In the second case, they capture and evaluate the risk impact, including potential risk and direct damage, using qualitative methods, but they do not use statistical models to forecast, because they do not have a sufficient base for their construction and validation.

Thus, it is possible to associate bank's financial risks with the risks that can be assessed based on applying quantitative assessment models of risk capital requirements, and non-financial risks with those ones for which it is advisable to apply qualitative assessments and capital buffer allocation methods.

However, it should be emphasized that the inability to conduct quantitative statistical assessments does not mean that the risk is not managed and measured. Simply, the control and measurement methods will be different (Table 1).

Table 1. Differences in methods for assessing financial and non-financial risks

Assessment and management methods	Financial risks	Non-financial risks
Evaluation Methods		
Historical data	Regular and observable realization	There were no historical realizations or they were extremely rare. The sample size is not sufficient to build a risk distribution assessment
Risk factors	Sufficiently determined for quantitative models building	The risk factors list is not uniquely defined
Assessment Methods	Statistical Models	Expert Assessments
Management methods		
Provisions for losses from current profits	There are underlying assets or other financial indicators to regularly determine the size of the reserve	A reserve is formed for specific events on the basis of expert judgment
Capital coverage	Based on quantitative models individually for each material risk position	Based on expert judgment in the form of a capital buffer

Capital Limits	Set	Not Set

The choice of methods for quantitative assessments of capital requirements for financial risks, and determining the capital buffer size is left to the bank. For risks that are subject to quantitative capital requirement models, the task of aggregating the distributions of individual risks into the distribution of total risk arises at the aggregate risk assessment stage. One of the approaches to solving this problem is suggested in the next section.

3. Research Design, Methodology and Data Analysis

A structural model for the economic capital assessment

Mathematically, the task of overall risk assessment is reduced to constructing the random value sum distribution of losses from risks exposed to aggregation, the so-called distribution convolution:

$$\xi = \xi_1 + \xi_2 + ... \xi_i + ... \xi_n \tag{1}$$

where ξ_i is the distribution of losses from the i-th type of risk.

Practices and techniques in risk aggregation are generally less developed than the methodologies that are used in measuring individual risk components. The BCBS highlights such problems in risk aggregation methodology as

- assuming diversification gains across all components;
- estimating the variance-covariance matrix which represents the co-movement between risks;
- lack of relevant data to assess risk interactions;
- lack of unification risk account units (risk measures), risk metrics, confidence levels and time horizons, used for different risk type assessments (BCBS, 2009).

From our point of view, the main problem of material risk aggregation is the lack of a universal approach to various kind risk assessment. Not only types of risk distributions are distinguished, but also *risk metrics and measures*.

By risk metric we understand the approach to assessing the losses incurred from the risk implementation. In practice, there are various risk type metrics that do not match significantly:

- credit risk in the current approach, IFRS 9 is estimated on the basis of expected losses, measured as the difference in the present value of the contractual and risk-adjusted cash flow based on the actual state of affairs. Thus, the credit risk metric is the difference between the planned cash flow indicator and the expert assessment based on current facts (the so-called plan-fact analysis);
- market risk measurement is based on the dynamic analysis of the financial instruments prices volatility (FI volatility). In this case, the risk is perceived as a change in the FI fair value over time;
- operational risk is measured mainly as incurred losses, sometimes adjusted for other bank benchmark data;
- gap analysis or duration methods are used to assess interest rate risk, which is the net interest income sensitivity to changes in market interest rates, etc.

Obviously, it is pointless to sum up various risk metrics to determine the overall risk. The indicator will not have a clear economic interpretation.

The frequency of various risk metric assessment also varies in financial statements: credit and operational risks are assessed on a monthly basis, market risk on a daily basis, non-financial risks losses can be assessed once a year, etc.

A risk measure refers to the characteristics of the random risk distribution used for risk assessment. They may vary in practice as well. Typically, the measure of risk is VaR, but the standard deviation is often used for market risks. Recently, risk measures such as Shortfall and spectral measures have become widespread. In addition, different time horizons and levels of confidence are used for the statistical assessment of various risk type measures.

Since 2013, BCBS has been analyzing the progress G-SIB in implementing the principles of risk aggregation and the preparation of risk reporting (BCBS, 2013), (BCBS, 2015-Jan), (BCBS, 2015-Dec), (BCBS, 2017), (BCBS, 2018). However, in 2018, BCBS's findings highlighted the difficulties of implementation and the need to continue working on improving risk aggregation and risk reporting systems, despite the fact that the project completion date was initially set as 2016.

In this regard, the relevant area of scientific and applied research is the further development of aggregating risk methodology. From our point of view, the best direction of this methodology development is *multifactor model development for assessing total financial risk based on the full modeling method*.

We offer an example of building such a model based on the identifying elements of the bank's profit formation that are exposed to certain material risks, as well as the determination of the factors of these risks, the change of which determines the volatility of the corresponding profit element.

This approach, combined with the management accounting methodology, reveals the bank's financial result (profit) structure in terms of business lines, products, customers, and geographical regions, allows us to assess the total impact of material risks to the bank, and to implement risk aggregation / disaggregation procedures, to assess allocation capital to cover risks and, establish risk limits based on the capital allocation and risk strategies.

The proposed approach will allow the harmonization of the procedures for assessing individual components of economic capital based on the following principles:

1) ensuring consistent disaggregation of the total financial result to positions exposed to various risks types;

2) the unified risk measures used for all material risks based on deviations of the financial result from the planned indicators both at the overall bank and business line levels, as well as individual product lines and customer groups;

3) the use of a universal risk metric - VaR and a universal tool for its assessment - stochastic modelling;

4) integration of ICAAP procedures in the processes of strategic and financial planning by using indicators of the risk appetite /the disposable capital of the bank when selecting planned alternatives.

To select the overall risk components we use differential function that reflects the influence of qualitative (intensive) and quantitative (extensive) revenue generation factors. The qualitative factor is ROA^t, and the quantitative factor is asset volume $-A^t$. Profit is the product of these two factors.

$$Profit^t = ROA^t * A^t \tag{2}$$

We use this function differential with the negative sign as the overall risk metric at all the analysis levels: total bank operations, business units, products, and clients.

$$Total\ risk^t = -\partial ROA^t * A^t - ROA^t * \partial A^t = -\frac{\partial ROA^t}{ROA^t} * Profit^t - \frac{\partial A^t}{A^t} * Profit^t \tag{3}$$

$-\partial ROA^t * A^t$ (*the first component of the expression (3)*) reflects the impact of risk factors determining assets' profitability.

$-ROA^t * \partial A^t$ (the second component (3)) reflecs the factors, determining assets volume change.

The second component of *expression (3)* can be interpreted as an indicator of strategic / business risk, as it reflects the banks ability to expand its business and attract the necessary capital for this purpose (both its own and borrowed). Therefore, we can use this indicator to model and assess business risk:

$$Business\ risk^t = -ROA^t * \partial A^t = -\frac{\partial A^t}{A^t} * Profit^t \tag{4}$$

The first component of expression (3) reflects the influence of all other risks. In order to highlight the individual aggregate risk components, we associate these components with various elements of a banks' Profit and Loss Statement (P&L). In doing so, we try to find the appropriate type of financial material risk prescribed by ICAAP for each P&l element. Bank profit is a combination of the following elements:

$$Profit^t = NII^t - ALLL^t + NTI^t + NFXE^t + NFCI^t + OOI^t - OExp^t - Tax^t \tag{5}$$

where:

NII^t is net interest income, which is the sum of

- interest income of banking book ($IIBB^t$) = average credit interest rate (ICR^t)*average credit portfolio volume (CP^t),
- and interest income of trading book ($IITB^t$) = average interest yield of trading book (CY^t)*average trade portfolio volume (BP^t),
- minus interest expenses ($IExp^t$) = average deposits interest rate (IDR^t)*average deposits portfolio volume (DP^t).

$ALLL^t$ is Allowance for Loan and Lease Losses (or provisions charge for loan impairment) = average provisions rate (PR^t)* CP^t.

NTI^t is net trade income, which is the sum of

- net gain of equity portfolio ($NGEP^t$) = average equity portfolio profitability (EPP^t) *average equity portfolio volume (EP^t),
- and net gain of commodity portfolio ($NGComP^t$) = average commodity portfolio profitability ($ComPP^t$) *average commodity portfolio volume ($ComP^t$).

$NFXE^t$ is net foreing exchange earnings, which is equal to the difference of

- FX gain (FXG^t) – FX loss (FXL^t),

or product of

- average exchange rate change (FXCh^t) *average open currency positions (OCP^t),

NFCI^t is net fee and commission income, which is equal to the difference of

- fee and commission income (FCI^t) – fee and commission expenses (FCExp^t)

or product of

- net average fee and commission profitability (NFCP^t)*A^t.

OOI^t is other operations income, which is equal to product of

- net average other operations profitability (NOOP^t)*A^t,

OExp^t is operations expenses, which is equal to product of

- average operations cost for assets unit (UOC^t)*A^t.

Tax^t is taxes paid, which is equal to product of

- average income tax rate for assets unit (ITaxR^t)*A^t .

Using expression (5) we can present the first component of expression (3) as

$$-\partial ROA^t * A^t = (-\partial ICR^t * CP^t + \partial IDR^t * DP^t) + \partial ALLL^t * CP^t + (-\partial CY^t * BP^t - \partial EPP^t * EP^t - \partial ComP^t * ComP^t - \partial FXP^t * OCP^t) - \partial NFCP^t * A^t - \partial NOOP^t * A^t - \partial UOC^t * A^t - \partial ITaxR^t * A^t \qquad (6)$$

We presented the overall financial risk of the bank as the sum of the main material risks. Each material risk corresponds to a certain risk factor and an element of P&L which determines the weight for aggregating the risk factor into the overall risk model (Table 2).

Table 2. The overall financial risk model components

Material risks	Risk factors	Risk weights
Business risk (BusinessRisk)	Assets volume change (Ach)	Profit
Credit risk (CR)	Change of average provision rate – PR	Allowance for Loan and Lease Losses - ALLL
Market risks (MR)		
Interest rate risks of trading book (IRRTB)	Change of average interest yield of trading book – CY	Interest income of trading book –IITB

Equity risk of trading book (ER)	Change of average equity portfolio profitability –EPP	Net gain of equity portfolio – NGEP
Commodity risk of trading book (ComR)	Change of average commodity portfolio profitability –ComPP	Net gain of commodity portfolio – NGComP
Foreign exchange risk (FXR)	Change of average exchange rate change – FXCh	Net foreign exchange earnings – NFXE
Interest risks of banking book (IRRBB)		
Interest rate risks of credit portfolio (IRRBB - CP)	Change of average credit interest rate (ICR)	Interest income of banking book (IIBB)
Interest rate risks of deposit portfolio (IRRBB - DP)	Change of average deposit interest rate (IDR)	Interest expenses (IExp)
Operational and other risks		
Operational risks (OR)	Change of average operational cost for assets unit – UOC	Operational expenses (OExp)
Price risk on fees, commissions and other deals (PriceRisk)	Change of net average fee and commission profitability - NFCP Change of net average other operational profitability – NOOP	Net fee and commission income (INFCI) Other operations income (OOI)
Tax risk (TaxRisk)	Average tax rate – TaxR	Tax paid (Tax)

The model created (3-6) **unambiguously links the components of the total risk with the elements of the banks' profit formation**. Further within each component, it is possible to separate more granulated risk elements. For example, it is possible to divide credit risk into certain credit portfolios, FX risk for currencies, equity risk for security portfolios and other kinds of securities.

Thus, in general terms, the aggregate risk model (3-6) can be represented as a linear combination of various risk factors:

$$TotalRisk^t = \sum_{i=1}^{N} \partial RF_i^t * RP_i^t \qquad (7)$$

where

N is number of risk factors in the economic capital model;

∂RF_i^t is the i-th risk factor change at time t;

RP_i^t is risk position, corresponding with the i-th risk factor.

The result of expression (17) is a random variable (more precisely, a random process) of the total risk. To assess the aggregate risk metrics, it is necessary to evaluate its distribution based on the given distributions of individual material risks types.

If the risk factors have different types of distributions or these distributions are not normal, the task of assessing the total risk is complicated.

Due to the complexity of the convolution parametric approximation, one of the most popular methods for assessing total risk is the stochastic modeling method (or Monte Carlo method). However, for its application it is necessary to evaluate not only the individual distributions of risk factors, but also their joint distribution, taking into account the correlation between individual factors.

Note that expression (7) is valid both for a single transaction/a separate financial instrument profit calculation, and for profit in the context of products, projects, customers, business lines and the total financial result of the bank.

The overall risk model is integrated with the financial banking model. Due to this, it is possible to assess the total risk within the financial planning process using stochastic modelling and stress testing. Financial planning and aggregate risk models have the same parameters including interest rates on loans and deposits, reserve rates for the impairment of assets, exchange rates and rates of return on financial market instruments, unit costs for bank processes and products, tax rates, etc.

The proposed approach to economic capital assessment makes it easy to disaggregate it in the context of business areas, products, customer groups based on traditional methods of functional-value analysis (cost-effective value engineering) used in management accounting systems.

It should be noted that the model (3-6) also allows us to evaluate the diversification effect for covering economic capital at different levels of analysis.

Note that in the model, such risk components as business risk, tax risk and price risk on bank fees, commissions and other deals have appeared. These risks are not traditionally considered in economic capital models, but, nevertheless, their impact on bank profits can be significant.

The operational risk measurement differs from that adopted in regulatory approaches as it shows its impact on the bank's costs. This approach is more consistent, since its manifestations lead to an increase in bank costs, and the occurrence of fines and compensation for losses incurred.

Note that BCBS allows the possibility of using various risk assessment methods in individual models and economic capital models, as identical measures and metrics must be used when aggregating risks (Basel Committee on Banking Supervision. Range of practices and issues in economic capital frameworks. Part IV.B – March 2009//www.bis.org).

The aggregated financial risk model advantages include:

1) quantitative accounting of a wide range of financial risks;

2) defining a unified approach to assessing certain material risks based on the bank's financial results;
3) the reflection of the effect of diversification;
4) using non-parametric methods for aggregate financial risk distribution assessment;
5) integration of the economic capital model with the financial planning processes.
6) universality: the applicability of the approach for any financial institution.

4. Results/Findings, Discussion

Limits for management economic capital

BCBS and the Bank of Russia put forward requirements for ICAAP both for individual material risks and for economic credit institution capital (total risk). These procedures must include:

- methods for assessing and forecasting material risks and the economic capital of a bank;
- capital management procedures based on determining the planned (target) level of available risk capital, current capital requirements, and the allocation of capital by types of material risks and activities;
- a system for monitoring capital adequacy, and limits for material risks.

In order to control the accepted risks, the bank determines the planned (target) risk levels, the target risk structure and the risk limits system for each material risk based on the business cycle phase, tolerance for risks and strategic and business objectives.

In order to control its capital adequacy, the bank establishes procedures for the capital allocation through a limits system in business line and in material risks, taking into account reserves for non-financial risks and for the new business projects implementation. The limits system must have a multi-level structure. Control over the established limits is carried out by setting signal values. If these limits are exceeded, an anti-crisis measure system must be developed and implemented and, possibly, capital reallocation should be carried out (Bank of Russia, 2015, paragraph 4.11-4.14).

The proposed model of economic capital allows the creation of the above-described procedures for managing economic capital, based on the allocation and distribution of available capital by types of material risks and setting limits. We can suggest the following scheme for implementing the regulator's requirements based on the integrated assessment of the economic capital model.

At **the first stage**, the bank's need for risk capital is estimated, using the economic capital model proposed above. Required capital depends on the business structure, development plans, including bank projects, the external economic situation, client base features, business process efficiency, etc.

At **the second stage**, the need for risk capital is settled, which is determined by the economic capital assessment regulated by the bank's financial model formed as part of its strategy development and development plans, and the available risk capital allocated by the Board of Directors.

The procedure must be organized *within the framework of the strategic and business planning process* and may require a number of iterations if the allocated risk capital is not sufficient to cover the risks of the bank's strategy and development. Shareholders can review their risk appetite, or require the bank to implement a more conservative strategy.

Risk capital can be allocated both in absolute terms and on the basis of various indicators of risk appetite, for example, on the basis of setting a target level of the RAROC indicator, the possibilities of using which are described in the next section.

At **the third stage**, the allocated risk capital should be distributed between business areas, customer groups, products, and material risks. To do this, based on the model, diversification coefficients must be determined. The function is implemented based on the calculation of economic capital at the selected planning levels. In this case, a unified assessment model is used, which is applied to calculate the EC of all business areas, bank projects, and certain types of material risks. Further, the obtained diversification coefficients can be used to allocate capital at different hierarchical levels of setting risk limits.

At **the fourth stage**, limits must be set based on the allocated risk capital. This can be both direct restrictions on the volume of losses incurred from risks in the context of business areas and material risks, and limits that restrict the volume of operations.

When setting limits for losses incurred, the bank must determine the metrics of losses incurred on loans and financial assets, on operational and other risks. For example, the losses incurred on loans can be estimated as direct costs to write them off, and the difference between the amortized costs of actually received loan flow from its target value. The latter is more consistent with the current concept of measuring the fair value of financial assets, as reflected in IFRS 9.

When setting limits on the volume of operations, the risk factor VaR estimates obtained in the model can be used. If based on the ratio $VaR_{KRisk} = VaR_{\partial NR} * CP$, the limit on the volume of the loan portfolio can be set in the amount equal $EC_{CRisk}/VaR_{\partial NR}$.

As a result, on the basis of the described principles, the bank can form a hierarchical system of limits, presented in Fig. 4. Further, if necessary, they are disaggregated by individual products or financial instruments.
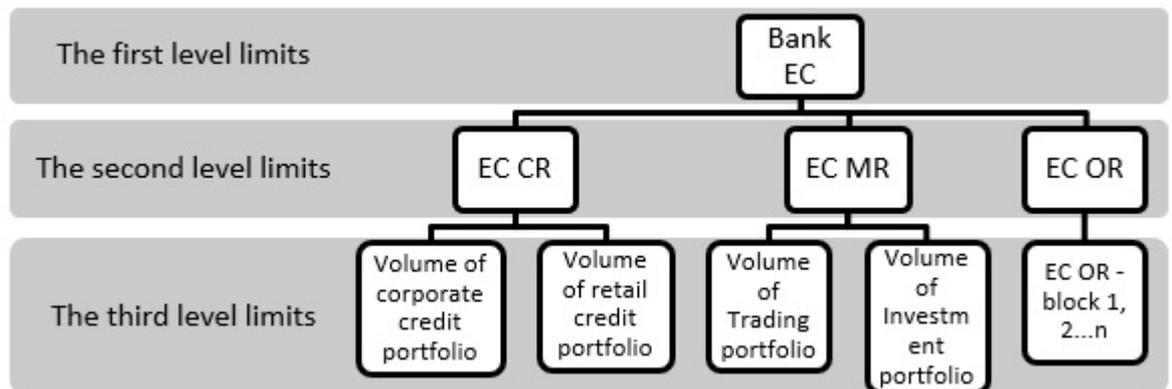
Fig. 4. An example of a system of limits based on the allocation of bank risk capital

5. Conclusion, Contribution and Implication

The multifactor model for assessing economic capital proposed above can be implemented within the traditional bank model, as the parameters of the financial model are also risk factors in the proposed model for assessing economic capital. Thus, this model is naturally integrated into the strategic planning and management system, since, simultaneously with the selection of planned alternatives, their risks will be assessed and economic capital estimates will be calculated at all hierarchical levels of management: departments, products, customers.

The approach based on the use of Income Statement Analysis to identify positions exposed to various types of risk allows you to automatically determine weights for aggregating estimates of economic capital of certain material risks into an assessment of the total risk of a bank.

As shown above, the use of the proposed model fulfills all the requirements of Pilar 2 and Bank of Russia regulations regarding ICAAP procedures.

6. References

BCBS(1988) International convergence of capital measurement and capital standards// Basel Committee on Banking Supervision - www.bis.org, 15 Jul 1988, PP.1-30.

BCBS(2004) Basel II: International convergence of capital measurement and capital standards: a Revised Framework// Basel Committee on Banking Supervision - www.bis.org, 10 Jun 2004, PP.1-251.

BCBS(2010) Basel III: A global regulatory framework for more resilient banks and banking systems// Basel Committee on Banking Supervision - www.bis.org, 16 Dec 2010, PP.1-77.

BCBS(2009) Range of practices and issues in economic capital frameworks// Basel Committee on Banking Supervision - www.bis.org/publ/bcbs152.pdf, 27 Mar 2009, PP.1-73.

BCBS(2012) Principles for effective risk data aggregation and risk reporting// Basel Committee on Banking Supervision Consultative Document - www.bis.org/publ/bcbs222.pdf, 25 Jun 2012, PP.1-24.

BCBS(2013) Principles for effective risk data aggregation and risk reporting// Basel Committee on Banking Supervision Consultative Document - www.bis.org/publ/bcbs239.pdf, 8 Jan 2013, PP.1-28.

BCBS(2013) Progress in adopting the principles for effective risk data aggregation and risk reporting// Basel Committee on Banking Supervision Consultative Document www.bis.org/publ/bcbs268.pdf, 17 Dec 2013, PP.1-34.

BCBS(2018) Progress in adopting the principles for effective risk data aggregation and risk reporting// Basel Committee on Banking Supervision Consultative Document www.bis.org/publ/d443.htm, 20 Jun 2018, PP.1-26.

Bank of Russia (2015) On Requirements for the Risk and Capital Management System of a Credit Institution and a Banking Group// Bank of Russia Directive No. 3624 U - www.cbr.ru, 15.04.2015, PP.1-28.

Dugin A.D. and Co (2019) Risk and capital management system development (ICAAP) (under the editorship of Dugin A.D. and Penicas G.I.) // - M.:Urait. PP.145-167

Pomorina M.A.(2017) Financial management in a commercial bank// - M.: Knorus

Assessment of the risk of a decrease in the customer base of banks in connection with the development of financial technologies

Dmitri Pomazkin – National Research University Higher School of Economics, Moscow, Russia
Dmitri.pomazkin@mail.ru

Andrey Egorov – National Research University Higher School of Economics, Moscow, Russia

Keywords: Fintech, risk, banks, customer base, financial markets

1. Introduction

Due to the development of FINTECH, which opens up comfortable access to financial markets for both corporate clients and individuals, banks may face risks associated with both a reduction in deposits and lending volumes, which may lead to a reduction in profits. In this regard, it is advisable to build a socio-demographic client model and estimate the proportion of individuals who can independently manage the investment portfolio and the amount of funds that can be placed in securities. The main idea of the model is to estimate the change in the share of active users of FINTECH, due to the growing up and growth of financial resources in the younger generation. The results can be useful when specifying loyalty programs based on age category Given the potential growth of the stock market due to the low base effect and the increasing number of new brokerage accounts, the flow of funds from deposits to the stock market may increase even more. On the other hand, it is necessary to assess the reduction in lending volumes due to the possible development of the corporate bond market.

2. Theoretical Background and Literature Review

In connection with the development of fintech, which provides comfortable access to financial markets for both corporate clients and individuals, banks may face a risk associated with both a reduction in the volume of deposits and the volume of lending, which may lead to a reduction in profits. In this regard, it is advisable to build a socio-demographic client model and assess the proportion of persons who are able to independently manage the investment portfolio and the amount of funds that can be placed in securities.

3. Research Design, Methodology and Data Analysis

The main idea of the model is to assess the change in the share of active fintech users in connection with the growing up and growth of financial resources among the younger generation.

4. Results/Findings and Discussion

The results can be useful in refining loyalty programs based on age category. Given the potential growth of the stock market due to the low base effect and the increasing number of new brokerage accounts, the flow of funds from deposits to the stock market may further intensify. On the other hand, it is necessary to assess the reduction in lending volumes due to the possible development of the corporate bond market.

5. Conclusion

In order to mitigate the risks of reducing the customer base, in addition to implementing loyalty programs, banks need to develop a targeted approach, taking into account the socio- demographic client profile, the development of financial technologies and services provided by other financial institutions. To prevent the outflow of the client base, it is advisable, in addition to regular monitoring of the age profile of retirement, to conduct modeling of future changes in the age profile of the client base to clarify possible reasons for retirement and take preventive measures.

6. References

Ang, J. B., and S. Kumar. (2014). Financial Development and Barriers to the Cross-border Diffusion of Financial Innovation. Journal of Banking & Finance 39: 43–56. doi: 10.1016/j.jbankfin.2013.10.011

Immortal E.R. (2018). Digitalization of the financial sector of the economy: who will receive digital dividends? // Economics. Taxes. Right.. No2.

Kamau, D. M., Oluoch, J. (2016). Relationship between Financial Innovation and Commercial Bank Performance in Kenya, International Journal of Social Sciences and Information Technology, 2(4), 34-47.

Shabbir, M. S., Rehma, A. K., Shabbir, T. (2016). Combine Effect of Automated Services and Traditional Services Quality on Customer Satisfaction: Evidence from Banking Sector of Pakistan, Int J Econ Manag Sci, 5(327), 2, 1-8.

Tahir, S., Shah, S., Arif, F., Ahmad, G., Aziz, K. and Ulla, M. (2018). Are financial innovations improving performance? Analysis of technological innovations used in Pakistan. Journal of Innovation Economics and Management, 27 (3), 195-214. DOI: 10.3917 / jie.027.0195.

Victor, O. I., Obinozie, H. E., Echekoba, F. N. (2015). The Effect of Information Communication Technology and Financial Innovation on Performance on Nigerian Commercial Banks 2001-2013, International Journal of Accounting Research, 42(2437), 1-16.

Migration matrices as a tool for calculating the probability of default for the entire life of an asset

Alfiya Vasilyeva – National Research University Higher School of Economics, Moscow, Russia
alfiavaf@mail.ru

1. Theoretical Background and Literature Review

The crisis of 2008 clearly exposed the drawbacks of the global financial system. It became clear that credit risk assessment models should be based on expected credit losses (EL), and for a particular group of assets, the probability of default (as one of the main components involved in calculating EL) should be calculated over the entire life of the financial instrument. Such requirements have been implemented in the framework of the new international financial reporting standard (IFRS 9) worldwide since January 1, 2018. (Including Russian banking market). It means banks have to bring into line the current models for assessing credit risk. IFRS 9 is based on the expected credit loss (ECL) approach. The new business model radically changes the approach to reserve formation and takes into account the impact of macroeconomic indicators on their value.

The purpose of the article is to build a model for estimating the probability for the entire life of assets in accordance with the requirements of IFRS 9.

Group-wide models are typical low default portfolios characterized by low or no defaults; in particular, good rating grades might experience many years without any defaults even when external data are considered (i.e. rating agencies' data). Examples include portfolios with an overall good quality of borrowers (e.g. sovereign or bank portfolios) as well as high-volume-low-number portfolios (e.g. specialized lending).

However, none of these assets are default free, hence any reasonable model should assign always a positive default probability. Unfortunately, the direct fitting of the zero cDRs via any fitting function and, in particular, via the adjusted Weibull function is not suitable due to the excessive number of assumptions and manual adjustments required.

For these reasons, it has been decided to use a different methodology across the whole Group-Wide segments relying on Non Homogeneous Continuous Time Markov Chain (NHCTMC) methodology.

Markov models for transitions among risk categories are widely used methods in areas from portfolio management to bank supervision and risk management.

They are based on transition matrices which represent a key tool when assessing the riskiness of a credit exposure, since they report the distribution of issuers/borrowers based on their initial rating class and on their final status at the end of a particular time interval (e.g., one-quarter or one-year). The last column of the matrix represents the default state, considered to be an absorbing state.

The development of this model is based on commercial Bank data, so both commercial banks and regulatory authorities in implementing projects to implement IFRS 9 can use the results and applied methods. The practical relevance of this work also determines its scientific novelty, since it represents one of the first studies in the field of long-term probability of default on real data of Russian commercial banks.

The probability of default over the life of a financial instrument (life-time PD / lt PD) is determined based on migration matrices, and the approaches of rating agencies to calculate expected losses and the probability of default over long time horizons will also be described.

2. Research Design, Methodology and Data Analysis

Generator Matrix and its correction. The first step of the procedure is the calibration of a so-called generator or Q-matrix with respect to the long-run average 1-year migration matrix, describing transaction of a continuous-time Markov chain at infinitesimal small time intervals.

Specifically, let P_t be a Markov migration matrix among credit ratings at time t (*i.e.* an $n \times n$ real matrix with non-negative entries and with row-sums equal to 1), a matrix Q is a generator for the Markov chain (*i.e.* an $n \times n$ real matrix with non-negative off-diagonal entries and with row-sums 0) if $P_t = exp(t \cdot Q)$ defines the migration matrix for the time interval $[0, t]$, where $exp(\cdot)$ denotes the matrix exponential. The default probability $p_t^{(n)}$ for any given period t could be retrieved from the last column n of the $n \times n$ migration matrix $exp(t \cdot Q)$, where n is equal to the number of rating classes.

Non-Homogenous Continuous Time Markov Chain**.** Bluhm and Overbeck (2007) show that cumulative default frequencies can be interpolated well by a Non-Homogenous Continuous Time Markov Chain (NHCTMC) approach. The main difference to the Homogenous Continuous Time Markov Chain (HCTMC) is that the NHCTMC drops the time homogeneity assumption providing, in this way, a remedy to the systemic overestimation of the cumulative default frequencies obtained under the HCTMC. In fact, typically, time-homogeneous transition matrices can be considered adequate for limited forecast horizons (one or two years), but for IFRS9's purposes are seen as an excessive simplification since their ability to fit empirical term structures is limited to some extent.

3. Results/Findings and Discussion

At the time of development of the Lt PD model for the "Banks" segment, 2,782 observations were available for 354 banks since July 2009. For the "Contractors" segment, 453 observations were available for 135 contractors since July 2009. For the "Counterparties" segment, due to the complete absence of default observations, the approach to Lt PD modeling based on migration matrices is also not applicable.

Taking into account the above, an approach to Lt PD modeling based on migration matrices based on combined internal data on rating changes for the two segments was considered for the "Banks" and "Counterparties" segments.

When combining the rating groups, the number of observations in the rating group ranged from 168 to 485 observations (with the highest number of observations in the "good" rating groups and the lowest number of observations in the "bad" rating groups). Since it is important for segments with high credit quality borrowers to have a sufficient number of observations in "good" ratings to analyze the migration of ratings, it was concluded that the approach to Lt PD modeling is applicable by constructing a rating migration matrix based on internal data.Annual matrices were counted as follows:

✓ the calculation of the one-year probability that a borrower with a certain rating at the beginning of the year will have a particular rating in a year was carried out on a quarterly basis at an annual interval (annual matrices were calculated with a quarterly frequency) ;
✓ analyzed data from 01.07.2009 to 01.10.2017 (30 matrices in total);
✓ the matrix obtained by averaging 30 matrices was taken as the base one-year matrix;
✓ for the "Banks" and "Counterparties" segments, the data was combined into rating groups 2 (1+, 1, 1-, 2+, 2, 2-), 3 (3+, 3, 3-), 4+, 4, 4-, 5+, 5, 5-, 6+, 6, 6-, 7 (7+, 7, 7-), 89 (8+; 8; 8- and 9). The need to combine into groups is due to the insufficient number of observations in individual rating grades

Results of calculating cumulative PD**.** The calculation of cumulative PD was carried out by raising the adjusted base one-year migration matrix to the power. Multi-year matrices were designed for a period of up to 5 years.

Risk category	1 год	2 год	3 год	4 год	5 год
2	0,2%	0,5%	1,0%	1,8%	2,8%
3	0,6%	1,6%	2,8%	4,4%	6,3%
4+	1,0%	2,2%	3,9%	5,9%	8,1%
4	1,2%	3,0%	5,1%	7,5%	10,1%
4-	1,6%	3,5%	5,8%	8,4%	11,2%
5+	2,0%	4,6%	7,6%	10,8%	14,1%
5	2,6%	6,0%	9,7%	13,5%	17,3%
5-	3,4%	7,2%	11,3%	15,5%	19,7%
6+	4,3%	8,8%	13,6%	18,3%	22,9%

Risk category	1 год	2 год	3 год	4 год	5 год
6	5,5%	11,8%	18,1%	24,0%	29,4%
6-	7,1%	16,4%	25,1%	32,6%	38,9%
7	11,1%	20,5%	28,6%	35,5%	41,4%
89	32,4%	50,9%	62,0%	69,0%	73,6%
10	100,0%	100,0%	100,0%	100,0%	100,0%

4. Conclusion, Contribution and Implication

This model has been developed on the basis of data from a commercial bank. Its results may be used from theoretical and practical points of view by commercial banks as well as by regulatory authorities when executing projects involving the implementation of IFRS 9

5. References

International Accounting Standard (IAS) 39. Financial Instruments: Recognition and Measurement. 2016. URL: http://www.consultant.ru/document/cons_doc_LAW_193673/ (In Russ.).

Vasil'eva A.F., Zhevaga A.A., Morgunov A.V. Methods of managing credit risk of corporate clients in the face of variability of requirements of financial reporting standards. Upravlenie finansovymi riskami. 2017;(4):258-268. (In Russ.).

International Financial Reporting Standard (IFRS) 9. Financial Instruments. 2018. URL: http://www.consultant.ru/document/cons_doc_LAW_201982/ (In Russ.).

Guidance on credit risk and accounting for expected credit losses (BCBS 350). 2015. URL: https://www.bis.org/bcbs/publ/d350.pdf

Bank of Russia Regulation No. 483-P "On the procedure for calculating credit risk amount based on internal ratings". 2015. URL: http://www.consultant. ru/document/cons_doc_LAW_186639/ (In Russ.).

Dodson B. The Weibull analysis handbook. Milwaukee, WI: ACQ Quality Press; 2006.

Kuznetsova Yu.I., Zhuravlev I.B. Application of the Bayesian estimate of the probability of a rare event to determining the probability of default of a counterparty. Upravlenie finansovymi riskami . 2013;(2):94-102. (In Russ.).

Svetlov K.K. Stochastic market analysis methods. Cand. econ. sci. diss. Synopsis. St. Petersburg: St. Petersburg State University; 2015. 24 p. URL: https://disser.spbu.ru/disser2/752/aftoreferat/Svetlov_Avtoreferat.pdf (In Russ.).

Rating agencies in the BRICS countries

Sergei Grishunin – National Research University Higher School of Economics, Moscow, Russia
Sergei.v.grishunin@gmail.com; Sgrishunin@hse.ru,

Natalya Dyachkova – National Research University Higher School of Economics, Moscow, Russia

Keywords: credit ratings, national rating agencies, BRICS, text screening, methodology comparison, effectiveness, regulation, competition

1. Introduction

The relevance of the scientific and practical paper is based on the fact that it is necessary to monitor the ongoing changes in the regulation and practice of macroprudential supervision of the activities of national rating agencies (NRA), and it will be able to compare them for different countries with a similar level of economic development. A potential benefit from a comparative analysis of a large number of publications will be the identification and implementation of the most important changes in the activities of foreign and NRAs, and an assessment of their impact on local financial markets. Such impact is relevant for predicting financial shocks associated with the actions of the NRA.

The scientific and theoretical significance of the results presented by papers of the comparative analysis and the preparation of the review is going to use the processing of large text database using text-based screening methods for a pool of scientific papers on NRA activities, their regulation and performance in the domestic financial markets of the BRICS countries. The object of the study is the theoretical and empirical papers of foreign and Russian authors on the study of differences in credit ratings and the regulation of the rating agencies.

2. Theoretical Background and Literature Review

An important aspect of the work is the analysis of the competition between national and international rating agencies, including the impact of duopolistic and oligopolistic equilibriums and considering the optimal Pareto conditions for pricing of rating services, the payment problem (distance ratings vs. buying) for various types of ratings and the problem of ratings inflation according to BRICS financial markets.

At the same time, the results of empirical observations and studies obtained within one country will be compared with the results of external studies in relation to them by the NRA of another country, including a comparison of the practices and methodologies for assessing issuers of Chinese and Russian agencies. The conducted meta-analysis will allow us to compare both financial and non-financial factors that affect the qualitative change in ratings assigned to different issuers, as well as the possibility of comparing ratings of different NRAs.

The object of the research is theoretical and empirical works of foreign and domestic authors on the study of discrepancies in credit ratings and regulation of RA activities.

3. Research Design, Methodology and Data Analysis

The textual analysis is based on the analysis of articles based on the dynamics of ratings over the past twenty years. The expected results of the study will reveal the main trends of the ongoing changes in the field of regulatory supervision of rating activities in the BRICS partner countries. The presented analysis of modern sources will include publications reflecting the dynamics of assigning and changing ratings of issuers and their issues in the BRICS countries.

An important aspect of the work is the analysis of the competition between NRA and MRA in the domestic and foreign markets, from assessing the state of duopolistic and oligopolistic equilibrium to the formation

of Pareto-optimal conditions for the pricing of rating services, terms of payment for various types of ratings and the problem of rating inflation in the domestic financial markets of the BRICS countries.

From a practical point of view, the results of the global survey of empirical sources will take into account BRICS countries and macroeconomic factors when assessing the impact of issuer credit ratings for their fuller disclosure and risk management both for local financial markets and for supporting partnerships between the BRICS countries.

4. Main Findings and Discussion

This paper presents the various stages of the formation and application of rating methodologies for ratings assigned in the BRICS countries, the material of the paper is divided into the following main sections:

> 1. A summary of the main stages of the development of the rating services market in the BRICS countries;

> 2. Consideration of the fundamental factors of the external and internal environment that affect the assignment of credit ratings and other types of ratings in the BRICS countries;

> 3. Comparative analysis of methodologies: detailed consideration of how various rating agencies from the BRICS countries determine their own ratings, which reflect expert opinion on the internal or autonomous financial stability of a bank or enterprise in relation to other banks, financial companies and industrial enterprises;

> 4. Allocation of methodological aspects of the actions of some rating agencies in relation to others: the process of forming credit ratings of one or another rating agency, their assessment of the probability of default and the level of requirements for maintaining the rating, their inclusion of fundamental analysis, which consists of assessing the macroeconomic profile for each system, the operating environment and the company's own financial profile; for commercial banks, concepts are included that reflect the idea of its solvency and liquidity, as well as any other qualitative factors.

A feature of the paper is the consideration of issues on the support of ratings, their sensitivity and structural analysis of the processes of rating agencies from the BRICS countries in connection with the definitions of the Basel agreements. The main approach in the work is to take into account the expectations associated with various forms of external support for the actions of rating agencies and the market acceptance of their information. The structure of the paper also reflects how ratings for banks are determined and interpreted, and how the ratings of banks are influenced by the methodology of various rating agencies, how they consider the structure of the bank's liability and assets, which affect the risk of debt instruments and deposits in the event of bank failure, and in the absence of their potential support.

4a. Stages of the Development of the Rating Services Market in the BRICS

As a result of the financial crisis of 2007-2008. In the international financial markets, a fundamental change in the financial architecture of many companies took place, and not least, in this regard, international rating agencies also began to change, because not least of all, their risk assessment methodologies indirectly led to an increase in the crisis in the American and European markets. These events led to the fact that they revealed the need to search for a multilateral response and take collective responsibility for the crisis phenomena and search for specific solutions to develop and take measures aimed at restoring confidence and economic growth. The BRICS partners respond by creating their own methodologies and internal risk assessment systems by small rating agencies, which would limit the dominant influence of the "Big Three" international rating agencies in the financial markets within these countries. Such step is an initiative for the BRICS countries, because it is directed towards the interests of developing countries and countries with

economies in transition, since demonstrated their active desire to participate in the transformation of international markets and the ability to defend their own interests.

4b. Comparative analysis of methodologies

Most methodologies for assigning credit ratings in assessing various risks cover the banks under which the rating agencies consider the institutions commonly referred to as such in accordance with national law. As a rule, European and American banks are characterized by their regulatory status, usually have a license to attract deposits from the population, provide loans, are regulated at the domestic level by the state and the central bank, and have access to liquidity replenishment through the central bank channels. In the EU, there are also specialized "credit institutions" as banks. Issuers who are designated as

"Lending institutions" are usually valued using a slightly different methodology than conventional banks, and these specialized institutions have most of the following characteristics: bank statutes or equivalent; calculation and disclosure of regulatory capital ratios such as tier 1 capital (tier 1), risk weighted assets (RWA) also have their own liquidity, membership in the EU payment system, material financing (usually more than 20% of total financing) and access to central bank financing.

The approaches described in most of the methodologies of various rating agencies are similar and applicable to both new ratings and monitoring existing ratings over time. When assigning a new rating, most rating companies tend to place great emphasis on the financial history of the company, as well as an understanding of its strategy and business model, and additional institutional factors that usually require less analysis. In addition, rating agencies may have a different approach to assessing banks with limited financial histories. Most of the processes and observations are carried out by rating committees, which usually assess all the main components of the rating, experts can sometimes focus on one or more of its components, expressing their expert opinion. The following components are subject to peer review when assigning a credit rating:

- Changes in the company's profile at the macro / microeconomic level: may not necessarily lead to a revision of the bank's credit rating, but is the main input parameter for assessing the external environment of the bank's activities;

- Changes in the bank's financial ratios or other internal financial indicators may lead to a revision of its baseline credit assessment without taking into account the revaluation of the bank's macro / micro profile;

- Changes in the structure of the bank's assets and liabilities may lead to a revaluation of the LGD component in the analysis, while revision of other components is not required;

- A change in the level of government support for a bank or enterprise may lead to a revision of the credit rating without a mandatory revision of its base credit assessment or its preliminary rating assessments (PRAs), or its debt instruments with existing ratings.

The assignment of a credit rating to a financial instrument of a previously unconsidered or new type (for example, according to the Basel Accords, the conditional capital of a bank), may lead the rating agency to a decision to assign a credit rating without re-evaluating other components according to the rating agency's internal methodology.

4c. The Fundamental Factors of the External and Internal Environment of Rating Space

Main differences in methodological principles among rating agencies. Most of the methodologies are based on the experience of the recent financial crisis and internal research by rating agencies. The credit rating approach uses a sequential analysis, taking into account the assignment of the following ratings, which characterize the different risk profile of the company:

1. Assessment of the financial strength profile of the bank / company, as a result of which the probability of default of the company is calculated;

2. Assessment of support for the company from investors and the state, market position;

3. Analysis of the impact of the depth of economic ties and counterparties, assessment of possible losses and the structure of the company's assets, highlighting areas of specific risk associated with other risks by the types of activities of the bank / company;

4. Assessment of internal management and company structure.

The combination of these assessments allows us to step by step consider the position of the bank / company, and based on the data obtained, form a rating assessment of the bank / company relative to the market.

Factors determining the rating value. The analysis of the company begins with an assessment of system-wide factors, which represent data on the macroeconomic situation in the country, which is also noted as a macroeconomic profile:

1. Availability of economic variables: GDP growth, real interest rates;

2. Consideration of the influence of the environment: exchange rate, price level;

3. Credit variables, asset quality, amount of overdue debt;

The presence of other factors for which predictive qualities are more difficult to predict, namely: the reliability of the country's institutions, compliance with legal and legal norms, the corruption index, vulnerability to external financing, structural advantages. Most of these factors are based on the methodology of rating agencies, taken from the methodologies for assessing and assigning sovereign ratings and analysis of sovereign creditworthiness. It also takes into account the factors underlying banking crises, which are closely related to sovereign and currency crises. International rating agencies use the practice of drawing up their own testing procedures to establish certain factors and elements of the macroeconomic profile, while international rating agencies, when assessing the external structure of the market, use methodologies that are developed within one rating system and are formed from the components of the sovereign rating assessment. In this case, the factors that determine the macroeconomic, regulatory, operating and market environment are used.

The analysis of the financial condition of each bank or financial company is based on these two main characteristics of solvency and liquidity. Assuming all other variables are equal, higher capitalization increases the ability to absorb losses, increasing counterparty confidence and reducing the risk of liquidity problems. Meanwhile, larger liquid assets indirectly increase solvency, as they allow the bank not to sell illiquid assets at a loss in the event of a financing problem.

5. Conclusion

Our conclusions can be set as following statements that the characteristics of the development of rating agencies in the BRICS countries. The business development process of credit rating agencies in emerging markets consists of the following conditions:

1. Independence of the credit rating process from the commercial interests of the business;

2. The skills and qualifications of personnel involved in business development and preparation of products and services;

3. The level of fees charged for credit ratings and related services;

4. The scope of services that can be provided by rating agencies.

The broadened influence of ratings & the understanding of these issues through its work on conflicts of interests, fees and regulation of the provision of ancillary services by rating agencies have severe aspects for further work. It is also noted a number of changes related to the number of assigned credit ratings in the BRICS countries, the data is shown in the diagram below. As it can be seen from the dynamics, the percentage of credit ratings assigned by international agencies is gradually decreasing in favour of national rating services and agencies.

6. References

Bozovic, Milos & Urosevic, Branko & Zivkovic, Bosko. (2011). Credit Rating Agencies and Moral Hazard. Panoeconomicus. 58. 219-227. 10.2298/PAN1102219B.

Dyatchkova, Natalya & Grishunin, Sergei & Karminsky, Alexandr. (2018). Credit ratings patterns for BRICS industrial companies. Procedia Computer Science. 139. 17-24. 10.1016/j.procs.2018.10.212.

Elkhoury, Marwan. (2007). Credit Rating Agencies and Their Potential Impact On Developing Countries. United Nations Conference on Trade and Development, UNCTAD Discussion Papers.

Galyaeva, L. & Kotlyar, E.. (2016). The development trends of credit rating agencies activity in Russia. Proceedings of the Voronezh State University of Engineering Technologies. 307-313. 10.20914/2310-1202-2016-2-307-313.

Helleiner Eric & Hongying Wang (2018) Limits to the BRICS' challenge: credit rating reform and institutional innovation in global finance, Review of International Political Economy, 25:5, 573-595, DOI: 10.1080/09692290.2018.1490330.

Karminsky, Alexandr & Grishunin, Sergei & Dyachkova, Natalya & Bisenov, Maxim. (2019). The comparison of empirical methods for modeling credit ratings of industrial companies from BRICS countries. Eurasian Economic Review. 10. 10.1007/s40822-019-00130-4.

Empirical modelling of international banks' credit risk: assessment and comparison of credit ratings

Alexander Karminsky – National Research University Higher School of Economics, Moscow, Russia

Ella Khromova – National Research University Higher School of Economics, Moscow, Russia

Roman Kudrov – National Research University Higher School of Economics, Moscow, Russia
kudrovroman@gmail.com

Keywords: banks, credit risk, ratings, liquidity.

1. Introduction

The activities of CRAs are finite, hence not all the banks are assigned a credit rating. Credit rating modeling is wildly used in the academic literature, but there are several limitations in the practical implementation of these models. Due to difference in methodologies and possible subjectivity, we may not rely on the forecasted credit rating of a single CRA. This prevents the practical use of models obtained in the previous papers. To solve these problems, in this paper, we construct a credit rating model for assessing bank's credit risk, namely an ordered logit model with a panel data structure. The aim of this paper is to develop the technique for credit risk assessment using a uniform credit rating model. The object of our research is the international banks. The subject is the financial sustainability of banks taking into account the macroeconomic situation and level of state governance in the country of residence.

2. Theoretical Background and Literature Review

The econometric techniques used for credit risk assessment belong to one of the following groups: company's bankruptcy prediction and credit rating analysis. Altman & Rijken (2004) demonstrated that the models of bankruptcy prediction worked accurately in the short run period (1 year), but for long run (around 6 years) credit risk estimation credit rating models were preferred. Later, the models of credit ratings were applied in the works (Hwang et al., 2010; Bellotti et al., 2011; Le & Viviani, 2018). Karminsky & Khromova (2016) built econometric models to predict the rating of three international agencies. Karminsky & Khromova (2018) aggregated the previous experience in credit ratings and PD modeling in their work on the sample of Russian banks from 2007 to 2017 year. We have analysed an extensive set of academic papers and prepared the table with potential factors and indicators which can be used in the modelling. Since credit rating is not a quantitative figure, it is usually compared to the fundamental risk ratios (PD, LGD and EAD). Pomasanov & Vlasov (2008) and Hamalinsky & Pomazanov (2012) introduced the model of credit ratings calibration on PD for Russian banks.

We formulate the following list of hypotheses to be tested in our paper. *Hypothesis 1:* Subjectivity of CRAs' assessment of international banks' financial sustainability can be reduced by using multiple ratings simultaneously in the base scale. *Hypothesis 2:* Transparency of the public authority and government effectiveness benefit banks in credit risk management and help them to obtain higher credit ratings. *Hypothesis 3:* The share of a factor of liquidity in the credit rating assessment increases during the periods of financial crises and distress. *Hypothesis 4:* Banks with recently issued credit ratings tend to be less stable just after the rating assignment than banks with even lower credit ratings issued a long time ago.

3. Research Design, Methodology and Data Analysis

We collect the credit ratings assigned by the Big-3 international rating agencies: Standard Poor's (S&P), Moody's and Fitch Ratings. The credit ratings are collected from the website Cbonds.ru which provides financial information about the international companies. We analyse a time period from the first quarter of 2007 to the first quarter of 2019 year. This time interval includes the worldwide financial crisis (2008/2009 years) which allows our econometric calculations to be persistent to shocks. In total, there are 49 quarters. All the data is considered at the end of the corresponding quarter. The final sample contains of 8684

observations (bank- quarters) for Moody's agency, 7195 for S&P and 6261 for Fitch rating agency. The sample consists of 46 countries: 14 developed and 32 developing ones. The sample represents different geographic regions, just as the initial data extracted from the portal, which makes it representative. We have managed to collect 29 indicators of influence on banks' financial sustainability. Also, we collect the macroeconomic ratios that are usually used in the academic literature. The source of information is OECD.org and The World Bank. Macroeconomic indicators cannot fully explain the business risk associated with a particular country. That is why we collect the indicators responsible for the state governance quality. This is the first time when such set of variables is used in credit rating modelling. We have gathered these variables from The World Bank. These indexes are the components of the database "Worldwide Governance Indicators".

In our work we will use the linear logarithmic model which was successfully applied in the paper (Karminsky& Sosyurko, 2011) in order to obtain the pairs of coefficients for displaying each of analyzed scale into the base one:

$$\ln(M) = a_i \ln(R_i) + b_i$$

For each rating scale i the equation is built, where M – Moody's rating in numerical scale; R_i – rating of an agency i in the numerical scale; a_i and b_i are the found coefficients of the model. We use the Moody's international scale as a base one as it has the greatest number of ratings-pairs with other scales.

In this paper we build the models to predict a categorical variable (a credit rating), hence standard logit and probit models cannot be used. Ordered logit/probit models will be applied. We have estimated both ordered probit and logit models, but ordered logit was preferable due to higher predictive power and greater number of significant variables. In all further chapters we present the results of ordered logit models estimation.

4. Results/Findings and Discussion

4.1. Credit rating models for different agencies

First of all, we start with the models aimed at credit rating forecast on the basis of public information for three agencies: Moody's, Standard & Poor's and Fitch Ratings. In our work we decided to use the time lag of 2 quarters. In order to control for heteroscedasticity, we use White-Huber standard errors. We start with the first model specification (models m(1), sp(1) and f(1)) including financial variables (with interaction terms) only. The second model specification (models m(2), sp(2) and f(2)) includes the country-specific ratios (macroeconomic and state governance indexes). The results of estimation are shown in **_Table 1_** (see the Appendix). We fail to reject the first hypothesis. CRAs may have different methodologies and various external factors (subjectivity, competitiveness, regulations, etc.) may lead to biased credit scores. The significance levels of indicators are different for CRAs and some indexes are significant for Moody's and S&P but insignificant for Fitch. Hence, we cannot accurately interpret the influence of these explanatory variables on the credit risk, which proves Hypothesis 1.

4.2. Principal Component Analysis (PCA)

Principal Component Analysis (PCA) may help to capture as much information about the data as possible in the minimum number of variables. PCA is also helpful in solving the multicollinearity problem. This method allows to reduce the number of variables by selecting the most volatile ones. We apply PCA on two groups of country-specific variables as these are highly correlated inside their groups.

4.3. Uniform credit rating model

In real life, credit rating may be used as an estimator of credit risk and the agency that provides this rating is not always important. This brings us to the idea of joint modeling of different credit ratings. We will take the minimum value of single scale numeric credit rating (numbers were assigned according to the mapping

provided above). In total, we have 30 different credit values from the lowest rating (1) to the highest one (21.5). We decided to take the minimum value as this would help us to estimate credit risk correctly. The first model specification is constructed including financial variables only. The second model specification is constructed including financial, interaction terms and principal components. The results of estimation are shown in *Table 2* (see the Appendix). The principal components for macroeconomic situation (MAC1 and MAC2) and for the state governance level (GOV1) are significant at 1% significant level, which depicts the correct choice of the PCs. High level of significance of this PC supports the second hypothesis.

4.3.1. Marginal effects calculation

The estimation results of ordered logit model help us to understand the sign of influence of a particular covariate on credit risk. The coefficients themselves do no show the power of the influence. To evaluate it, we need to calculate the marginal effects. The largest marginal effects are caused by indicator NONL/L (proxy for asset quality), hence in our sample the credit risk is mostly associated with poor asset quality of a bank. For both emerging and developed countries the marginal effects of leverage on rating classes are significant. However, it can be clearly seen that for banks from developed countries (EU) this ratio affects the credit ratings stronger than for banks from emerging countries (CIS). We fail to reject the third hypothesis. During the financial crisis in 2009 it was important for banks to keep high liquidity in order to survive and decrease the credit risk. Before crisis and after crisis CUR is not so influential on credit ratings and credit risk. In 2010 the marginal effects of CUR decreases comparing to 2009 year, but do not return to pre-crisis values.

4.3.2. Model's forecasting power and robustness check

The final grade model has the highest forecasting power. Our analysis provides us with the model with almost 80% of rating grades predictions with an error less than two rating grades. Only 12% of forecasted ratings by grade(2) deviate from the actual ones by more than three rating grades. We conduct the following robustness checks: sensitivity to changing the type of the model, sensitivity to changing the credit rating classification and out-of-sample forecasting power. The analysis depicts that models are accurate and robust.

4.4. Calibration of credit ratings and PD on the example of Russian banks

We have presented the results of constructing a dynamic scale of credit rating conversion to probability of default (PD). We notice that banks with junk ratings (from class C) have very high probability of failure after the first quarter of credit rating assignment (the default frequency is about 56%). However, such banks that can survive after the first quarter have probabilities of default even lower than banks with ratings from a better class (class CCC) and for some periods the probabilities of default are even less than for credit ratings from class B. In a group of junk credit ratings, a bank which is able to survive for one year after the rating issue has a lower incremental PD on the horizon of the next five years (as CAGR value shows). This tendency does not allow us to reject the fourth hypothesis for the banks with highly speculative credit ratings.

5. Conclusion, Contribution and Implication

Our paper introduces the approach to credit risk valuation, which is not limited by credit rating estimation only. The models proposed in the previous academic articles help economic agents to forecast the numerical credit rating that could have been assigned by a CRA; interpretation of this rating score remained for the interested party itself. In our work we calibrate the credit rating on the PD using the historic default frequencies of Russian banks. Using the obtained dynamic transmission scale, it is possible to value the credit risk associated with a particular grade, which makes credit ratings more comprehensive and intuitive for investors and may help them in investment decision making. The analysis does not allow us to reject

the fourth hypothesis for banks with credit ratings from highly speculative class.

The novelty of the article is the derivation of a credit risk estimation method on new extensive sample of international banks. We are able to show that in order to assess the credit risk correctly it is not enough to forecast the credit rating of any CRA, as the forecasted scores may vary. We present the model of credit rating forecasting on a base scale, which helps us to eliminate the subjective and unjust assessments of rating agencies. Moreover, we find out new significant indicators on banks' credit risk and evaluate their power of influence.

6. References

Altman, E. & Rijken, H. (2004). How rating agencies achieve rating stability. Journal of Banking & Finance, 28(11), 2679–2714.

Bellotti, T., Matousek, R. & Stewart, C. (2011). Are rating agencies' assignments opaque? Evidence from international banks. Expert Systems with Applications,38(4), 4206-4214.

Hamalinsky, A. & Pomasanov, M. (2012). The rating model calibrating for sectors with a low number of defaults. Financial risk management, 2, 82-94. (in Russian)

Hwang, R-C., Chung, H. & Chu, C. (2010). Predicting issuer credit ratings using a semiparametric method. Journal of Empirical Finance,17(1),120-137.

Karminsky, A. & Khromova, E. (2016). Modelling banks' credit ratings of international agencies. Eurasian Economic Review,6, 341-363.

Karminsky, A. & Khromova, E. (2018). Increase of banks' credit risks forecasting power by the usage of the set of alternative models. Russian Journal of Economics, 4(2), 155-174.

Karminsky, A. & Sosurko, V. (2010). Features of modeling of the international ratings of the banks. Financial risk management, 4, 292-305. (in Russian)

Le, H. & Viviani, J. (2018). Predicting bank failure: An improvement by implementing a machine-learning approach to classical financial ratios. Research in International Business and Finance, 44, 16-25.

Pomasanov, M., Vlasov, A. (2008).Calibration of national rating systems. Rynokcennichbumag (Security market),74-79. (in Russian)

7. Appendix

Table 1: Ordered logistic models for different credit rating agencies

Source: Author's calculations

Indicators	Moody's		S&P		Fitch	
	m(1)	m(2)	sp(1)	sp(2)	f(1)	f(2)
CAP	0.031***	0.049***	0.051***	0.065***	0.029**	0.046***
	(0.006)	(0.006)	(0.011)	(0.013)	(0.011)	(0.011)
NONL/L	-0.077***	-0.053***	-0.049***	-0.029***	-0.010	-0.049***
	(0.005)	(0.005)	(0.007)	(0.008)	(0.007)	(0.007)
IE/DE	-8.236***	-4.223**	-1.873*	-2.194**	-23.353***	-9.986**

	(1.715)	(1.756)	(0.989)	(1.012)	(4.242)	(4.267)
ROA	3.413***	2.974**	3.542**	3.930**	0.717	0.076
	(1.217)	(1.296)	(1.570)	(1.754)	(1.268)	(1.205)
LA/NLA	0.021***	0.018***	0.019***	0.019***	0.003	0.005**
	(0.003)	(0.003)	(0.005)	(0.005)	(0.002)	(0.002)
EFF	-0.041***	-0.039***	-0.013**	-0.016***	-0.009	-0.025**
	(0.007)	(0.007)	(0.006)	(0.006)	(0.009)	(0.010)
LOGA	0.736***	1.094***	0.822***	1.163***	0.816***	1.465***
	(0.067)	(0.075)	(0.144)	(0.149)	(0.104)	(0.118)
(LEV)*(EU)	0.324**	0.291**	0.754***	0.822**	0.653***	0.589**
	(0.116)	(0.111)	(0.244)	(0.249)	(0.174)	(0.174)
LEV*(CIS)	0.249***	0.254***	0.078	0.023**	0.114*	0.051***
	(0.056)	(0.057)	(0.056)	(0.007)	(0.066)	(0.077)
(CUR)*(Y2008)	0.013***	0.013***	0.011*	0.011*	0.728***	0.727***
	(0.003)	(0.003)	(0.006)	(0.006)	(0.103)	(0.102)
(CUR)*(Y2009)	0.027*	0.036***	0.069***	0.084***	0.249**	0.251**
	(0.014)	(0.014)	(0.019)	(0.019)	(0.08)	(0.08)
(CUR)*(Y2010)	0.013*	0.013**	0.026*	0.028**	0.229**	0.226**
	(0.007)	(0.007)	(0.01)	(0.01)	(0.07)	(0.07)
GROSS		0.024*		0.092***		-0.021
		(0.014)		(0.028)		(0.023)
CABAL		-0.055***		-0.094***		-1.369*
		(0.013)		(0.024)		(0.792)
POLIT		0.251**		0.775***		0.673***
		(0.107)		(0.186)		(0.160)
Sample size	8,684	8,671	7,186	7,181	6,261	6,256
AIC	24732.98	24425.01	11121.29	10960.23	13214.53	13072.24
BIC	24937.99	24686.51	11313.93	11207.88	13403.31	13314.93

Indicators	Class model		Grade model	
	class(1)	class(2)	grade(1)	grade(2)
CAP	0.016***	0.016***	0.016***	0.016***
	(0.002)	(0.002)	(0.001)	(0.001)
NONL/L	-0.077***	-0.069***	-0.083***	-0.069***
	(0.006)	(0.007)	(0.005)	(0.005)
OE/REV	-0.004***	-0.003***	-0.003***	-0.003***
	(0.001)	(0.001)	(0.0004)	(0.0004)
ROE	0.056	0.110*	0.125***	0.119**
	(0.060)	(0.062)	(0.046)	(0.048)
LA/NLA	0.000***	0.000***	0.003**	0.003**
	(0.000)	(0.000)	(0.001)	(0.001)
EFF	-0.032***	-0.031***	-0.017***	-0.017***
	(0.006)	(0.006)	(0.004)	(0.004)
NI	0.007	0.006	0.007**	0.008**
	(0.005)	(0.005)	(0.003)	(0.003)
LOGA	0.535***		0.247***	
	(0.087)		(0.057)	
LOGA^2		0.032***		0.081***
		(0.004)		(0.011)
(CUR)*(Y2008)		0.018***		0.023**
		(0.004)		(0.011)
(CUR)*(Y2009)		0.078***		0.016***
		(0.021)		(0.004)
(CUR)*(Y2010)		0.033***		0.019***
		(0.011)		(0.007)
(LEV)*(CIS)		0.026***		0.026***
		(0.008)		(0.008)
(LEV)*(EU)		0.235***		0.0145*
		(0.047)		(0.0077)
(PROV/G)*(IE/DE)				0.00002*
				(0.00001)
(ALL/NONL)*(OE/OI)				-0.016***

105

				(0.003)
(ROA)*(AGE)				0.199*
				(0.673)
MAC1		0.874***		0.886***
		(0.074)		(0.052)
MAC2		-0.316***		-0.953***
		(0.059)		(0.121)
GOV1		2.863***		1.603***
		(0.128)		(0.092)
Sample size	12,350	12,091	12,350	12,174
AIC	12369.24	11567.20	39330.51	38009.13
BIC	12480.46	11737.41	39619.95	38394.29

Table 2: Uniform ordered logit credit rating model

Source: Author's calculations

Development of a rating system for prediction of credit risk and probability of default of Russian banks using machine learning models

Alyona Astakhova – National Research University Higher School of Economics, Moscow, Russia
aaastakhova_1@edu.hse.ru

Sergei Grishunin – National Research University Higher School of Economics, Moscow, Russia

Keywords:Credit default prediction, Russian financial system, Ordered logit model, Artificial intelligence methods, Credit rating system.

1. Introduction

The research is dedicated to the development of a credit rating system for prediction of credit risk and probability of default of Russian banks. The rating system allows, along with the financial position of bank, to take into account its macroeconomic and market conditions, management efficiency, compliance with prudential requirements, as well as key success factors of the bank.

The relevance of the research is explained, *firstly*, by the need to predict the probability of default of financial institutions in unstable banking system in Russia with a large number of bankruptcies (according to the Bank of Russia, 2,709 licenses were revoked from 1991 to 2019). Investors and regulators need rating systems, which can efficiently segregate defaulters from non-defaulters. *Secondly*, to assess the relative creditworthiness of Russian banks, credit rating scale of its own is required, taking into account the specifics of Russian financial system. Moreover, rating agencies need national rating scale, which considers the specifics of Russia's financial system. Existing banking rating systems usually based on only financial reporting data. *Thirdly,* in unstable and fast changing environment rating systems must incorporate qualitative and regulatory data. *Fourthly*, artificial intelligence methods usually give more precision in default prediction that "traditional" methods (such as logit regression).

2. Theoretical Background and Literature Review

Literature review shows that there is a limited number of studies on the development of models for assessing the probability of default of banks in Russia. In most cases, these models: (1) do not allow forecasting the probability of default at a particular point in time taking into account macroeconomic cycles; (2) use a universal scale of international rating agencies, not calibrated to Russian market; (3) do not cover most of the spectrum of non-financial information, especially in macroeconomics, fulfilling prudential requirements, quality and management efficiency; (4) do not take into account specific factors of doing business, such as the possibility of obtaining support from the state and membership in financial and industrial groups. In addition, most studies involve the use of econometric approaches to modeling (for example, logistic regression), the number of studies using machine learning models and neural networks is limited. The literature review shows the research tasks are of primary importance for researchers and practitioners as the previous studies indicate that the credit risk assessment analysis differs using different performance criterions on different databases under different circumstances. The paper is aimed at filling the gap in the existing research as only very few efforts were focused on prediction of credit rating scale using artificial intelligence (AI) methods.

3. Research Design, Methodology and Data Analysis

Object of the research: Russian commercial banks for the period from 2015 to 2019 ("good banks" – 3 years; "bad banks" – 5 years). **Subject of the research:** artificial intelligence models for predicting the probability of default and relative credit ratings of banks. **The theoretical and methodological base** of the paper was the work of foreign and Russian researchers in the field of corporate finance, risk management

and macroeconomics. The works of the following Russian and foreign researchers were used: M.V. Pomazanov, Karminsky A. M., Peresetsky A. A., Ivashkovskaya I.V., Thomas L.C., West D. and others. The following machine learning models were used: (1) logit regression (LR); (2) classification and regression trees (CART) - Random forest, Recursive partitioning, Conditional Inference Trees, Bayesian N Recursive partitioning and Unbiased Non parametric methods - Model Based Trees (Logistic); (3) support vector machine methods (SVM) - Vanilladot Kernel and Gaussian RBF kernels; (4) artificial neural network (ANN): (5) Lasso regression and (6) Ensemble model.

Goals of the research: (1) selecting and study the scientific literature of the topic; (2) choosing the most relevant methods of artificial intelligent for building probability default models; (3) gathering a sample data of Russian banks from 2015 to 2019 (or 859 observations); (4) fulfilling a detailed comparative analysis of models' prediction accuracy; (5) building an ensemble model to improve the prediction accuracy; (6) building the rating system suitable for regulatory purposes and the distribution of ratings in this rating system.

The scientific novelty of the research is underpinned by limited research on the topic of credit rating modelling of banks in emerging markets. In particular, the system, developed, in addition to financial data considers other important metrics: macroeconomic and market conditions, management efficiency, compliance with prudential requirements and key success factors of the bank. Another novelty factors include: (1) building and comparing large number of models of artificial intelligence; (2) application of ensemble learning for improving predictive power of the model (this technique was rarely used in literature in spite its ability to enhance predictions; (3) building a rating scale which allows comparison Russian banks with each other by their credit strength.

Practical relevance of the research is highly relevant. Firstly, a lot of banks and non-financial companies started introducing internal rating systems for assessing creditworthiness of financial institutes. So, they need models and methodologies to build such models and need understanding which modelling technique gives the required precision of the level of creditworthiness. Secondly, the Central Bank of Russia needs the regulatory internal ratings system to monitor banks as part of its supervisory function. Thirdly, newly established national rating agencies need its own rating systems and rating scales which considers the specifics of Russian financial system but based on objective models with sufficient precision capabilities.

4. Results/Findings, Discussion

The research results show the ensemble model that incorporates a set of models (in this research: random forest, RBF kernel-based SVM model and logit regression) significantly increased the prediction accuracy and presented rather high AUROC – 93.4. All models related to classification and regression trees (CART): Random forest, Recursive partitioning tree and Bayesian N Recursive partitioning provided the best AUROC, Kolmogorov-Smirnov (KS) Test and Gini coefficient. Alongside with the highest discriminative power in this study CART models have good potential for interpretation and scaling in terms of factors to apply. Thereby, tree-based models are considered the most promising to apply in banks credit scoring and internal credit rating.

All machine learning models showed fair *(70 ≤ AUROC ≤ 80)* or excellent (*AUROC ≥ 80*) results and proved to be reliable models for prediction default of Russian banks.

Credit rating scale for Russian financial institutes was built based on prediction power of the ensemble model. The result of built models was used to investigate the relative creditworthiness of Russian banks. With regard to the credit rating scale, it can come to the conclusion about its relative conservatism in comparison with existing scale of Russian rating agencies. Though, the results made on the test set showed that 42,3% of banks have marginal year probability of default (PD) less than 1.2% ("A" – rating), almost 34% of banks observed in a test set have PD equals from 4.2% to 6.3% ("B+" - rating) and near to 12,2% of banks have PD equals to more than 80% ("D" - default rating).

The research as also provided the detailed analyses of the information power (the importance) of the financial and nonfinancial factors within each machine learning model.

5. Conclusion, Contribution and Implication

Structure of the paper: The paper consists of introduction, five main sections, and conclusion. In *introduction* the problem is stated, the relevance of the topic is substantiated, conclusions on the literature review are presented, the choice of methodology and tools is explained, and statistical data are described. *The first part* provides description of the literature and the outlook of current Russian banking system. *The second part* provides a detailed description of both traditional methods and machine learning methods applied in this work. The advantages and disadvantages of these models are described, how the choice of certain models is justified. In addition, methodology validation is presented in methodology section. Also, methodology for constructing rating system is proposed. *The third part* provides description of the data used in the models. The approaches to the selection of financial and non-financial indicators in models are grounded. *The fourth section* presents the results of each of applied models, the results of comparative analysis and validation of the application of machine learning models, and the choice of best model is justified. This part also presents a rating system based on the results of best machine learning model. *In the final word*, we present the conclusions of the study, as well as the directions for further research by the authors.

6. References

Available upon request

Comparison of empirical methods for modelling of credit ratings of machine building companies from developed and developing markets

Alexandra Egorova – National Research University Higher School of Economics, Moscow, Russia

Elina Agaeva – National Research University Higher School of Economics, Moscow, Russia

Stepan Barkhatov – National Research University Higher School of Economics, Moscow, Russia

Vladimir Lozovoy – National Research University Higher School of Economics, Moscow, Russia

Keywords: credit rating forecasting, artificial intelligence methods, machine building industry

1. Introduction

The assessment of the credit quality of corporate borrowers is a topical applied task in terms of managing credit risk. The correct identification of borrowers' credit quality allows ranking them in order to determine their probability of default, inability to repay the obligations completely and duly, and enables to calculate the amount of provisions for doubtful debts according to IFRS 9.

A credit rating is a measure of creditworthiness or risk of default. From one hand, they are important for borrowers because a credit rating being a confirmation of a customers' liquidity allows to attract more investors. From the other hand, credit ratings speed up and simplify the process of analyzing debt obligations which is useful for potential investors.

The formation of external public ratings is performed by the specialized rating agencies, however, their rating assignment has drawbacks. Small and middle businesses need to attract investors too, but they may not have financial abilities to address a big rating agency. Besides high costs, the use of big agencies is limited by quite long update intervals and high market volatility at the same time. In this regard, the formation of internal credit ratings, the modeling of ratings based on the methodology of large rating agencies, using remote analysis of entities built on publicly available and internal information about the borrower have begun to be of particular interest. By creating its own independent rating system, the organization becomes capable of making decisions quickly and efficiently.

The main aim of the current study is to choose the best method for the quantitative assessment of corporate borrowers' credit quality. Within the paper we set several tasks. Firstly, we build models on real data from machine buidling industry using various methods. Secondly, we compare their predictive power. Thirdly, we choose the best model in terms of data availability for the end user, the accuracy of the forecast and interpretability of the influence of factors. Finally, we make recommendations for the applied use of various methods.

2. Theoretical Background and Literature Review

There are plenty of models for evaluating and forecasting credit ratings. Many researchers use standard approaches such as linear regressions, logistic regressions, or discriminant analysis. In the context of the latter we cannot help mentioning the fundamental work of Altman (1968). Some studies are devoted to building credit rating systems with machine learning models, for instance, neural networks. Now, we would like to mention several papers in which different approaches were considered.

In the article by Karminsky and Peresetsky (2007) the variables were divided into two groups: firm-specific (financial ratios) and macro factors. They built ordered logistic models in different variations (i.e. with or without macro variables). It was shown that the introduction of general risk factors led to higher quality of

the fit and forecasts. The share of precise predictions was about 76%, with an error within one rating category - 99%.

In another study (Sermpinis, Tsoukas, Zhang, 2018) a different methodology for constructing a credit rating system was applied. The approaches engaged by the authors were represented by ordered probit models combined with lasso and elastic nets. A usual ordered probit model demonstrated the worst result of all employed models in terms of out-of-sample forecasts. Regarding in-sample forecasts, the models did not differ much. Thus, lasso and elastic nets helped to increase the accuracy of forecasts.

Tsai and Chen (2010) also used machine learning methods in building credit rating systems. They applied supervised and unsupervised techniques both separately and combining the two approaches (hybrid models). The supervised learning technique is a solution to the classification problem, the second one – to the clustering problem. Tsai and Chen distinguish four approaches to the classification problem: decision tree, neural networks, naïve Bayesian classifier, logistic regression. Concerning the second method, researchers (Huang, 2004; Tsai, 2010) emphasize that models based on AI techniques lose in terms of interpretability compared to traditional statistical methods.

Clustering is an unsupervised machine learning technique in which observations with similar characteristics are grouped into clusters. There are two categories of clustering algorithms – iterative and hierarchical. The most wide-spread algorithms of clustering are k-means and EM-algorithm.

In their article Tsai and Chen estimate 18 different specifications of models (both hybrid and with only one of ML methods engaged). They reveal that the highest predictive power was demonstrated by the logistic regression (79.4% on the test sample), then the neural network (78.6%), the Bayesian classifier (77.2%) and the decision tree (73.0%). The clustering models showed lower predictive power (68.5% and 56.9% for EM and k-means, respectively) which allowed to conclude that supervised machine learning approaches outperform clustering methods.

3. Research Design, Methodology and Data Analysis

Within the study we test several hypotheses:

1. The techniques applied will show the following results in descending order of predictive power: extreme gradient boosting (xgboost), random forest, ordered logistic regression.

We think ordered logit will demonstrate the worst performance because it is based on the maximization of the likelihood function. As our sample is unbalanced, its results will be skewed towards the most frequent rating grades. Unlike the ordered logit, random forest should show better results, so as xgboost. Such a ranking of the approaches in terms of accuracy is also justified by the conclusions made in the analyzed literature: extreme gradient boosting often outperforms other methods.

2. Trimming the sample into test set and the training set randomly will be more relevant than with time factor taken into account.

This assumption is strengthened with the fact that random splitting enables to get a more compatible distribution. If some grades appear more often in the training set, they will probably appear in the test set with the same frequency which affects the accuracy of the forecast on the test set especially in the case of heavily unbalanced classes.

3. Adding macroeconomic variables improves the quality of the prediction.

Studies, for instance, the study of Karminsky, Peresetsky (2007) show that the introduction of general risk factors contribute to higher accuracy of forecasts.

4. In the context of the ordered logistic regression we make assumptions about the expected directions of influence of the regressors.

We believe that some factors affect the creditworthiness positively and the others, in contrast, negatively. The full list of the variables for the ordered logit with expected and actual signs and the hypotheses for each regressor's sign can be found in Appendix 1.

The research design looks as follows:

1. Data preprocessing.

Initially, we solve the problem of omissions. Then we check whether the premium for the size of the company needs to be considered in the subsequent analysis. The proxy for the size turned out to be insignificant for the research, thus, we decided not to embed it (Appendix 2). After that, using the indicators present in the sample, we calculate the new ones, i.e. depreciation rate, some multiples, dummy variables for idiosyncratic properties of the firm, etc.

2. The selection of the variables.

In the selection of the variables we rely on VIF (Variance Inflation Factor), the proxy for the presence of multicollinearity in the model.

3. Model fitting and results comparison.

Then we proceed to the modelling of credit rating systems. Three approaches are employed in the study. The first one – ordered logistic regression – is a standard one, the other two are ML algorithms (random forest and extreme gradient boosting). In accordance with the proposed hypotheses, we consider two ways of splitting the sample: randomly and with time factor. Moreover, we build models both with and without macroeconomic variables to understand how they influence the accuracy of predictions.

These methods will be applied to the non-default part of the sample exclusively for two reasons. First, default cases in the sample are outnumbered by non-defaults, which would not reveal precise effect of the regressors on the credit rating. Second, simple prediction of default cases is not actually useful for real-life application, because highest and lowest credit rating companies are incomparable in terms of financial solvency.

4. Results/Findings, Discussion

Data description and pre-test analysis.

Our initial sample contains 880 observations of 107 manufacturing companies over the period of 2005-2016 with companies from both developed and developing markets. For each observation we have a number of internal and external factors, which might affect the credit rating of the company. For convenience we can separate them into 5 main categories: profitability measures, i.e. financial data of the company, solvency measures, i.e. capability to repay debt, some general properties of the firm, as size ant other, broad economy variables (GDP growth rate, key rate, etc.) and a few country's political stability proxies.

Among the whole set of variables available to us, we tried to select those, which were least correlated with each other. We measured VIFs for the whole set of variables and within each subgroup. The logic goes as

follows: government effectiveness index appeared to be highly correlated with other stability measures as control of corruption and rule of law indices, so we decided to keep only one variable. The final set includes both common financial ratios and broad economy variables.

Empirical results and hypothesis testing.

Extreme gradient boosting and random forest were recognized as best performing models in terms of different metrics such as accuracy, kappa, precision, recall and F1 score (see Appendix 3). All models considered have significantly outperformed naïve forecast. Multinomial logit regression has shown rather poor performance in comparison with machine learning models, as expected. Surprisingly, extreme gradient boosting has not outperformed random forest algorithm.

We suppose the different nature of model' ensembling mechanism in random forest and gradient boosting to be the main reason for rather poor performance of boosting and high accuracy of random forest. The latter estimates several regression trees independently, whereas gradient boosting reduces errors from the models (also regression trees in our case) estimated during previous iteration of the algorithm. Therefore, on the 'noisy' dataset with observations gathered from different countries over a long time span (we have 18 countries over a period between 2005 and 2016 in the sample) the estimation error should be unpredictable and boosting migth converge to the results of random forest.

As expected in the Hypothesis section, random split of the sample into train and test datasets leads to higher forecasting power of the model, especially on the data with unbalanced classes. Randomly sampled train and test datasets demonstrate similar class distribution, which results in more accurate forecasts. By the contrary, splitting the sample into train and test by time only increases imbalance in class distribution already present in our sample.

However, we were surprised by the fact that macroeconomic variables do not improve forecasting accuracy of our models significantly (see Appendix 3); macro regressors even worsen the result . This conclusion is supported by feature importance metrics from machine learning models (see Appendix 4), calculated as loss in prediction accuracy when omitting different regressors. The main reason is rating methodology (if Through-The-Cycle approach is applied by the rating agency, companies are compared peer-to-peer and no macroeconomic context is taken into account).

5. Conclusion, Contribution and Implication

In the current study on the dataset consisting of machine buidling companies we have employed three methods for the formation of credit rating systems. ML approaches demonstrated higher predictive power compared to the ordered logit though they lack the possibility of interpretation. The standard approach we used allowed not to reject most of the hypotheses about the regressors' direction of influence on the rating grade (detailed results are presented in Appendix 1). General risk factors decreased the accuracy of forecasts which is probably due to their delayed influence in case of TTC rating philosophy. Random trimming of the sample showed better results. The professional significance of the conducted research lies in the possibility of using the models built for the quantitative assessment of corporate borrowers' credit quality.

6. References

Available upon request

7. Appendices.

Appendix 1.

Expected and actual signs of the coefficients in the ordered logistic regression.

(Source: Authors' calculation.)

Variable	Formula	Expected sign	Actual sign	Number of the Comment
Firm-specific variables				
RCF / Net Debt	--	−	−	1
EBITDA margin	EBITDA / Sales	−	−	2
(RCF - CAPEX) / Debt	--	−	+	3
Current Ratio	Current Assets / Current Liabilities	−	+	4
Quick Ratio	(Current Assets – Inventory) / Current Liabilities	−	+	5
(Cash + MS) / Debt	--	−	+	6
Debt / BV of Equity	--	+	+	7
Debt / Market Cap	--	+	+	8
(EBITDA - CAPEX) / Interest Expense	--	−	−	9
ROAE	NPATBUI / Average Equity	−	+	10
Average Interest	--	+	+	11

EV / EBITDA	--		−	−	12
EV / Sales	--		−	+	13
Net Debt / EBITDA	--		+	+	14
Depreciation rate	Depreciation / Total Assets		+	−	15

Macroeconomic and other variables					
Real GDP growth	--		−	+	16
Gross investment to GDP	--		−	−	17
Share in global manufacturing	--		−	−	18
Real interest rate	--		?	−	19
Control of corruption	--		−	−	20
Private companies	--		+	+	21
Developed countries	--		−	−	22
Time trend	--		+	+	23
Crisis years	--		+	−	24

Note: insignificant variables (according to 10% level of significance, or t-statistics > 1.64 in absolute value) are highlighted with grey color, and positive signs represent negative impact on a rating.

Comments for Appendix 1:

Comment 1. The business specific factor *RCF / Net Debt* is insignificant though its actual sign is negative like the expected one, because high values of this indicator means that *Net Debt* of a borrower is covered by *Retained Cash Flows* (*RCF* is the amount of cash left after the borrower bears all the expenses, pays off obligations and dividends).

Comment 2. *EBITDA margin* has a negative sign, just as it was expected. The higher it is, the better the rating. This is also very logical, as this indicator shows cost-effectiveness.

Comment 3. The ratio *(RCF - CAPEX) / Debt* is insignificant and positive, though it was anticipated to be negative since the increase in this indicator is supposed to mean greater financial stability of the borrower. The rationale is similar to that of *RCF / Net Debt*.

Comments 4 and 5. *Current Ratio* and *Quick Ratio* are the liquidity ratios that show to what extent an entity is capable of paying off its *Current Liabilities* with available resources. We expected these indicators to have negative signs and good impact on creditworthiness. However, they both have turned out to have positive signs, though insignificant for *Quick Ratio*.

Comment 6. *(Cash + MS) / Debt*, where *MS* stands for *Marketable securities* (extremely liquid assets almost compared to cash), has a positive insignificant sign. In fact, it contradicts economic sense, because it would be more logical if an increase in the most liquid assets to the body of debt was associated with better creditworthiness.

Comments 7 and 8. The ratios *Debt / Book Value of Equity* and *Debt / Market Capitalization* both positively affect the explained variable, which means that the higher these indicators are, the lower the rating grade would be. This result has a simple economic intuition, since the higher the *Debt* to *Equity* (or financial leverage) is, the worse the creditworthiness of a borrower should be.

Comment 9. *(EBITDA - CAPEX) / Interest Expense* shows good impact on the rating grade, its sign is negative as it was presumed. The more resources after bearing *Capital Expenditures* are left to pay off the debt service, the better it characterizes the entity.

Comment 10. *ROAE,* or *NPATBUI / Average Equity* (where *NPATBUI* is for *Net Profit after Tax before Unusual Items)* is one of the indicators measuring a company's efficiency, therefore, the coefficient is expected to have a negative sign (to influence the creditworthiness well). However, it can be noticed that the actual sign is significantly positive which makes the economic interpretation rather difficult.

Comment 11. An increase in *Average Interest* leads to lower rating grades just as it was expected. The higher the service of the debt is, the worse it is in terms of the entity's reliability.

Comments 12 and 13. *EV / EBITDA* and *EV / Sales* are the ratios associated with the valuation of the company. We expect that if the market gives an entity a high value then it should be a trustworthy counterparty, which leads to higher rating grades (or negative signs in our case). The actual direction of influence of *EV / EBITDA* has coincided with the one predicted, however, this was not true for *EV / Sales*, the sign of which was, on the contrary, positive and also significant. So, the model says that the higher *EV / Sales* is, the worse the rating is, unfortunately, that is not very explicable.

Comment 14. Both anticipated and actual signs of *Net Debt / EBITDA* happened to be positive, which is quite intuitive, as the higher the body of the debt is compared to the resources of the company after subtracting *COGS (Cost of Goods Sold)* and *SG&A (Selling, General and Administrative expenses)* the higher the rating category should be.

Comment 15. The *Depreciation rate* has turned out to be negative and insignificant. Here, we can also observe some interpretation problems as we deal with the machine buidling industry in which fixed assets play a crucial role. The more intensively fixed assets depreciate, the worse it must be for the borrower's financial condition, the lower the rating grade must be.

Comment 16. *Real GDP growth* was expected to have a negative sign, or to lead to a better rating grade, since the growth of this factor indicates an increase in household incomes and, probably, better creditworthiness. In practice, it has turned out to have a positive sign, though insignificant. A possible explanation might be such that higher rates of *Real GDP growth* are inherent mainly in developing countries that are currently "catching up" with developed countries. The developed countries, on the contrary, have already reached high levels of real GDP and therefore their growth has slowed. Here, by assuming that the borrower from a developing country may be less reliable that the one from a developed one (ceteris paribus, of course), we can try to connect the results with the concept of the convergence between countries.

Comment 17. The actual sign of *Gross investment to GDP* has coincided with the expected one, it is negative, though again insignificant. Thus, the higher this regressor is, the heavier a country invests, the better the creditworthiness of a borrower might be. We assume that a big share of investment to GDP signals about a favorable economic situation in the corresponding country.

Comment 18. Another macroeconomic factor − *Share in global manufacturing* − has the expected sign: the larger this variable, the better the country's rating. High values of this regressor mean that a particular country plays an important role in the global economy, so, it is likely to have a good situation in its local market.

Comment 19. *Real interest rate,* according to the Fisher equation (with linear approximation), represents the subtraction of an inflation rate from a nominal rate. Low values of this variable can actually imply several situations of relations between inflation and nominal rates, but here we can see that the sign is negative, thus, higher real rates lead to a better rating grade.

Comment 20. The qualitative variable *Control of corruption* is associated with a negative sign as it was expected. The higher this indicator is, the better is the business environment in a certain country, the more trust there is between agents. Thereby, the credit rating grade might be better.

Comment 21. The coefficient of dummy variable for *Private companies* is positive as it was anticipated. Non-public companies are less transparent, thus, they may be associated with higher level of risks, and that can result in a worse rating category.

Comment 22. The dummy for *Developed countries* has turned out to be negative which is consistent to its expected sign, however, is was not significant. The reason we assumed higher rating grades for the borrowers from developed countries lies in the fact that these countries have better institutional characteristics, for instance, business environment or law enforcement.

Comment 23. The variable *Time trend* shows that there is a tendency of overall downgrade in credit ratings, the time factor has a positive sign which means worse credit ratings. This may be explained with the tightening of regulatory requirements and some increasing conservatism of rating agencies which was also discussed in the work of Karminsky and Peresetsky (2007).

Comment 24. The dummy for *Crisis years* was anticipated to have a positive sign, because during and after the global financial crisis the expectations in the markets were not optimistic which, as we assumed, could have led to higher risk-aversion and worse credit ratings on the whole. However, the actual sign was negative and significant, which is not very consistent with our hypothesis and, probably, requires further research.

Appendix 2.

The interconnections between the multiples EV / EBITDA and EV / Sales with Size.

(Source: Authors' calculation.)
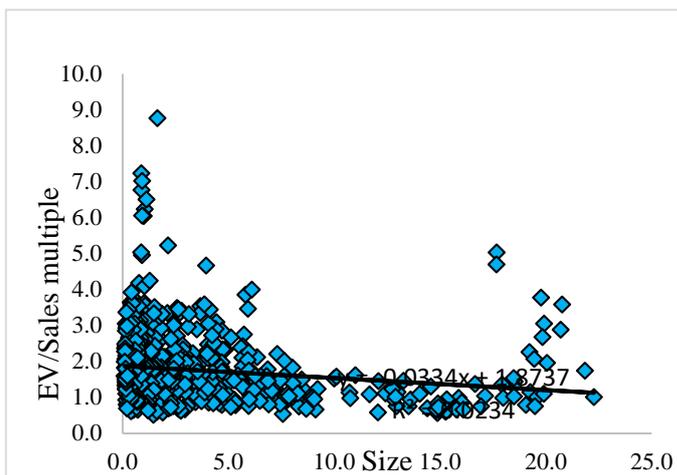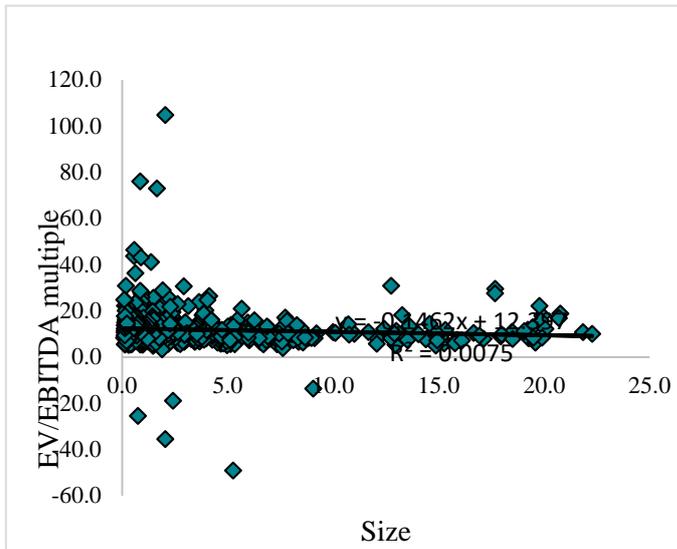
Appendix 3.

The results of model estimation.

- Available upon request

Appendix 4.

Regressor importance in the machine learnin models.

Accuracy improvement by regressor in random forest

Error decrease by regressor in gradient boosting
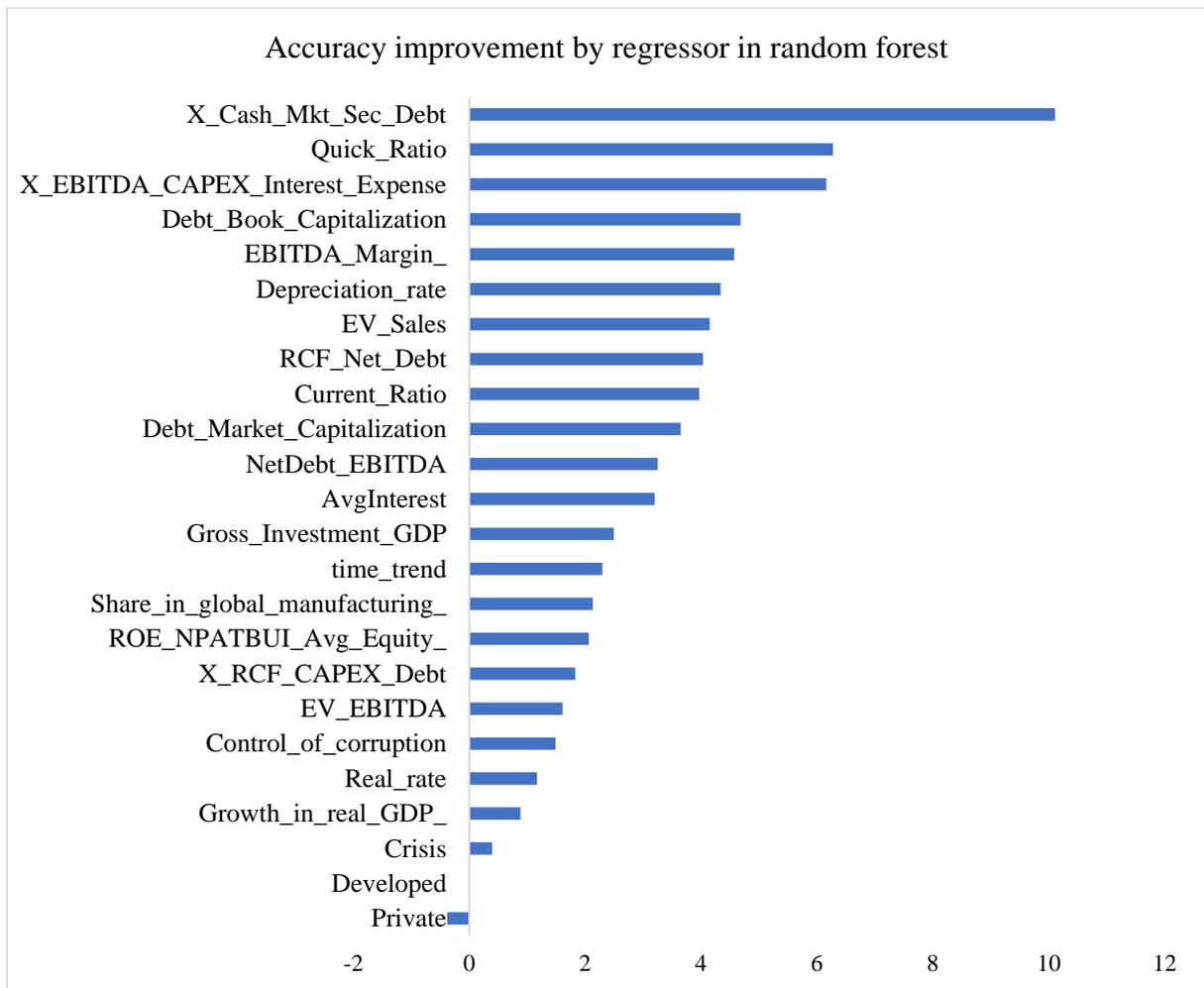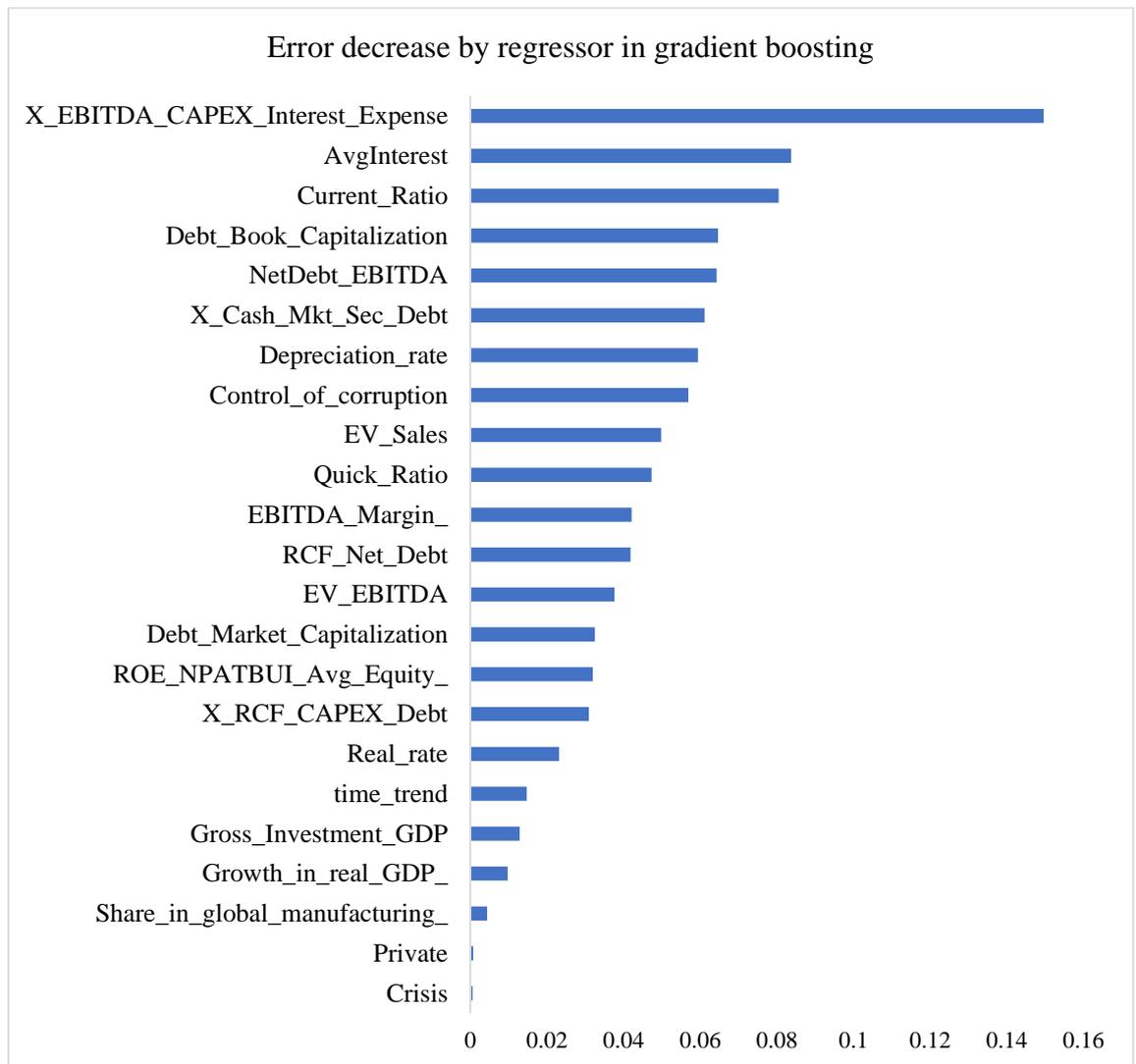
Track: Global sustainable finance

Chairperson: Moinak Maiti

Globalization and technological revolution affects each and every industry sector (Maiti, 2018 a&b). Of them the finance sector draws special attention as the number of operations increased fourfold since the last two decades. Now to get competitive advantages organizations innovate themselves in terms of sustainable finance. Often experts refer that presently we are entering into the present era as sustainable finance. In recent years the literature of finance documents many studies related to the events of organizations on sustainable investments that are beyond the traditional practice of shareholder wealth maximization. These studies are critically related to the organizations' performance on three parameters E, S and G (See Maiti, 2020). Now sustainable finance is not only limited to asset manager or investor preferences but becomes a regulatory imperative. Fernando J. Rodriguez Marin mentioned in National Law Review, Volume X, Number 17 (2020) "A multitude of sustainable finance and development initiatives have been implemented internationally and nationally, highlighting the growing urgency for ESG integration into financing arrangements and corporate behavior". Then IAN YOUNG of MSCI highlighted "MSCI ESG Indexes Outperform During Covid-19 Pandemic in Q1 2020". Then on the other hand a series of crisis leads to unanticipated shocks to the global economies and financial markets that raises several questions related to the sustainability issues. In that respect, it is important to investigate what is the role of global sustainable finance in addressing those issues?

Partner Journals:

Journal of Public Affairs (Wiley):

https://onlinelibrary.wiley.com/page/journal/14791854/homepage/productinformation.html

Journal of Asian Business and Economic Studies (Emerald):

https://www.emeraldgrouppublishing.com/journal/jabes

Effect of Oil Spills on Stock Markets

Kobra Ahmadpour – Department of Economics, Ghent University, Belgium

Michael Frömmel – Department of Economics, Ghent University, Belgium michael.froemmel@ugent.be

Keywords: oil spills, stock markets, energy markets

1. Introduction

Extreme events can affect asset prices, examples are natural disasters (Wang and Kutan (2013)), nuclear or chemical disasters (Capelle-Blancard and Laguna (2010)), major terrorist attacks (Chen and Siems (2004)) or accidents in the oil industry (Feria-Domínguez, Jiménez-Rodríguez, and Fdez-Galiano (2016)). Besides their direct health-threatening effect and environmental damage, such events can be expected to affect stock prices since they are large, unexpected external shocks. Oil spills can obviously affect stock prices through various channels: the oil spill itself generates costs to the company involved directly. It may also affect other firms when investors update their expectations on the probability of oil spills, expect regulatory measures or through a reaction of oil prices. The latter may even affect industries competing with the oil industry, such as 'green' energy. While the increased environmental concern and subsequent regulatory actions related to the oil spill appear to have had adverse effects for petroleum firms which are not directly involved in oil spill, the accident apparently triggered a favorable product price effect for these petroleum firms as well.

2. Theoretical Background and Literature Review

In this paper, we examine the reaction of an oil industry portfolio and an alternative energy industry portfolio to a large sample of oil spill disasters that happened between 1988 and 2019. The contribution of our paper to the literature is twofold: First, while there have been a couple of studies investigating the impact of a single, large oil spill on stocks from the oil industry (e.g. the impact of the Exxon Valdez oil spill on the stock prices of Exxon Valdez and other oil companies (Herbst, Marshall, and Wingender (1996)) and the effect of the Deepwater Horizon explosion on the BP share market and its subcontractors (Sabet, Cam, and Heaney (2012))), to the best of our knowledge there are no studies systematically analyzing the effect of a large sample of oil spills. Therefore, the question, to which extent oil spills in general affect stock prices, and which characteristics matter for a potential impact of oil spill accidents remains unanswered. We aim at closing this gap. Second, we do not only analyze the systematic effect on the oil sector, but also on the green energy sector.

Several studies measured the effect of an individual oil spill on the stock returns of companies that were involved in the event and stock returns of other oil companies. The Exxon Valdez oil spill at the coast of Alaska in 1989 has been analysed by a couple of papers such as [Herbst, Marshall, and Wingender (1996), Jones, Jones, and Phillips-Patrick (1994), Mansur, Cochran, and Phillips (1991), White (1996) and Patten and Nance (1998)]. All these studies find a negative significant effect on the stock returns of Exxon Valdez oil company. However, none of these studies find a significant effect on the stock returns of other oil companies.

Herbst, Marshall, and Wingender (1996) analyse the impact of the Exxon Valdez oil spill on the stock prices of Exxon Valdez and other oil companies. They find a significant negative abnormal return for Exxon Valdez following the oil spill, but no effect for other oil companies. They also find that oil price increased following the Exxon Valdez catastrophe due to the expectation of decreasing in oil supply. Patten and Nance (1998) examine the reaction of a portfolio of oil companies on the Exxon Valdez oil spill. They find a negative cumulative return for Exxon Valdez, whereas the whole portfolio has increased.

Multiple event studies have been also documented the effect of the Deepwater Horizon oil spill in the Gulf of Mexico. Kollias, Papadamou, and Apostolos (2012) provide a case study for the influence of the Deepwater Horizon oil spill in the Gulf of Mexico on the BP stock value and other companies in the oil and gas industry. They find a significant negative reaction of both the BP stock price and the other oil and gas sector to the event. Sabet, Cam, and Heaney (2012), Goossens & Spalt (2012), Koda (2016) and Heflin and Wallace (2017) provide evidence regarding the effect of the Deepwater Horizon explosion on the BP share market and its subcontractors. They have documented that the stock price of BP and its subcontractors dropped dramatically following the incident. Furthermore, US government imposed severe exploration moratorium on offshore operations which had a negative effect not only on the BP share market and its subcontractors but also a wide range of firms in the oil and gas industry. Zevenbergen, Zou, and Arping (2008) examine the impact of oil spills on the stock return of oil companies following the oil spills. They conclude that, on average, the oil spills have a significant negative abnormal return for companies that directly involved in the oil spill and they find the positive statistically significant abnormal return for peer group oil companies that are not directly involved in the oil spill.

3. Results/Findings, Discussion

Our sample covers a period of 32 years, from January 1988, to December 2019. For practical reasons or to filter out less relevant cases a couple of criteria have to be fulfilled: (i) The oil spill has to be news-worthy. We control for this by including only those spills that have been reported in the New York Times. (ii) the spill has to be substantial. we consider only spills of at least 300 cubic meters. This threshold is somewhat arbitrary but deemed necessary to keep the number of spills manageable. Using these criteria, we end up with a sample of 51 oil spills between 1988 to 2019. For collecting the oil spills sample, we sought some different sources. First, we used the c4tx casualty database (Centre for Tankship Excellence Casualty Database). We also had a look at other sources such as ITOPF (International Tanker Owners Pollution Federation Limited) and oil spill list on the Wikipedia and "Centre de Documentation, de Recherche et d'Expérimentations sur les pollutions accidentelles des eaux" (Cedre). By applying the aforementioned criteria, we came to a final sample of 51 oil spills.

This paper examines the effect of oil spills on the stock returns of the firms in oil sector and the alternative energy industry. By using the daily data, we performed the event study methodology during the event windows to determine the extent to which the CAAR are statistically significant for each sector. By applying different event study approaches including market model, OLS market model with dummy variable and GARCH model with dummy variables for event window, we find that the oil industry portfolio has responded positively to the oil spill events. Our result exhibits that the CAAR on average are positively significant following the incidents in some days over the event window. Therefore, we conclude that there is a positive intra-industry effects of oil spills on the stock returns of the oil industry portfolio which are not directly involved in the oil spills.

4. Conclusion, Contribution and Implication

In case of the alternative energy industry portfolio, the market model result does not show any statistically significant cumulative average abnormal return through the event window by using the standard t-test, Patell Z test and Brown and Warner test. Furthermore, the regression coefficients of the OLS market model with dummy variables estimation of the alternative energy industry portfolio are not also significant at any day through the event window. Meanwhile, the result of the EGARCH model indicates that the alternative energy industry portfolio has experienced on average a significantly negative cumulative average abnormal return. Furthermore, by performed different sensitivity analysis, we found some interesting points. It seems that the size of the oil spill has a meaningful impact on the regression result. While we already indicate that the oil spills have a positive influence on the oil industry portfolio, we noticed that the oil spills sample

which are bigger than 100 million liters have a negative effect on the oil industry portfolio stock returns. Furthermore, we divided the oil spills sample to the oil spills which have happened in the United State and the oil spills which have happened in the other countries through the world. We found that the United State oil spills sample have a negative impact on the oil industry portfolio, while the oil spills sample for other countries have a positive impact on the oil industry portfolio. Finally, we find that the effect of oil spills on the oil industry portfolio for the oil spills with more than five articles in the New York Times journal is different from our previous result. We found a negative response of the oil industry portfolio to the oil spills with more than five articles. Taken together, our study conclude that oil spill accidents have a positive intra industry effect for other oil company which are not directly involved in the oil spill events in the period following the oil spill events. These positive reactions can be interpreted as a consequence of increase in oil price and oil product price following the events. In addition, oil spill events also have a negative impact on the returns of renewable energy resource.

5. References

Barrett, W., Heuson, A., & Kolb, R. (1986). The effect of Three Mile Island on utility bond risk premia: a note. The Journal of Finance, 255-261.

Betzer, A., Doumet, M., & Rinne, U. (2013). How policy changes affect shareholder wealth: the case of the Fukushima Daiichi nuclear disaster. Journal of Applied Economics Letters, 799-803.

Binder, J. (1998). The event study methodology since 1969. Review of Quantitative Finance and Accounting, 11(2), 111–137.

Blacconiere, W., & Patten, D. (1994). Environmental disclosures, regulatory costs, and changes in firm value. Journal of Accounting and Economics, 357-377.

Boehmer, E., Musumeci, J., & Poulsen, A. (1991). Event-study methodology under conditions of event-induced variance. Journal of Financial Economics, 30(2), 253–272.

Bollerslev, T. (1986). Generalized autoregressive conditional heteroskedasticity. Journal of Econometrics, 31(3), 307-327.

Borenstein, S., & Zimmerman, M. (1988). Market Incentives for Safe Commercial Airline Operation. Journal of American Economic Association, 913-935.

Bourdeau-Brien, M., & Kryzanowski, L. (2017). The impact of natural disasters on the stock returns and volatilities of local firms. Journal of The Quarterly Review of Economics and Finance, 259-270.

Bowen, R., Castanias, R., & Daley, L. (1983). Intra-industry effects of the accident at Three Mile Island. Journal of Financial and Quantitative Analysis, 87-112.

Box, G., & Jenkins, G. (1970, January). Time series analysis: Forecasting and control. San Francisco: Holden-Day.

Breusch, T., & Pagan, A. (1979). A simple test for heteroskedasticity and random coefficient variation. Biometrika, 47 (5), 1287–1294.

Brown, S. J., & Warner, J. B. (1985). Using daily stock returns – The case of event studies. Journal of Financial Economics, 3-31.

Cable, J., & Holland, K. (1999). Modelling normal returns in event studies: A model selection approach and pilot study. The European Journal of Finance 5(4), 331-341.

Capelle-Blancard, G., & Laguna, M.-A. (2010). How does the stock market respond to chemical disasters? Journal of Environmental Economics and Management, 192-205.

Cedre. (n.d.). Retrieved from wwz.cedre.fr/en: http://wwz.cedre.fr/en/Resources/Spills

Centre for Tankship Excellence Casualty Database. (n.d.). Retrieved from c4tx.com: http://www.c4tx.org/ctx/job/cdb/do_flex.html

Chen, A., & Siems, T. (2004). The effects of terrorism on global capital markets. European Journal of Political Economy, 349 – 366.

Chen, C. (1984). The structural stability of the market model after the Three Mile Island accident. Journal of Economics and Business, 133-140.

Christine, B. (1994). Trends in Marine Pollution Legislation. Journal of Risk Management, 59-61.

Davis, P. (1991). Ecological danger feared as a result of burning oil war in the Gulf. The Baltimore Sun.

Dickey, D., & Fuller, W. (1979). Distribution of the estimators for autoregressive time series with a unit root. Journal of the American Statistical Association, 74(366), 427-431.

Dolley, J. (1933). Characteristics and procedure of common stock split-ups. Journal of Harward Business Review, 37(5), 316–326.

Dragos, N. I. (2011). Deepwater Horizon Disaster and influence on offshore industry. Journal of Engineering Studies and Research, 94-101.

Durbin, J., & Watson, G. (1971). Testing for serial correlation in least squares regression.III. Biometrika, 58 (1), 1–19.

El-Sharif, I., Brown, D., Burton, B., Nixon, B., & Russell, A. (2005). Evidence on the nature and extent of relationship between oil prices and equity values in the UK. Journal of Energy Economics, 819-830.

Elyasiani, E., Mansur, I., & Odusami, B. (2011). Oil price shocks and industry stock returns. Journal of Energy Economics, 966-974.

Engle, R. F. (1982). Autoregressive conditional heteroscedasticity with estimates of the variance of United Kingdom inflation. Journal of Econometrica, 987-1007.

Fama, E., Fisher, L., Jensen, M., & Roll, R. (1969). The adjustment of stock prices to new information. Journal of International Economic Review, 1-21.

Feria-Domínguez, J. M., Jiménez-Rodríguez, E., & Fdez-Galiano, I. M. (2016). Financial perceptions on oil spill Disasters: Isolating corporate reputational risk. Journal of Sustainability, 8(11).

Ferstl, R., Utz, S., & Wimmer, M. (2012). The effect of the Japan 2011 disaster on nuclear and alternative energy stocks worldwide: An event study. Journal of Business Research, 25-41.

Fields, A., & Janjigian, V. (1989). The effect of Chernobyl on electric-utility stock prices. Journal of Business Research, 81-87.

Fodor, A., & Stowe, J. (2012). Financial market reactions to a company disaster: The BP case. Journal of Applied Finance, 22(1), 88-103.

Goossens, G., & Spalt, O. (2012). The big oil spill: The market value consequences of the Deepwater horizon disaster. Tilburg : Tilburg School of Economics and Management.

Hammoudeh, S., & Li, H. (2005). Oil sensitivity and systematic risk in oil-sensitive stock indices. Journal of Economics and Business, 1-21.

Heflin, F., & Wallace, D. (2017). The BP oil spill: Shareholder wealth effects and environmental disclosures. Journal of Business Finance and Accounting, 337-374.

Herbst, A., Marshall, J., & Wingender, J. (1996). An analysis of the stock market's response to the Exxon Valdez disaster. Journal of Global Finance Journal, 101-114.

Hill, J., & Schneeweis, T. (1983). The effect of Three Mile Island on electric utility stock prices: a note. The Journal of Finance, 1285-1292.

International Tanker Owners Pollution Federation Limited. (n.d.). Retrieved from www.itopf.org: https://www.itopf.org/knowledge-resources/data-statistics/statistics/

Jarque, C., & Bera, A. (1987, January). A test for normality of observations and regression residuals. International Statistical Review. 55 (2), 163–172.

Jones, J., Jones, C., & Phillips-Patrick, F. (1994). Estimating the costs of the Exxon-Valdez oil spill. Journal of Research in Law and Economics, 109-149.

Jones, K., & Rubin, P. (2001). Effects of harmful environmental events on reputations of firms. Journal of Advances in Financial Economics, 161-182.

Kalra, R., Henderson, G., & Raines, G. (1993). Effects of the Chernobyl nuclear accident on utility share prices. Quarterly Journal of Business and Economics, 52-78.

Kalra, R., Henderson, G., & Raines, G. (1995). Contagion effects in the chemical industry following the Bhopal disaster. Journal of Financial and Strategic Decisions, 1-11.

Kang, W., Ratti, R., & Yoon, K. (2015). Time-varying effect of oil market shocks on the stock market. Journal of Banking & Finance, 150-163.

Karafiath, I. (1988). Using dummy variables in the event study methodology. Journal of Financial Review, 351–357.

Kawashima, S. T. (2012). The effect of the Fukushima nuclear accident on stock prices of electric power utilities in Japan. Journal of Energy Economics, 2029-2038.

Koda, Y. (2016). Do peers get punished: Stock market effect of BP oil spill on peers. Journal of Environmental and Resource Economics at Colby, 3(1).

Kollias, C., Papadamou, S., & Apostolos, S. (2012). The financial spillovers of the Gulf of Mexico oil incident. Journal of Empirical Economics Letters, 633-643.

Ljung, G., & Box, G. (1978). On a Measure of a Lack of Fit in Time Series Models. Journal of Biometrika, 297-303.

Lopatta, K., & Kaspereit, T. (2014). The cross-section of returns, benchmark model parameters, and idiosyncratic volatility of nuclear energy firms after Fukushima Daiichi. Energy Economics, 125-136.

Lundgren, T., & Olsson, R. (2010). Environmental incidents and firm value-international evidence using a multi-factor event study framework. Journal of Applied Financial Economics, 1293-1307.

MacKinlay, A. C. (1997). Event studies in economics and finance. Journal of Economic, 13-39.

Makino, R. (2016). Stock market responses to chemical accidents in Japan: An event study. Journal of Loss Prevention in the Process Industries, 453-458.

Mama, H., & Bassen, A. (2013). Contagion effects in the electric utility industry following the Fukushima nuclear accident. Journal of Applied Economics, 3421-3430.

Mandelbrot, B. (1963). The variation of certain speculative prices. The Journal of Business, 36(4), 394-419.

Mansur, I., Cochran, S., & Phillips, J. (1991). The relationship between the equity return levels of oil companies and unanticipated events: the case of the Exxon Valdez incident. Journal of Logistics and Transportation Review, 241-255.

Mian, S., & Bennett, S. (2009). The Tasman Spirit oil spill: implications for regulatory change in. Journal of Disasters, 390-411.

Newey, W., & West, K. (1987). A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix. Econometrica, 55(3), 703–708.

Patell, J. (1976). Corporate forecasts of earnings per share and stock price behavior: empirical tests. Journal of Accounting Research, 14(2) , 246-276.

Patten, D., & Nance, J. (1998). Regulatory cost effects in a good news environment: The intraindustry reaction to the Alaskan oil spill. Journal of Accounting and Public Policy, 409-429.

Phillips, P., & Perron, P. (1988). Testing for a Unit Root in Time Series Regression. Biometrika, 75 (2), 335–346.

Pynnönen, S. (2005). On regression based event study. Journal of Acta Wasaensia, 327—354.

Rukavishnikova, A., Baars, N., & Jankensgard, H. (2014). The impact of oil price fluctuations on stock performance of clean energy companies: A global study on a corporate level. Retrieved from Lund University Libraries: http://lup.lub.lu.se/student-papers/record/4469667

Sabet, A., Cam, M., & Heaney, R. (2012). Share market reaction to the BP oil spill and the US government moratorium on exploration. Australian Journal of Management, 61-76 .

Salinger, M. (1992). Value event studies. Review of Economics and Statistics, 671-677.

Scholtens, B., & Boersen, A. (2011). Stocks and energy shocks: The impact of energy accidents on stock market value. Journal of Energy, 1698-1702.

Spudeck, R., & Moyer, C. (1989). A note on the stock market's reaction to the accident at Three Mile Island. Journal of Economics and Business, 235-241.

Wang, L., & Kutan, A. (2013). The Impact of Natural Disasters on Stock Markets: Evidence from Japan and the US. Journal of Comparative Economic Studies, 672–686.

White, M. (1996). Investor response to the Exxon Valdez oil spill. McIntire School of Commerce, University of Virginia. Retrieved from https://doi.org/10.18130/V3Z19R

Zevenbergen, E., Zou, L., & Arping, S. (2008). An event study on the effect of oil spills on the stock returns of publicly traded oil companies. Amsterdam: University of Amsterdam.

Understanding Inflation Volatility from a Fiscal Perspective: Evidence from Emerging and Developing Economies

Ishmael Ali Esson – National Research University Higher School of Economics, St. Petersburg, Russia
iesson@edu.hse.ru

Moinak Maiti – Department of Finance, National Research University Higher School of Economics, St. Petersburg, Russia

1. Introduction

Over the past years, the concept of global economic integration has attracted mainstream debate among policymakers. While others advocate against globalization-oriented policies due to its adverse outcomes, globalization has however witnessed significant stretch since the early 1980s (IMF, 2006) such that many economies have been affected by this globalization wave. As more economies become open to the concept of global economic integration, economic openness widens, and countries begin to benefit from the rising globalization wave. According to Triffin and Grudel (1962), greater economic openness acts as a safety valve to inflation such that more open countries experience lower inflation than less open countries. This phenomenon which was later examined by Hardovelis (1992) in explaining the time inconsistency problem through the economic openness-inflation relationship was further assessed by Romer (1993). According to Romer (1993), greater economic openness induces a decline in inflation. Nonetheless, the parallelism between the recent decline in both inflation and inflation volatility, and the globalization wave has led to a welcomed perception that the element of volatile inflation may not entirely be a domestic phenomenon, but partly identifiable to the increased economic openness and the globalization wave that has spread across countries. While globalization and economic integration continue to witness significant embracement, countries that are open to this hyper-globalization concept become more exposed to external risk. Notably among them is the effect of global inflationary cycles that propagate through commodity, trade and financial channels and the concerns regarding the stability of domestic inflation as economies become more integrated. As the rise in economic integration is gradually becoming conventional, the impact of external shocks from economic openness on prices had become a global issue and the role of fiscal policy in restructuring economies had been witnessed in the past decade.

Surprisingly, the literature on inflation had mostly focused on the role of monetary policy and inflation targeting without much emphasis on fiscal policy and the possible impact of the rising global economic integration. Moreover, few recent research studies had sought to explore the reasons behind the recent decline in inflation volatility in recent times. Therefore, this study seeks to understand the decline in inflation volatility and whether fiscal policy and economic openness played a major role in this stabilization process. To give an insight into the present phenomenon, the problem statement of this study is formulated as research questions.

- How does fiscal policy interact with economic openness, and inflation volatility?

- Does government respond to shocks from economic openness in the short run?

- How do shocks to economic openness affect inflation volatility?

- Can the historical level of economic openness help in anchoring inflation volatility?

2. Theoretical Background and Literature Review

Theory suggests that inflation decreases with increased economic openness. Triffin and Grudel (1962) asserts that greater economic openness acts as a safety valve to inflation such that more open countries experience lower inflation than less open countries. This phenomenon which was later examined by Hardovelis (1992) in explaining the time inconsistency problem through the economic openness-inflation relationship was further assessed by Romer (1993). According to Romer (1993), greater economic openness induces a decline in inflation. However, external shocks and trade induced risks are common features of globalization; therefore, compensation hypothesis suggests that governments of opened economies tend to implement fiscal policies aimed at reducing the risks that come with economic openness.

3. Research Design, Methodology and Data Analysis

The Panel Var methodological approach, which is an extension of Sim (1980) traditional Vector Autoregression model is applied to the panel data used in the study. The reduced form of the Panel Vector Autoregression is specified as a multivariate homogenous model as:

$$Z_{i,t} = a_i + A(L)Z_{i,t} + \phi X_{i,t} + \varepsilon_{i,t} \qquad (2)$$

$$t = 1,2 \ldots 14 \text{ and } i = 1,2 \ldots 29.$$

where $Z_{it} = (opn_{it}, fisc_{it}, vol_{it})'$ denotes a vector of well-approximated unit root processes such that the log difference Δz_{it} of Z_{it} can be represented as a stationary vector moving average $\Delta z_{it} =$

$A_i(L)\varepsilon_{it}$. The vector $X_{i,t}$ is a set of control variables. For the baseline model, real GDP is used as the control variable. A cross-fixed effect parameter 'a_i' is introduced into the model to capture the cross-sectional heterogeneity in the panel. Following Love and Zicchino (2006) among others, the fixed effects are removed using the forward mean-differencing procedure (Helmert procedure).

4. Results/Findings, Discussion

All variables are found to be stationary at the first difference.
Lag order selection
  The second-order Panel Var is the optimal model since it has the smallest MBIC, MAIC, and MQIC. Based on the coefficient of determination selection criterion, the second-order Panel Var is chosen.

How does fiscal policy interact with economic openness and inflation volatility?
  The current level of inflation volatility is significantly and negatively affected by the level of economic openness within the past year. That is, as economies become more open to globalization, inflation volatility reduces despite the increased exposure to external risk and price shocks.

Does economic openness provide insight into the dynamics of inflation volatility?
  The results indicate that economic openness granger causes inflation volatility. Thus, causality runs from economic openness into inflation volatility.

Temporary Shocks from economic openness and its impact on inflation volatility: Does government respond?
  Shock to economic openness has a negative and significant effect on inflation volatility after the first period. Fiscal policy responds positively to an openness innovation. However, the response is not statistically significant.

Permanent Shocks from economic openness and its impact on inflation volatility: Does

government respond?

The cumulative impulse response functions with the 95% confidence interval created from a Monte Carlo simulation of 500 repetitions indicates that a permanent increase induces a negative and significant decline in inflation volatility.

SENSITIVITY AND ROBUSTNESS ANALYSIS

The study examines if the results above are sensitive to three different specifications. After controlling for other exogenous variables and switching the identification order, the main result, however, remained the same**.**

Model stability tests

The model stability test revealed that all three panel var specifications are stable.

5. Conclusion, Contribution and Implication

The research findings indicate that economic openness has contributed significantly toward the decline in inflation volatility. The impulse response functions that traces the effect of a temporal increase in economic openness indicate a sharp decline in inflation volatility in the short run. The cumulative impulse response function also indicates that about a 1.5% decline in inflation volatility is due to a permanent increase in economic openness. Moreover, the var estimates also indicate that an increase in economic openness within a year reduces current inflation volatility by about 2.8% percentage points. The granger causality test strongly indicates a unidirectional causality running from economic openness into inflation volatility even after controlling for other factors. Moreover, the degree of economic openness rises with rising income.

6. References

Froyen, R. & Waud, R. N., 1987. An Examination of Aggregate Price Uncertainty in Four Countries and Some Implication For Real Output. International Economic Review, Issue 28, pp. 353-373.

Hardouvelis, G.A., 1992. Monetary policy games, inflationary bias, and openness, Journal of Economic Dynamics and Control, 16(1), pp. 147-164.

Love, I. & Zicchino, L., 2006. Financial development and dynamic investment behavior: Evidence from panel VAR. The Quarterly Review of Economics and Finance, 46(2), pp. 190-210.

Triffin, R. & Grudel. H., 1962. "The Adjustment Mechanism to Differential Rates of Monetary Expansion among the Countries of the European Economic Community." Review of Economics and Statistics, 44: 486-90

The Behavior of Corporate Bonds Trading Volume: Evidence from an Emerging Market

Muhammadriyaj Faniband – Department of Commerce, Christ Academy Institute for Advanced Studies, Bengaluru, India riyajfaniband@gmail.com

Pravin Jadhav – Department of Economics, Institute of Infrastructure Technology Research and Management, India

1. Introduction:

This paper analyses the impact of macroeconomic and non-macroeconomic factors on the trading volume of corporate bonds included in the National Stock Exchange of India during a monthly period from January 2010 to March 2018. More precisely, this paper addresses the following unanswered questions: Do macroeconomic and non-macroeconomic factors affect the trading volume of corporate bonds? Is there any symmetric or asymmetric dependence of the trading volume of corporate bonds on each of the specific variables? In this context, this paper analyzes the impact of Gross Domestic Product (GDP) rate, Consumer Price Index (CPI), Term Deposit Interest Rate (TDIR), Exchange Rate (ER), Economic Policy Uncertainty Index (EPUI) and Volatility Index (VIX) on trading volume of corporate bonds to provide answers to these questions.

2. Theoretical Background and Literature Review

There is a wide range of literature considering the movement of corporate bonds due to the possible determinants such as macroeconomic, bond specific, firm-specific factors at different points of time, and in different circumstances. Several research attempts are made to explore the relationship of corporate bonds with various factors in the Indian context. (Acharya, 2011; Banerji et.al, 2012; Mitra, 2012; Nath, 2012; Sen and Bahel, 2003; Raghavan et al; Sen et al., 2003; Wells & Schou-Zibell, 2008)) take an overview of issues and challenges in the Indian corporate bond market. (Maurya & Nath, 2016) show that GDP and Trade openness do not affect the trading volume of corporate bonds. (Seth, Sankaran & Sethunarayana, 2010) illustrate the liquidity parameters and the trading parameters do not clearly explain illiquidity in the Indian market. Aside from liquidity risk, yield spreads are explained better by credit risk. (Mukherjee, 2019) finds the default risk has a significant impact on yield spread. There is a relationship between bond liquidity and yield spread. This paper establishes a link between the corporate bonds trading volume and macroeconomic and non-macroeconomic factors. This phenomenon has been noted before. No study has been found that investigates the impact of macroeconomic and non-macroeconomic factors on TVCBs using the QR methodology in the Indian context. Therefore, this research is an attempt to plug the gap in the literature and extend the literature**.**

3. Research Design, Methodology and Data Analysis

In this paper, the dependence is studied using quantile regression (QR) methodology (Koenker & Bassett, 1978). The QR allows examining the conditional dependence of specific quantile of corporate bonds trading volume concerning the conditioning factors. The QR approach also provides specific insights into the impacts of macroeconomic and non-macroeconomic factors on trading volume under different market circumstances, including bearish (lower quantile) and bullish (upper quantile).

4. Results/Findings and Discussion

The empirical result obtained by QR analysis for the study period shows that the most influencing factor is CPI. Therefore, if investors want to invest in corporate bonds using the trading volume and reduce the risk created by macroeconomic or non-macroeconomic factors, they should consider CPI. In contrast, the trading volume is less sensitive to GDP, TDIR and ER. If investors seek to minimize the risk of these factors, they should be directed to invest carefully in corporate bonds using the above factors. However, trading volume is not sensitive to EPUI and VIX. Therefore, investors should avoid investing in corporate bonds using these factors.

5. Conclusion, Contribution and Implication

The results indicate that the gross domestic product rate has a negligible impact. Further, the consumer price index shows a significant and positive impact. Moreover, we find an inverse relationship between term deposit interest rates and trading volume. This paper also notes the impact of exchange rates is mixed. This study documents that trading volume is not sensitive to economic policy uncertainty index and volatility index.   The main contribution of this paper may be that this is the first application of the QR method to explore the impact of macroeconomic and non-macroeconomic factors on the trading volume of corporate bonds

6. References

Acharya, A. (2011). Corporate Bond Market in India : Issues and Challenges. *Reserve Bank of India Occasional Papers*, *32*(3), 68–106.

Banerji, S., Gangopadhyay, K., Patnaik, I., & Shah, A. (2012). New Thinking on Corporate Bond Market in India. *National Institute of Public Finance and Policy New Delhi, Working Paper No. 2012-106*, 1–22.

Koenker, R., & Bassett, G. (1978). Regression Quantiles. *Econometrica*, *46*(1), 33–50.

Mitra, A. (2012). Why Corporate bond market in India is in Nelson ' s low level equilibrium trap for so long ? *NSEIndia*, *46*(5), 8–16. https://www.nse-india.com/content/press/NS_mar2009_2.pdf

Maurya, A. K., & Nath, M. O. (2016). The Macro-economic Determinants of Corporate Bond Market in India. *Pacific Business Review International*, *1*(1), 163–176.

Mukherjee, K. (2019). Demystifying Yield Spread on Corporate Bonds Trades in India. *Asia-Pacific Financial Markets,26*(2). 253-284. https://doi.org/10.1007/s10690-018-09266-w

Nath, G. C. (2012). Indian Corporate Bonds Market – An Analytical Prospective. *CCILIndia*, 7–33. https://doi.org/10.2139/ssrn.2062269

Sen, P., Bahel, N., & Ranjan, S. (2003). Developing The Indian Debt Capital Markets : Small Investor Perspectives. *Perspective Planning Division, Planning Commission Government of India*. https://niti.gov.in/planningcommission.gov.in/docs/reports/wrkpapers/wkpr_debt.pdf

Seth, R; Sankaran R, S. N. (2010). A study on yield spreads and liquidity measures in the Indian bond market. *Indian Institute of Management Calcutta, WPS No. 665/ November 2010*.

Sunder Raghavan, Ashok Sahoo, Angshuman Hait, S. G. (n.d.). A Study of Corporate Bond Market in India: Theoretical and Policy Implications. *DRG, Study No. 40. Reserve Bank of India*, 1–89.

Wells, S., & Schou-zibell, L. (2008). India's Bond Market—Developments and Challenges Ahead. *Asian Development Bank*. https://www.adb.org/sites/default/files/publication/28497/wp22-india-bond-market.pdf

Price Distortions and Municipal Bonds Premiums: Evidence from Switzerland

Carlos Joaquín Rincón – Department of Finance, National Research University Higher School of Economics, St. Petersburg, Russia krinkonernandes@edu.hse.ru

Keywords: Municipal bonds, risk premiums, spreads, price distortions.

1. Introduction

On January 15th 2015 the Swiss National Bank suddenly announced that it would no longer hold the Swiss franc at a fixed exchange rate with the euro. As a result, the Swiss franc soared, for an immediate appreciation of 20 percent in one day. While the Swiss stock market collapsed, mutual and hedge funds around the world realized large losses, and the Swiss 10-year treasury yield dropped some 251 bps in the same couple of days.

Although the Swiss treasury yields were in an already downward trend since 2011, that trend strengthen with the dis-intervention of the franc. While the Swiss treasury yields dropped dramatically after the currency shock, so did their municipal bond yields. Most Swiss municipal bonds had the same downward trend since 2011 as the treasuries, and one would expect that the trend would strengthen with the dis-intervention of the franc.

The aim of this study is to identify the effects of currency price distortions on the municipal bond spread in Switzerland. As specific objectives, this research aims to determine if the spread has indeed widened after the currency shock, and if so, to determine the percentage change in the premiums after the currency shock. In this paper, the dis-intervention of the Swiss franc of 2015 is used as a quasi-natural experiment, to explore whether a no government intervention in the foreign exchange markets policy may have impacted the spreads and change the default, liquidity, and/or maturity premiums of municipal bonds in Switzerland.

2. Theoretical Background and Literature Review

Some academic literature on municipal bonds focus on the low liquidity as a key factor of the pricing in this market such as: Green et al. (2010) and Ang et al. (2014). In contrast, Longstaff (2011) finds that the credit/liquidity component is very small compared to the marginal tax rate.

After adjusting for the tax exemption, Schwert (2017) finds that default risk accounts for 74 percent to 84 percent of the average municipal bond spread over the period 1998 to 2015.

Fabozzi (2007) suggests that the municipal bonds (similar to the treasuries), under normal economic states, may not offer any additional compensation to the investor from one additional year in the maturity of the bond in the long portion of the yield curve.

Manchester and Davies (2009) may suggest a possible market segmentation in the government issued bonds market as a result of the tax benefits from investing in municipal bonds for local investors on one side, while foreign purchases increase in the treasuries market on the other side.

Very little has been explored about the implications of currency changes into the municipal bonds market as they do not have a direct connection. That is, the connection relates to the treasuries market, and this market has an impact on the economy interest rate levels that sets the overall cost of funding in a particular economy.

In this paper, the following questions are addressed: does a raise in the local currency prices contribute to a widening of the municipal bond spreads? Do changes in the currency price levels make a long run impact in the municipal bond spreads? Answers to these questions may have policy implications as they may imply that if policy makers wish to reduce the relative cost of financing for state and local government investments, all efforts to reduce transaction costs and improve liquidity will have no significant impact on borrowing costs, and all efforts to lower default risks by municipalities would be wasted.

3. Research Design, Methodology and Data Analysis

This research takes the daily trading settlement data of municipal bonds in the Swiss inter-bank bond market as samples. The data ranges from January 2012 to January 2018, that is: 3 years before and 3 years after the currency shock. This data includes 26 municipal bonds that were still outstanding as of the end of the range. All data have been obtained from the EIKON Refinitiv terminals.

A two-stage least squares method is used to solve the endogeneity issue between Spread to Benchmark and Treasury Yields, and also links the currency prices with the spread.

Stage 1: $t\_yield_t = \pi_0 + \pi_1 currency_t + v_t$

Stage 2: $bnchmrksprd_{i,t} = \beta_0 + \beta_1 t\_yield_t + \beta_2 liqdty_{i,t} + \beta_3 matur_{i,t} + \beta_4 rank_{i,t} + u_{i,t}$

In the first stage, the variable $currency_t$ represents how the endogenous variable t_yield_t is affected by changes in the currency, so that here the control variable is $currency_t$. Whereas, in the second stage the $bnchmrksprd_{i,t}$ dependent variable measures the difference of a municipal bond i yields to those of the same maturity treasury bonds; the $liqdty_{i,t}$ variable measures the bond liquidity; the $matur_{i,t}$ variable the length to maturity of the particular municipal bond in years from the time of the experiment; and the $rank_{i,t}$ variable is a dummy variable that measures the default risk by assigning the value of 1 if the municipal bond has the maximum AA+ rating, and a value of 0 if it holds AA through AA-.

4. Results/Findings, Discussion

The regression results show high statistical significance for most variables. Then, the coefficients in this table would suggest an expected spread before the shock of 26.88 bps, and an expected spread of 40.93 bps after the shock, in line with our expectations that the spread has in fact widened an average of 14 bps after the currency dis-intervention.

Table 2: Regression Results

Variable	MGIV2SLS	MGIVFE	M1IV2SLS	M1IVFE	M2IV2SLS	M2IVFE,
t_yield	2.5159***	2.5107***	33.8708***	32.1012***	-17.8684***	-18.5987***
matur	0.3109***	(omitted)	0.4575***	(omitted)	0.1871***	(omitted)
rank	-10.7560***	(omitted)	-9.2982***	(omitted)	-11.4888***	(omitted)
liqdty	48.1404**	32.5865**	(omitted)	(omitted)	49.8798**	34.3906***
_cons	1.3050	15.2251	44.5415***	45.8749***	-6.1609	5.2306

legend: * p<.05; ** p<.01; *** p<.001

Source: Own calculations

These results lead to conclude that the maturity premium for each additional year of the municipal bond maturity only accounts to just 4.57 percent of the spread, from a previous 17 percent. Interestingly though, there is evidence to conclude that the default risk premium, that accounted to 34.59 percent of the spread before the shock, has increased 23.56 percent (in absolute value), and still counting to 28.07 percent of the now wider spread after the currency shock. The analysis of the liquidity premium is somewhat unclear though, as the results of the models seem inconclusive.

Although we have identified the magnitudes and changes after a treatment of at least the maturity and default premiums, these changes are counter directional to the change in the spread. That is, the increases in both premiums reduce the spread after the treatment instead of widening it. Then, what has caused the widening of the spread after the currency shock? A possible answer could be the price differentiation from the market segmentation (Manchester & Davies, 2009) as a result of the tax benefits from investing in municipal bonds for local investors leading to (inverted) home bias and imperfect risk sharing as Babina, et. al. (2015) have suggested. Therefore, the higher demand for Swiss treasuries from foreign investors targeting this asset as a reaction to the currency dis-intervention while showing light appetite for the municipals (as these investors would not benefit from the tax exemption for local investors) may have widened the spread.

5. Conclusion, Contribution and Implication

The empirical results display that the municipal bond spread has widened an average14 bp for the three-year period after the currency shock of 2015. The results also display a marginal impact of the default risk on the yield spread was about -9.298 bp per rating scale before the currency shock of 2015, and changed to -11.488 well after that currency shock, for a 23.56 percent variation of a premium that accounts to 28.07 percent of the wider average after the treatment spread.

Based on the above conclusions, this study may suggest that economic policy makers in Switzerland should take into account some of the long run side effects from distortions in their foreign exchange prices. Some of these side effects include the change in the risk premiums of the municipal bonds. Moreover, the results may tell that to further permit the municipalities to benefit from the lowering of the yield rates in Switzerland, their local authorities should focus on improving the default risk of the majority of municipalities, as only two municipalities in Switzerland hold the AA+ rating, while the others hold a lower rating.

The results in this research have important policy implications. First, unexpected large currency price shocks may have long run implications on the municipal bond spreads in Switzerland. The spread has widened after the currency shock of 2015. Second, the default premium of these municipal bonds seems to have been affected the most by the currency shock of 2015. Third, the maturity premium seems to be a very small component in the premium set. Forth, this research does not offer a conclusive result about the liquidity premium. That is, there is no sufficient evidence to determine whether currency shocks may change the magnitude of this premium in Switzerland, at all (even though some correlation between the currency and the liquidity of the bonds has been identified).

This research contributes to the understanding of municipal bond pricing by showing that default risk accounts for a large portion of the municipal bond spread. This study is not able to identify the role of liquidity as a key driver of municipal bond yields in Switzerland.

6. References

Babina, T., Jotikasthira, C., Lundblad, C., and Ramadorai T., 2015. Heterogeneous taxes and limited risk sharing: Evidence from municipal bonds, Working paper, University of North Carolina.

Fabozzi, F., 2007. Fixed income analysis. 2nd Edition. Hoboken, NJ: John Wiley & Sons, Inc.

Green, R., Li, D., and Schurhoff, N., 2010. Price discovery in illiquid markets: Do financial asset prices rise faster than they fall? The Journal of Finance, 65, pp.1669–1702.

Longstaff, F., 2011. Municipal debt and marginal tax rates: Is there a tax premium in asset prices? The Journal of Finance, 66, pp.721–751.

Manchester, P. and Antony Davies., 2009. Implications of foreign investment patterns for federal, state, and local bond financing, Working Paper, Duquesne University.

Schwert, M., 2017. Municipal Bond Liquidity and Default Risk. The Journal of Finance. 72, pp.1683-1722.

Innovation Performance of Sustainable Companies in an Open Innovation Environment

Yu-Chieh Hua – Department of Finance, National Research University Higher School of Economics, St. Petersburg, Russia

Elena Rogova – Department of Finance, National Research University Higher School of Economics, St. Petersburg, Russia erogova@hse.ru

Keywords: open innovation, sustainability, corporate financial performance

1. Introduction

Open innovation and corporate sustainability become more and more important in the modern world of business. Although the concept of open innovation has been introduced for decades, but it was after the era of internet and technology that it becomes critical for business to stay competitive. Sustainability, same as innovation, becomes crucial as awareness of social and environmental impact of businesses is growing in the society. Research argues that implementation of sustainability practices increases the efficiency and innovation of the companies, and hence creates value for shareholders.

The research question for this study is how sustainability improves financial performance in real world. Which are the main drivers of improvement - innovation, efficiency, strategic advantage, or all of them? This question has not been answered yet in existing literature. We focus on the innovation aspect and try to find out the difference of innovation performance between sustainable companies and non-sustainable companies.

The paper is structured as follows. In literature review, we discuss both sustainability and open innovation, including general concept, results from previous researches and the methods we use in the next section. Methodology section shows the design of the study, data collection process and variables selection. Results section presents empirical findings. Finally, we make conclusions of what we have found.

2. Theoretical Background and Literature Review

There has been no general agreement on methodology of measuring sustainability. In the study of Labuschagne *et al*. (2005), sustainability can be evaluated by three aspects: economic sustainability that includes financial performance and potential trading opportunities; social sustainability that includes internal human resources and external stakeholder environmental sustainability that considers the air, water, and land etc. Lopez *et al*. (2007) used existing Dow Jones Sustainability index (DJSI) as a tool. Ameer *et al*. (2010) mentioned in their research the Environment, Social and Governance (ESG) Key Performance Indicators (KPIs) developed by Corporate Knights Research Group (CKRG). The Return on Sustainability Investment (RoSI) methodology developed by New York University claims that companies that implement sustainability in its strategy and practice gain short- and long- term value for shareholder and society by improvement of customer loyalty, employee relations, innovation, media coverage, operational efficiency, risk management, sales and marketing, supplier relations and stakeholder engagement. Hence leads to greater profitability, higher corporate valuation, and lower cost of capital.

The concept of open innovation by Chesbrough (2003) involves the acquisition of external knowledge and sharing the internal knowledge externally. Huang *et al*. (2010) argue that by enable usage of external knowledge, companies gain the opportunities to leverage, therefore, leads to better performance. Acquisition of external knowledge, under a resource-based view, improve business performance in two ways. It creates more opportunities for companies to utilize existing resources in a new way by new knowledge, and/or increase the efficiency of company by doing things better without new technology (Anokhin *et al*. 2016).

3. Research Design, Methodology and Data Analysis

Previous research has shown roughly 90% of studies indicate a non-negative relationship between sustainability and corporate financial performance. Sustainability improves corporate financial performance by better innovation, efficiency, and strategic effect. This study focuses on innovation part of the improvement and evaluates it in open innovation condition.

In order to capture the difference of innovation performance in sustainable companies and answer whether sustainable company has a better innovation performance comparing to others, this study will first create model using innovation performance as dependent variable, and then compare the innovation performance of treatment group – companies in DJSI – and control group – companies not in DJSI of 5 years period from 2014 to 2018 total in the US. The process of sampling is that first we choose all US companies that has been successively included in North America DJSI index from 2014 to 2018 as treatment group, then we randomly select the same numbers of companies in treatment group from top 500 as the control group. We use forward citation-weighted patent counts as a proxy of innovation performance. According to Wadhwa *et al.* (2016), citations received by a patent reflect the intellectual lineage of the patent and the impact that the patent has on subsequent technological development. We refer to this research and choose the independent variables that are suitable for our case.

1) Firm size, measured as the natural logarithm of total revenue. Firm size should be added in the model as bigger firm has more resources that can be used in innovation.

2) Current ratio. Measuring unabsorbed slack resources, which are resources that still do not have a specific usage for and can be redeploy easily. Firms with more idle resources tend to seek opportunities more than others, which includes innovation.

3) Age.

4) R&D intensity, measured by R&D expenditure divided by total revenue

5) Patent account.

For firm i in time t, we capture the effect of these independent variables in time $t-1$ to innovation performance.

In DJSI index, each year consists around 150 companies; a total of 77 companies have been included successively from 2014 to 2018. However, there are 6 companies that either goes through regroup/merger or data accessibility issue leads to an exclusion from our sample. Therefore, 71 companies are selected for both treatment and control group. Data are obtained from diverse sources, patent amount and forward citation count are obtained from Orbit; current ratio, R&D expenses and revenue are obtained from Thomson Reuters and public data from Strategy&.

To choose between fix and random effect model, Hausman and overidentifying restrictions test were performed. We run fixed effect penal regression for three models, the integrated model, which is the total sample base, and two more models that separate the treatment and control group out of the integrated model.

4. Results/Findings and Discussion

The result from regression is quite interesting, it shows that current ratio, size, R&D intensity and age have no effect on firms' innovation performance. Patent amount is significant, which is logical as the more patents a company has, the more citation it should receive.

However, to answer our research question, we put more attention on the coefficients' difference between treatment and control group. The coefficient of treatment and control group are both significant at $p < 0.001$ level, and the regression dose shows that patent amount of treatment group has a bigger impact on innovation performance compare to control group.

Dependent variable = Innovation Performance

	Integrated	Treatment	Control
Patenr amount, t-1	1.06***	1.09***	0.82***

	(0.03)	(0.04)	(0.05)
Current ratio, t-1	33.46	5.06	24
	(69.33)	(92.71)	(89.17)
Ln(Size), t-1	12.92	-158.39	-135.04
	(201.23)	(362.53)	(171.92)
R&D intensity, t-1	-196.53	-381.02	-7463.28
	(2190.65)	(2801.27)	(4502.13)
Age, t-1	10.09	27.49	33.6
	(25.93)	(38.26)	(28.34)
Constant	87765.9***	109842.8***	61992.6***
	(4998.24)	(9033.18)	(4157.68)

To test whether the difference is statistically significant, we conduct interaction term analysis in the regression model and present the result in table 6. The coefficient of treatment group is higher than control group and the difference is around 0.26, significant at p=0.001 level. This result confirmed our hypothesis that companies that implemented sustainability practice have better innovation performance than non-sustainable firms

5. Conclusion, Contribution and Implication

The aim of this research is to find out how sustainability improves firms' financial performance focusing on the aspect of innovation. The result finds evidence from empirical data that there is a difference of innovation performance between sustainable companies and non-sustainable companies and is statistically significant.

The difference indicates that with the same amount of patent, sustainable companies has better innovation performance in the view of subsequent technological development. To bear in mind that this result should not be generalized to all industry as our sample base dose not or only includes very limited sample for financial, real estate and utilities industry.

Our research contributes to the topic of sustainability and financial performance by creation of a conceptual framework of how sustainability improves financial performance. Then we have found evidences from empirical data that indeed sustainable firms perform better in innovation.

Further research can focus on the efficiency and strategic effect gained by implementation of sustainability practice.

6. References

Ameer, R., Othman, R. (2012). Sustainability Practices and Corporate Financial Performance: A Study Based on the Top Global Corporations. Journal of Business Ethics, 108, 61–79. https://doi.org/10.1007/s10551-011-1063-y

Anokhin, S., Wincent, J., & Oghazi, P. (2016). Strategic effects of corporate venture capital investments. Journal of Business Venturing Insights. 5, 63–69. https://doi.org/10.1016/j.jbvi.2016.04.002

Chesbrough, H.W. (2003). Open Innovation: The New Imperative for Creating and Profiting from Technology. Harvard Business School Press, Boston, MA.

Huang, T., Wang, W.C., Ken, Y., Tseng, C.-Y., & Lee, C.-L. (2010). Managing Technology Transfer in Open Innovation: The case study in Taiwan. Modern Applied Science, 4(1), 2-11. https://doi.org/10.5539/mas.v4n10p2

Labuschagne, C.L., Brent, A.C., & van Erck, R.P.G. (2005). Assessing the sustainability performance of industries. Journal of Cleaner Production, 13, 373-385. https://doi.org/10.1016/j.jclepro.2003.10.007

Lopes, C.M., Scavarda, A., Hofmeister, L.F., Thomé, A.M.T., & Vaccaro, G.L.R. (2017). An analysis of the interplay between organizational sustainability, knowledge management, and open innovation. Journal of Cleaner Production, 142, 476–488. https://doi.org/10.1016/j.jclepro.2016.10.083

Wadhwa, A., Phelps, C., & Kotha, S., 2016. Corporate venture capital portfolios and firm innovation. Journal of Business Venturing, 31,95-112. https://doi.org/10.1016/j.jbusvent.2015.04.006

Higher School of Economics National Research University, Saint Petersburg, Russia

On the Contextual Determinants of Climate Changes Reporting by Forbes 2000 Global Listed Companies to CDP- Evidence from BRICS Countries

Charumathi Balakrishnan – Department of Management Studies, Pondicherry University (A Central University), India profcharu@gmail.com

Habeebu Rahman – Department of Management Studies, Pondicherry University (A Central University), India

1. Introduction

Climate change is a serious business risk with significant strategic, financial and environmental implication. Countries introduced environmental legislation following the Kyoto Protocol and Paris climate agreement under the UNFCCC. A set of regulations among these focused on improving corporate transparency on their GHG emission in the form of mandatory regulations and voluntary guidelines on corporate GHG emission reporting. Developed countries such as United States, Canada and Australia have enacted mandatory corporate GHG emission reporting regulations in the first decade of 21st century. Emerging economies started enacting reporting regime followed by larger economic activities and emission in those countries. Economic growth significantly increases the CO_2 emission (Aye, Edoja & Charfeddine, 2017). In this study, we investigate the scenario in a group of developing countries - BRICS countries – Brazil, Russia, India, China and South Africa. We found both mandatory regulations and voluntary framework encourage firms' participation in the CDP reporting on climate change but voluntary framework improves the extent of disclosure. We also found a significant influence of the Paris climate agreement on participation and the extent of CDP disclosure. We also validated the institutional theory in the context of emerging economies.

2. Theoretical Background and Literature Review

Yang and Farley (2016), Comyns (2018) and Grauel and Gotthardt (2016) validated the institutional theory, which was proposed by DiMaggio and Powell (1983). Theories such as legitimacy theory, stakeholder theory, agency theory and signalling theory were also validated. Ecological modernization theory and institutional theory were validated in a multi-country study by Grauel and Gotthardt (2016). In the emerging economies, Charumathi and Rahman (2019) validated board capital theory and critical mass theory in the Indian context.

Studies were also done on developed nations such as United States (on Securities and Exchange Commission's mandatory reporting) and Canada (Canadian Voluntary Climate Challenge and Registry), United Kingdom (Department for Environment, Food and Rural Affairs' guidance) and Australia (National Greenhouse and Energy Reporting). Grauel and Gotthardt (2016) found the existence of country-level environmental regulations and national contexts as determining factors of voluntary carbon reporting. In case of developing nation, Yang and Farley (2016) found that the Chinese country-level reporting guidelines have a greater influence on the content of climate change reporting compared to international guidelines.

The Kyoto Protocol mandated developed countries to reduce emission whereas the Paris climate agreement focuses on the equal partnership by all nations to achieve climate goals. The corporate climate change

disclosure practices were mostly researched in developed countries and less investigated in the emerging economies. Hence, we investigate if intuitional theory holds good and whether the country of origin and regulation determine the status and extent of CDP reporting by firms in BRICS counties. In the light of above, we have arrived at following hypotheses:

Null Hypothesis, H_{01}: Different national context and regulatory regimes do not determine the status of the firms' climate change disclosure to the CDP.

Null Hypothesis, H_{02}: Different national context and regulatory regimes do not determine the extent of the firms' climate change disclosure to the CDP.

3.   Research Design, Methodology and Data Analysis

In this empirical study, we used secondary data such as a) status of CDP reporting and b) CDP scores besides financial variables. Nature of reporting regulations are categorized into a) Mandatory b) Voluntary and c) No reporting regulations (Annexure 1). The sample includes 281 companies from BRICS countries (Annexure 2) and forming part of Forbes list of 2000 global companies which workout to 1552 firm-year observations for the 10 years (2010 to 2019).   A binomial logit model and a multinomial logit model are used to determine   the factors influencing CDP reporting status (reporting or non-reporting) and CDP score respectively. CDP   score was categorized into four types: 0) Insufficient Reporting, 1) Leadership, 2) Management,   3) Awareness and 4) Disclosure.

We used two models given below:

$$CDP\ Reporting = \beta_0 + \beta_1\ Country\ + \beta_2\ Industry\ + \beta_3\ Paris\ Agreement\ +\ \beta_4\ Mandatory\ +\ \beta_5\ Voluntary\ +\ \beta_6\ Total\ Assets\ +\ \beta_7\ Total\ Revenue\ +\ \varepsilon i \qquad (\ 1\ )$$

$$CDP\ Score\ = \beta_0 + \beta_1\ Country\ + \beta_2\ Industry\ + \beta_3\ Paris\ Agreement\ +\ \beta_4\ Mandatory\ +\ \beta_5\ Voluntary\ +\ \beta_6\ Total\ Assets\ +\ \beta_7\ Total\ Revenue\ +\ \varepsilon i \qquad (\ 2\ )$$

4.   Results/Findings and Discussion

Table 1

Results of Binomial Logistic Regression

Number of observations	1552.00
LR chi2(7)	121.83
Prob > chi2	0.00
Pseudo R2	0.06

CDP Reporting[1]	Odds Ratio	S.E.	z	P>z	H[01]
Country[2]	0.88	0.05	-2.19	0.03**	Rejected
Industry[2]	1.01	0.00	1.51	0.13	
Paris Agreement[2]	1.44	0.23	2.27	0.02**	Rejected
Mandatory[2]	0.23	0.04	-7.67	0.00***	Rejected
Voluntary[2]	1.31	0.21	1.69	0.09*	Rejected
Total Assets[2]	1.01	0.05	0.13	0.90	
Total Revenue[2]	1.05	0.07	0.70	0.48	
_cons	0.36	0.16	-2.29	0.02**	

Notes: 1= Depended Variable, 2= Independent Variable.

*, **, *** denote significance at the 10%, 5% ,1% level, respectively.

From table 1, we found that the status of CDP reporting on climate change is significantly influenced by a) existence of mandatory reporting regulation (at 1%) and b) country of origin and Paris Climate Agreement (at 5%). ***Thus, different national context and regulatory regimes determine the status of the firms' climate change disclosure to the CDP.***

Table 2

Results of Multinomial Logistic Regression

Number of observations	1552

LR chi2(28)			394.70		
Prob > chi2			0.00		
Pseudo R2			0.18		
CDP Score[1]	**Coef.**	**S.E.**	**z**	**P>z**	**H_{02}**
Insufficient Reporting	(base outcome)				
Leadership					
Country[2]	-0.58	0.21	-2.77	0.01***	Rejected
Industry[2]	0.02	0.01	1.85	0.06*	Rejected
Paris Agreement[2]	2.83	0.51	5.61	0.00***	Rejected
Mandatory[2]	-1.69	0.55	-3.06	0.00***	Rejected
Voluntary[2]	-1.17	0.53	-2.19	0.03**	Rejected
Total Assets[2]	-0.21	0.12	-1.73	0.08*	
Total Revenue[2]	0.66	0.17	3.95	0.00***	
_cons	-7.68	1.30	-5.90	0.00	
Management					
Country[2]	0.03	0.13	0.23	0.82	
Industry[2]	0.02	0.01	1.95	0.05**	Rejected

Paris Agreement[2]	1.33	0.34	3.87	0.00***	Rejected
Mandatory[2]	-2.60	0.61	-4.23	0.00***	Rejected
Voluntary[2]	0.79	0.35	2.27	0.02**	Rejected
Total Assets[2]	-0.01	0.12	-0.05	0.96	
Total Revenue[2]	-0.08	0.15	-0.53	0.60	
_cons	-2.71	0.97	-2.79	0.01***	

Awareness

Country[2]	0.19	0.11	1.80	0.07*	Rejected
Industry[2]	0.00	0.01	0.32	0.75	
Paris Agreement[2]	1.57	0.33	4.79	0.00***	Rejected
Mandatory[2]	-17.27	644.24	-0.03	0.98	
Voluntary[2]	0.73	0.33	2.23	0.03**	Rejected
Total Assets[2]	0.20	0.11	1.75	0.08*	
Total Revenue[2]	-0.46	0.14	-3.35	0.00***	
_cons	-0.75	0.83	-0.91	0.36	

Disclosure

Country^2	0.53	0.14	3.88	0.00***	Rejected
Industry^2	0.03	0.01	2.14	0.03**	Rejected
Paris Agreement^2	0.54	0.35	1.55	0.12	
Mandatory^2	-15.70	816.72	-0.02	0.99	
Voluntary^2	2.23	0.37	6.01	0.00***	Rejected
Total Assets^2	-0.08	0.13	-0.61	0.54	
Total Revenue^2	-0.24	0.17	-1.41	0.16	
_cons	-2.20	1.04	-2.11	0.04**	

Notes: 1= Depended Variable, 2= Independent Variable.

*, **, *** denote significance at the 10%, 5%, 1% level, respectively.

From Table 2, we found following:

a) In the Leadership category, extent of CDP reporting is a) positively and significant influenced by Paris Climate Agreement (at 1%) and b) negatively and significantly influenced by mandatory reporting regulation (at 1%), voluntary reporting framework (at 5%) and country of origin (at 1%).

b) In the Management category, the extent of CDP reporting is a) positively and significantly influenced by Paris climate agreement (at 1%), voluntary reporting framework (at 5%) and the industry classification (at 5%); and b) negatively significant influenced by mandatory reporting regulation (1%).

c) In the Awareness category, the extent of CDP reporting is a) positively and significantly influenced by Paris climate agreement (at 1%) and voluntary reporting framework (at 5%); and b) negatively influenced by mandatory reporting regulation.

d) In the Disclosure category, the extend of CDP reporting is a) positively and significantly influenced by the country of origin (at 1%), voluntary reporting framework (at 1%) and industry classification (at 5%); and b) negatively influenced by mandatory reporting regulation.

5. Conclusion, Contribution and Implication

Though mandatory reporting regulation made firms to report to CDP questionnaire, the extent of disclosure was very low. Though voluntary reporting framework gave option to report (not to report) to CDP questionnaire, the extent of disclosure by the reported firms was very high. Paris climate agreement made firms to report to CDP questionnaire and improved the extent of disclosure. Country of origin and industry classification have influenced the status and extent of CDP reporting. In the CDP reporting status, the Chinese and Russian firms are lagging behind whereas in the extent of reporting, firms from Brazil, India and South Africa are leading.

We contribute to the literature on corporate CDP reporting in emerging economies besides validating institutional theory (Yang & Farley, (2016); Comyns, 2018). We also contribute evidence for how international protocol (Paris climate agreement) and national context (Grauel & Gotthardt, 2016) influence corporate voluntary reporting to CDP.

Global investors and financial analysts can understand the different reporting cultures in the emerging economies. Compared to mandatory regulations, voluntary framework encourages firms to disclose more. The policy makers may consider this finding while deciding the policy (carrot and stick policy) on carbon reporting.

References

Aye, G. C., Edoja, P. E., & Charfeddine, L. (2017). Effect of economic growth on CO2 emission in developing countries: Evidence from a dynamic panel threshold model. *Cogent Economics & Finance*, *5*(1), 1379239. https://doi.org/10.1080/23322039.2017.1379239

Charumathi, B., & Rahman, H. (2019). Do women on boards influence climate change disclosures to CDP? – evidence from large Indian companies. Australasian Accounting, Business and Finance Journal, 14(2), 6-31. doi: 10.14453/aabfj.v13i2.2

Comyns, B. (2018). Climate change reporting and multinational companies: Insights from institutional theory and international business. Accounting Forum, 42(1), 65-77. doi:10.1016/j.accfor.2017.07.003

DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organisational fields. American Sociological Review, 48(2), 147. https://doi.org/10.2307/2095101

Grauel, J., & Gotthardt, D. (2016). The relevance of national contexts for carbon disclosure decisions of stock-listed companies: a multilevel analysis. Journal of Cleaner Production, 133, 1204-1217. doi:10.1016/j.jclepro.2016.05.182

Yang, H. H., & Farley, A. (2016). Convergence or divergence? Corporate climate-change reporting in China. International Journal of Accounting & Information Management, 24(4), 391-414. doi:10.1108/ijaim-02-2016-0010

Annexures

Annexure 1			
Reporting Regulations in BRICS			
Country	**Regulation**	**Year**	**Nature of Regulation**

Brazil	Resolution on Socio-environmental Responsibility Policy	2014	Voluntary
Russia	No regulations	-	-
India	Business Responsibility Reporting	2012	Voluntary
China	NDRC mandated GHG reporting	2014	Mandatory
South Africa	National Greenhouse Gas Emission Reporting regulations	2017	Mandatory

Note: Reporting regulations which has at least some element of climate change reporting only are considered for the study.

Annexure 2

Companies in Forbes 2000 Global List from BRICS

Country	No. of Companies in Forbes 2000 Global List
Brazil	19
Russia	22
India	53
China	177
South Africa	10
Total	**281**

Source: Forbes Global 2000 - The World's Largest Public Companies

Relevant Performance Indicators of Sustainable Business Practices

Yulia Leevik – Department of Finance, National Research University Higher School of Economics, St. Petersburg, Russia yuleevik@hse.ru

Iya Churakova – Department of Finance, National Research University Higher School of Economics, St. Petersburg, Russia

Keywords: sustainable finance, airline financial performance, key performance drivers

1. Introduction

Contemporary economic, social and environmental realities meet our global society with new situations that require solutions, new challenges and tasks. The concept of sustainable value creation replaces the concept of value creation [3]. The transition to a new concept is associated not only with the fact that there is a demand for it among consumers but also with the fact that in the long term, companies can receive financial and non-financial benefits associated with more rational use of available resources. The primary role of the financial system is to allocate funding to its most productive use. Here we are talking both about the principles of investing in more sustainable projects and about changes in the principles of corporate financial management, consistent with modern business models built on the pull principle, that is, relying on the needs of consumers and producing the product that the consumer needs in the right amount and at the right time.

2. Theoretical Background and Literature Review

The Airlines industry deals with many negative impacts starting from CO_2 emission and finishing with ineffective use of fuel and labour resources in a case of flights underload or decline. Another reason is that the EU sustainable initiative focuses on the replacement of air transport by the more efficient one from the ecological perspective. One more point of discussion is to create a point-to-point LCC (Low-Cost Companies) net that will reduce the environmental and social damage in comparison to the FCC (Full Cycle) companies [4]. In that case, the long-term perspective of planning and corporate social responsibility use may be a critical success factor of airline companies because of its significant environmental and social impacts [2]. The traditional measures of airline efficiency are cash flow, return on capital, operating costs, overall profitability, ROI and revenue. Today, the development and improvement of sustainable measurement systems such as balanced scorecards, indicators of total quality management of products and processes are one of the challenges for the management of the company. The airline sector influenced by the pandemic trends and now is slowly recovering.

Regarding the IATA forecasts the slowest annual passenger flow growth we can expect in Europe (2.2%) in comparison with the Asian market where is expected 5% annual growth rate. However, some airlines, particularly those in Asia, are not establishing adequate sustainability strategies [2]. Therefore, creating a more accurate tool that would help managers focus their attention on factors that are important to a business is a necessity. Summing up, the purpose of this work is the provision of reliable information on the model for measuring the performance of companies that would suit the companies in the European region. Determining the most appropriate model of key performance indicators for LCC and FCC companies in the European market also includes the realisation of the following tasks:

> a. identify the terminological comparability of the basic concepts of performance management for the European air transport market, including the concept of the sustainable value chain;

b.   determine the most appropriate model for measuring the performance of both types of companies based on their financial and non-financial reporting.

Building on previous research, the study described in this article examines the cost and revenue drivers in order to achieve the first level of sustainability: carefully forecast the demand and the cost to use existing resources effectively.

3.   Research Design, Methodology and Data Analysis

The paper is concentrated on the operations of air carriers operating in the European market (in the European part of Eurasia) comparing low-cost and full-cycle companies. Authors used secondary data, such as annual reports published on the official websites of companies, information for investors, public interviews, as well as financial statements of companies for the period 2014-2017. Data analysis methods are presented by the Spearman's Rho correlation coefficient (as the population is not normally distributed) and several non-parametric tests (Wilcoxon (Mann-Whitney) test for differences).

4.   Results/Findings and Discussion

Initial Data Analysis showed that FCC companies traditionally rely on cost-oriented indicators, calculating everything per kilometre, while LCC business model companies often use profit-oriented indicators and calculate them for each location or each transported passenger. This approach is more typical for companies like LCC since they mainly sell point-to-point flights with limited privileges (seats without free meals onboard, paid baggage). FSNC, by contrast, sells a much more complex product and, therefore, consider measuring the KPI system per kilometre more appropriate.

Several years earlier G. Demydyuk in 2011 [1] was conducted similar research based on a sample of 27 companies, 12 of which were companies of the LCC type and 17 of the FCC type. The researched reporting of these companies dates back to the period from 2004 to 2008 and includes companies from different regions except the EU. Based on the data of these companies, G. Demydyk made conclusions about average load factor values when using different models: she noted the difference neither in average values nor in extreme cases. With an almost identical average of the variable load factor equal to 77.3% for FCC companies and 77.9% for LCC type companies. However, the maximum load factor of the aircraft was observed for a company of the LCC type, 85.6%, while for a company like FCC it did not exceed 82.7%, that is, for companies like FCC it is slightly higher than the variation range of this indicator (24% compared to with 17% for LCC).

The results of this study confirm the conclusions of G. Demydyuk and show that the difference in revenues and the operating profit calculated per passenger is almost the same ($ 8.5for FCC companies and $ 7.7 for LCC companies.) Results show that the prices of LCC type companies are lower than those of the FCC companies, but the financial result is approximately the same. Several tests are given in Table 1 to understand whether averages are significantly different for two types of companies.

Table 1: Comparison of key performance indicators for research of American and Asian airlines G. Demydyuk and European companies (this study).

Indicators	A previous study by Demydyuk, 2011		This study		
Business model type	FSNC	LCC	FSNC	LCC	Wilcoxon (Mann-Whitney) test for differences
A v e r a g e Load factor, %	77,3	77,9	81,7	87,2	-3.259
Minimum Load factor, %	64,9	61,6	76	79,5	no test

Maximum Load factor, %	82,2	85,6	88,4	94	no test
Revenue per passenger	308,4 USD	245,86 EUR	105,3 USD	85,46 EUR	5.339
Operating profit per passenger	8,5 USD	7,7 USD	14,6 EUR	6,47 EUR	0.927
					p-value= 0.3538

5. Conclusion, Contribution and Implication

The results show a significant difference in the primary operating performance indicators of companies that use different business models. The percentage of aircraft load and operating profit per passenger are examples of such indicators. We examine the models that characterise two aircraft activities drivers: revenue-driving (per seat or passenger) and cost-driven (per passenger-kilometre). Estimating several regression models, we can make the following conclusions:

1.   For LCC companies, the preferred is a per-passenger model with percentages of explained variation equal to 98.9% for OP Margin and 57.9% for ROA. Another model (per kilometre) is also significant and explains variation well (determination for OP Margin is 90.5%, for ROA - 58.1%), but the model "per passenger" is more accurate.

2.   Traditionally is considered that for FCC companies it would be more appropriate to use the "per kilometre" revenue-driven model, since the services provided by these companies are more complex than point-to-point destination services, traditionally provided by the LCC companies. This paper develops an empirical model to examine the impact of the most relevant factors, measured per kilometre. However, they explain only a modest percentage of variation: modelling ROA we found 63.5% of explained differences, and for OP Margin this percentage equals 48.8%. If we use the same indicators calculated per passenger, the significance of the model increases and determination became sufficiently higher: 87.3% for the ROA variable and 48.5% for the OP Margin.

If we continue to analyse the differences, then it may turn out that the model can also include an analysis of the socio-economic environment of the country of departure, because the purchasing power of household income and social reasons also dictates passengers the level of comfort and choice of the aircraft company. Since today Asian companies are becoming increasingly active in the market, in the following studies, it would be interesting to understand whether the revenue-driven and cost-driven models work in these regions and what its features are. At the moment, we understand that it is possible to move from the model to some more modern counterparts, including not only technical means but also using the capabilities of artificial intelligence to reduce the cost and increase the efficiency of air transportation.

Our empirical results provide a piece of evidence that at the moment, the most appropriate model for measuring the results of companies is a revenue-driven model "per passenger". These results are relevant from the theoretical perspective of understanding current market organisation and trends in the airline industry, where the difference between full cycle and low-cost companies became almost invisible in some segments. The next step there is to use the multidimensional sustainability indicators to get the link between the sustainability principles to use and financial performance.

6. References

Demydyuk, G. (2011). Optimal financial key performance indicators: evidence from the airline industry. Accounting and Taxation, 4(1), p.39–51.

Dong-Shang C., Sheng-Hung C., Chia-Wei H. and Allen H. Hu. (2015). Identifying Strategic Factors of the Implantation CSR in the Airline Industry: The Case of Asia-Pacific Airlines. Sustainability. Issue 7(6), p.7762-7783; https://doi.org/10.3390/su7067762.

Fatemialraj, A. M., Fooladi, J. (2013). Sustainable finance: A new paradigm. Global Finance Journal. Volume 24, Issue 2, p.101-113. https://doi.org/10.1016/j.gfj.2013.07.006

Goetz, A. R., Graham, B. (2004). Air transport globalisation, liberalisation and sustainability: post-2001 policy dynamics in the United States and Europe. Journal of Transport Geography. Volume 12, Issue 4, p.265-276.

Track: Intellectual capital of individuals, groups and organizations

Chairperson: Petr Parshakov

Intellectual capital (IC) has been recognized by many scholars and practitioners as a main source of organizational performance and investors' expectations in the knowledge-driven economy (Edvinsson & Malone, 1997, Bontis, 1998, Stewart, 1998, Nahapiet & Ghoshal, 1998, Schiuma & Lerro, 2008, Shakina & Barajas, 2015). At the same time, the process that stands behind this IC based performance is still a black box which, therefore, naturally attracts interest from both researchers and business managers. This session is devoted to the studies of IC measurement and its relation with firm performance.

Keeping the firm into the family. An analysis of parents' learning mechanisms and succession dynamic capability

Natalia Martín-Cruz – University of Valladolid, Spain ambiela@eco.uva.es

Ismael Barros Contreras – University Austral de Chile, Chile

Héctor Pérez Fernández – University of Valladolid, Spain

Juan Hernangómez Barahona – University of Valladolid, Spain

Keywords: succession, family firm, dynamic capabilities, learning mechanisms, intentions

1. Introduction

The founders of a family firm have a clear objective for the firm, other than returns, that is survival. However, they confront two important dilemmas when retiring and deciding who takes over responsibility for the firm; first, who has the necessary and sufficient skills to run the firm and, second, who has the desire to preserve the family firm (Richards, Kammerlander, & Zellweger, 2019). From the successor perspective, being the next generation is related to the feeling of belonging that their parents are able to transfer. In the family firms, parents have an important role making next generations able to connect the dots. In fact, parents can create the learning mechanisms for their successors by giving them support (Garcia, Sharma, De Massis, Wright, & Scholes, 2019) making them to be committed to the family firm (Sharma & Irving, 2005), avoiding the negative imprints (Kidwell, Eddleston, & Kellermanns, 2018) and then making then willing to engage to the family firm. If they succeed, actual successors will advocate the benefits of continuing the family firm.

In this paper, we take a dynamic capabilities approach, and we consider the perspective of the potential successors of family firms. The objective of this paper is to relate the role of parents in the learning of successors about the family firm to the succession dynamic capability, and finally, to the successor intention to be the next generation in the family firm. Additionally, we control for successors' skills as the literature has suggested that could have an effect on the successor intentions.

2. Theoretical Background and Literature Review

Family firm literature has addressed this challenge from different theoretical perspectives. Although there are some advances in the family firm literature, there is still a need to have a better understanding of the process of succession and the role of the parents. In order to gain comprehension of these issues, we unfold the family firm as a bundle of learning mechanisms and dynamic capabilities created across generations (Chirico & Nordqvist, 2010). In fact, from this approach, the parents in the family firm have a role developing learning mechanisms that allow successors to create a commitment to the family firm, being one of the core dynamic capabilities that preserve a firm within the family.

The members of a family firm that simultaneously cover the functions of owners and managers maintain leadership and learning capabilities that make them worthy of being considered entrepreneurial managers and capable of creating lasting learning mechanisms for future generations that guarantees the sustainability of the succession dynamic capability (Teece, 2014). Based on those arguments, we formulate the following hypothesis.

H1. The use of deliberate parents' learning mechanisms with successors is positively related to the succession dynamic capability.

The succession dynamic capability allows the successors to deploy their own resources, adjust them as circumstances require, and generate or acquire new ones when needed (Teece & Al-Aali, 2013) oriented to the continuation of the family firm with the aim to preserve firm survival. In fact, strong dynamic capabilities related to succession could be associated to better strategic practices (Kidwell et al., 2018), long term profitability and growth (Teece, 2007). Based on those arguments, we formulate the following hypothesis.

H2. Succession dynamic capability is positively related to succession intention.

3. Research Design, Methodology and Data Analysis

The data were collected from 2018 Global University Entrepreneurial Spirit Students' Survey (GUESSS), an international research project which investigates the entrepreneurial intentions and activities of students using a geographical and temporal comparison (Sieger, Fueglistaller, & Zellweger, 2014). In this case, we use the Spanish version of the questionnaire.

The main variables of the research are: Succession intention. Scale of six items adapted from Liñán and Chen (2009). Parents learning mechanism. Career-Related parent support scale of Turner et al., (2003). Succession dynamic capability. This variable is operationalized with two different types of commitment: affective and normative (Sharma & Irving, 2005).

We use structural equation modeling for our statistical analysis. In particular, we employ the partial least squares (PLS-SEM) approach.

4. Results/Findings and Discussion

Parent learning mechanisms positively and significantly influences succession dynamic capability with a coefficient of 0.600 (t = 77.058) (affective commitment), and coefficient of 0.582 (t = 72.788) (normative commitment). These results provide evidence of the direct impact of parent learning mechanisms, through the parent's knowledge transference to potential successors in family firms. Thus, configuring succession dynamic capabilities, through the stimulation of both successors' affective and normative commitment, creating lasting learning mechanisms for future generations that guarantees the sustainability of the succession dynamic capability (Teece, 2014). These results support the H1.

Succession dynamic capability (affective and normative commitment) positively and significantly affects the succession intention with a coefficient of 0.281 (t = 20.804) (affective commitment), and coefficient of 0.451 (t = 33.371) (normative commitment). These results confirm that succession dynamic capability, resting on the succession feelings, perceptions, motivations, commitments of the successors, is relevant to create the succession intention, and thus, to preserve family firm survival. This result supports H2.

5. Conclusion, Contribution and Implication

Our research advances in the succession literature of family firms by using the dynamic capabilities approach to the succession literature. Succession is one of the topics that have been treated by several scholars but there is still need to theoretically and empirically locate the proximate causes at the micro-level of analysis (De Massis & Foss, 2018). Our research suggests that the dynamic capabilities approach has a role to understand the dynamics of the family firm.

The development and evolution of the succession dynamic capability must invoke mechanisms that go beyond semi-automatic stimulus response process (Zollo & Winter, 2002). In family firms, there is a learning process where the parents know that tacit knowledge as being experiential is not enough to develop a succession dynamic capability, and therefore, they deliberately organize learning mechanism to articulate and codify their knowledge to the successors.

The contributions of the paper are twofold. First, we advance in the knowledge of succession in family firms by using the dynamic capabilities approach in the creation of successors' commitment as antecedent of successors' intentions. Second, we present an empirical study in Spain, a country in which succession is a main problem to preserve family capital over time.

6. References

Chirico, F., & Nordqvist, M. (2010). Dynamic capabilities and trans-generational value creation in family firms: The role of organizational culture. International Small Business Journal, 28(5), 487-504. doi:10.1177/0266242610370402

De Massis, A., & Foss, N. J. (2018). Advancing family business research: The promise of microfoundations. 31(4), 386-396. doi:10.1177/0894486518803422

Garcia, P. R. J. M., Sharma, P., De Massis, A., Wright, M., & Scholes, L. (2019). Perceived parental behaviors and next-generation engagement in family firms: A social cognitive perspective. Entrepreneurship Theory and Practice, 43(2), 224-243. doi:10.1177/1042258718796087

Kidwell, R. E., Eddleston, K. A., & Kellermanns, F. W. (2018). Learning bad habits across generations: How negative imprints affect human resource management in the family firm. Human Resource Management Review, 28(1), 5-17. doi:https://doi.org/10.1016/j.hrmr.2017.05.002

Liñán, F., & Chen, Y. W. (2009). Development and cross–cultural application of a specific instrument to measure entrepreneurial intentions. Entrepreneurship Theory & Practice, 33(3), 593-617. doi:10.1111/j.1540-6520.2009.00318.x

Richards, M., Kammerlander, N., & Zellweger, T. (2019). Listening to the heart or the head? Exploring the "willingness versus ability" succession dilemma. Family Business Review, 0(0). doi:10.1177/0894486519833511

Sharma, P., & Irving, P. G. (2005). Four bases of family business successor commitment: Antecedents and consequences. Entrepreneurship Theory & Practice, 29(1), 13-33. doi:10.1111/j.1540-6520.2005.00067.x

Sieger, P., Fueglistaller, U., & Zellweger, T. (2014). Student entrepreneurship across the globe: a look at intentions and activities.

Teece, D. J., & Al-Aali, A. Y. (2013). Knowledge, entrepreneurship, and capabilities: revising the theory of the MNE. Universia Business Review (40), 18-32.

Teece, D. J. (2014). The foundations of enterprise performance: Dynamic and ordinary capabilities in an (economic) theory of firms. The Academy of Management Perspectives, 28(4), 328-352. doi:10.5465/amp.2013.0116

Turner, S. L., Alliman-Brissett, A., Lapan, R. T., Udipi, S., & Ergun, D. (2003). The career-related parent support scale. Measurement & Evaluation in Counseling & Development, 36(2).

Zollo, M., & Winter, S. G. (2002). Deliberate learning and the evolution of dynamic capabilities. Organization Science, 13(3), 339-351.

Antecedents of knowledge-based performance

Mariia Molodchik – National Research University Higher School of Economics, Perm, Russia, mmolodchik@hse.ru

Keywords: knowledge, learning, knowledge culture, transformational leadership, flexible structure, Russian companies

1. Introduction

Knowledge is recognized by scholars as a crucial driver of company performance (Grant, 1999). At the same time the mechanism of how knowledge-based performance emerges is still a black box. This study addresses the question, what are the antecedents of knowledge-based performance. Following Garvin et al., (2008) we suppose that supportive environment for organizational learning is a compulsory component for knowledge acquisition, generation, sharing and internationalization. Moreover, we try to analyze the role of proactive employee behavior for knowledge-based performance.

2. Theoretical Background and Literature Review

This paper proposes a complex view on knowledge-based performance, presenting knowledge capability through knowledge resources, organizational learning and employee proactive behavior. As stated by Parker et al., (2010), "being proactive is about making things happen, anticipating and preventing problems, and seizing opportunities". It is assumed that employee proactive behavior mediates the impact of supporting factors on knowledge resources and organizational learning. Among supportive factors or antecedents of knowledge-based performance we suppose to reveal knowledge culture, transformational leadership and flexible organizational structure. Knowledge culture is the combination of shared history, expectations, unwritten rules that shapes employee behavior with regard to knowledge creation and utilization (Herbert, 2012). Transformational leadership influences engagement of followers, promotes creativity individual skills and knowledge sharing practices (Pellegrini et al., 2020). Flexible organizational structure supports organizational processes with regard to knowledge management and is characterized through high level of decentralization, complexity and integration, while level of formalization should be low (Mahmoudsalehi et al., 2012). This paper contributes to knowledge management and organizational learning literature by simultaneous consideration of culture, leadership and structure for knowledge-based performance, moreover, it is supposed that proactive behavoir of employees mediates the impact of these three antecedents on knowledge index and organizational learning.

3. Research Design, Methodology and Data Analysis

The study uses PLS modelling in order to reveal path coefficients for knowledge-based performance. Dataset was collected through snowball method in 2019 and consists of 110 responses of Russian companies. The survey contains questions about company financial performance, innovation, organizational learning, knowledge resources, proactive behavior, knowledge culture, transformational leadership and flexible structure. All constructs except knowledge resources were measured with Likert scale. Metrics were mostly derived from Garvin et al., (2008) but also well-known justified measurements published in peer-reviewed journals.

4. Results/Findings and Discussion

The model has SRMR=0,087. The model included eight latent variables: company performance, innovation, organizational learning, knowledge index, proactive behaviour, knowledge culture, transformational leadership, flexible organizational structure. For all constructs Cronbach alfa was higher

than 0,7 and composite reliability was higher than 0,8. The model identified the following significant path coefficients showed in brackets:

- Flexible organizational structure has no direct impact on proactive behavior, but influences transformational leadership (0,715);
- Transformational leadership has direct impact on proactive behavior (0,279) and also forms knowledge culture (0,719);
- Knowledge culture influences proactive behavior (0,538);
- Proactive behavior mediates the impact of culture, leadership and structure, influencing knowledge index (0,376) and organizational learning (0,593);
- Knowledge-based performance is reflected in following chain: knowledge index influences organizational learning (0,196), organizational learning leads to innovation (0,708) and innovation has an impact on company performance (0,559).

5. Conclusion, Contribution and Implication

The study contributes to knowledge management providing novel research design for complex view on knowledge-based performance. Such complex view was empirically tested for Russian companies. The findings reveal that knowledge culture, transformational leadership and flexible organizational structure form proactive employee behavior, which in turn stimulates organizational learning and increases knowledge index. This study shows that proactive behavior drives knowledge-based innovation and financial performance of a company. This empirical evidence has crucial practical implication in terms of knowledge management focus that should be oriented on forming and supporting proactive behavior of company's personnel.

6. References

Garvin, D. A., Edmondson, A. C., & Gino, F. (2008, март). Is Yours a Learning Organization? Harvard Business Review, 86(3), 109–116.

Grant, R. M. (1999). The resource-based theory of competitive advantage: Implications for strategy formulation. Knowledge and strategy, 3–23.

Herbert, A. N. (2012). Linking knowledge processes with firm performance: Organizational culture. Journal of Intellectual Capital, 13(1), 16–38. https://doi.org/10.1108/14691931211196196

Mahmoudsalehi, M., Moradkhannejad, R., & Safari, K. (2012). How knowledge management is affected by organizational structure. The Learning Organization, 19(6), 518–528. https://doi.org/10.1108/09696471211266974

Parker, S. K., Bindl, U. K., & Strauss, K. (2010). Making Things Happen: A Model of Proactive Motivation. Journal of Management, 36(4), 827–856. https://doi.org/10.1177/0149206310363732

Pellegrini, M. M., Ciampi, F., Marzi, G., & Orlando, B. (2020). The relationship between knowledge management and leadership: Mapping the field and providing future research avenues. Journal of Knowledge Management, 24(6), 1445–1492. https://doi.org/10.1108/JKM-01-2020-0034

How to enhance the benefits of independent directors on emerging markets? The case of Russian board committees

Marina A. Zavertiaeva – National Research University Higher School of Economics, Russia, moskolkova@hse.ru

Ekaterina B. Kazarina – National Research University Higher School of Economics, Russia

Keywords Board of directors; corporate governance; Board committee; independent directors; emerging markets, Russia.

1. Introduction

The share of independent directors on a Board is a widely accepted metric of corporate governance quality. Previous studies conclusively demonstrate the positive role of independent directors within developing markets (Leung *et al.*, 2014; Upadhyay *et al.*, 2014). However, in emerging economies, benefits from hiring independent directors are not so obvious. First, the agency conflict between shareholders and a manager is not so severe in developing markets, so the monitoring role of independent directors fades into the background. Second, in the conditions of information asymmetry, independent directors have limited knowledge about a company. According to the stewardship theory (Donaldson, 1990), it limits their capability for the effective monitoring of managers. The above mentioned reasons explain the diversity of empirical findings on the role of independent directors within developing markets.

How can companies in emerging economies benefit from the qualities that independent directors have to offer? (Ahrens *et al.*, 2011) argue that a director should be "independent but involved" to practice corporate governance effectively. So, we need to take a deeper look at the roles and functions of independent directors to understand what drives them to be engaged and involved in a particular business. In order to do it, this paper considers Board committees. The aim of the current paper is to analyze the role of independent directors in value creation in an emerging market, taking into account their participation in committees.

2. Theoretical Background and Literature Review

Committees are formed inside the Board and may consist of Board directors and other company's employees. The main task of the committees of the Board of Directors is a preliminary consideration of the most important questions within the competence of the Board of Directors, their analysis and development of recommendations for their solution. Research evidence that investors positively regard the existence of Board committees (Calleja, 1999). There are several reasons why committees may be beneficial for a company's performance. First, it allows to solve a problem of low attendance of Board meetings and to avoid the presence of free riders. Second, according to the agency theory framework, committees ensure that the conflict between shareholders and managers is smoother, increasing the firm's efficiency because of better monitoring. Empirical papers prove that committees successfully monitor and build the system of motivation for management (Anderson *et al.*, 2004; Beasley *et al.*, 2008). Third, according to the stewardship theory, participation in committees help directors to get access to up-to-date information about the corporate activity and fully explore their knowledge and experience (Nicholson and Kiel, 2007).

Independent directors may be involved in Board committees activities. It can increase their knowledge about the company, reduce informational asymmetry (Nicholson and Kiel, 2007) and allow them to better monitor managers (Leung *et al.*, 2014). There is not much evidence on Boards' and committees' independence in developing markets. On the one hand, emerging countries follow the practice of developed

ones and introduce the requirement about Board independence in the National Codes. Also, there is a growing trend toward establishing Board committees (Berezinets *et al.*, 2017). On the other hand, we do not have enough knowledge about their outcomes. That is why we propose to investigate the committees and study whether the inclusion of independent directors allows for an increase in corporate performance. We formulate the hypothesis as follows:

H1: Russian companies with a greater share of independent directors on the Board committees have a greater market value

3. Research Design, Methodology and Data Analysis

The main data source used is the Spencer Stuart Russia Board Index ("Spencer Stuart Russia Board Index", 2020), which provides information about Boards of directors of the Russian companies which have the largest market capitalization. We collect data on 48 companies that were included at least once in the Spencer Stuart Russia Board Index from 2014 to 2017. Then we collected data on the sample companies for 2013. As a result, the final sample consists of 230 observations of 46 different companies from 2013 to 2017, which makes a balanced panel

Companies create specific committees in Boards, and only after that they can decide whether to include within them, independent directors or not. Therefore, independent directors are only seen in companies where the benefits of establishing committees are greater than the cost. Thus, estimates obtained by selective sampling do not provide an opportunity to identify any real patterns (Heckman, 1979). In order to solve the potential problems with self-selection, the Heckman two-step method is used.

At the first step, the Maximum likelihood estimation (MLE) is used according to all probit model samples for probability of the committee organization. At the second step on the sub-sample with a committee, the regression model for market value with an additional regressor that is responsible for the self-selection is evaluated by panel data analysis using the fixed effects. Particular features of specific companies as well as sector-specific will be taken into account by adding an industry average sample value of the Tobin's Q index for a particular year. Models are estimated using statistical package R.

4. Results/Findings and Discussion

The share of independent directors in audit, remuneration, and nomination committees positively influence the value of Russian companies. An increase of the share of independent directors in the audit committee by 0.1 leads to an increase of Tobin's Q by 0.031; in the remuneration committee – by 0.037; in the nomination committee – by 0.59. Note that the previous research usually does not find the relationship between corporate value and audit, compensation and/or nomination committees (Cotter and Silvester, 2003; Jermias and Gani, 2014; Upadhyay *et al.*, 2014).

As for the strategy committee, its share of independent directors negatively influences the firm's value. A growth of the share of independent directors in a strategy committee by 0.1 decreases Tobin's Q by 0.031. Our result is consistent with the findings of (Klein, 1998) who shows that a higher proportion of insiders in strategy and investment committees leads to better financial results.

So, the participation of independent directors in audit, remuneration, and nomination committees positively influences market value of a company that partially confirms the hypothesis H2. However, the findings on the negative influence of the strategy committee' independence reject the hypothesis.

5. Conclusion, Contribution and Implication

The results of the study elucidate how to strengthen benefits connected with independent directors in emerging markets companies. It can be used by a company's shareholders interested in raising corporate

value. What is interesting, we demonstrate that the type of a committee, in which independent directors are included, matters. It allows companies to organize the work of a Board in the most effective way.

6. References

Ahrens, T., Filatotchev, I. and Thomsen, S. (2011), "The research frontier in corporate governance", Journal of Management & Governance, Vol. 15 No. 3, pp. 311–325.

Anderson, R.C., Mansi, S.A. and Reeb, D.M. (2004), "Board characteristics, accounting report integrity, and the cost of debt", Journal of Accounting and Economics, Vol. 37 No. 3, pp. 315–342.

Beasley, M., Pagach, D. and Warr, R. (2008), "Information conveyed in hiring announcements of senior executives overseeing enterprise-wide risk management processes", Journal of Accounting, Auditing & Finance, Vol. 23 No. 3, pp. 311–332.

Berezinets, I., Ilina, Y. and Cherkasskaya, A. (2017), "Board structure, board committees and corporate performance in Russia", Managerial Finance, available at:https://doi.org/10.1108/MF-11-2015-0308.

Calleja, N. (1999), "'To Delegate or Not to Delegate': Board Committees and Corporate Performance in Australia's Top 100 Companies", Sydney Law Review, Vol. 21 No. 1, available at: http://classic.austlii.edu.au/au/journals/SydLawRw/1999/1.html (accessed 18 April 2020).

Cotter, J. and Silvester, M. (2003), "Board and Monitoring Committee Independence", Abacus, Vol. 39 No. 2, pp. 211–232.

Donaldson, L. (1990), "The Ethereal Hand: Organizational Economics and Management Theory", Academy of Management Review, Vol. 15 No. 3, pp. 369–381.

Heckman, J. (1979), "Sample selection bias as a specification error", Econometrica, Vol. 47 No. 1, pp. 153–161.

Jermias, J. and Gani, L. (2014), "The impact of board capital and board characteristics on firm performance", The British Accounting Review, Vol. 46 No. 2, pp. 135–153.

Klein, A. (1998), "Firm Performance and Board Committee Structure", The Journal of Law and Economics, Vol. 41 No. 1, pp. 275–304.

Leung, S., Richardson, G. and Jaggi, B. (2014), "Corporate board and board committee independence, firm performance, and family ownership concentration: An analysis based on Hong Kong firms", Journal of Contemporary Accounting & Economics, Vol. 10 No. 1, pp. 16–31.

Nicholson, G.J. and Kiel, G.C. (2007), "Can Directors Impact Performance? A case-based test of three theories of corporate governance", Corporate Governance: An International Review, Wiley-Blackwell, Vol. 15 No. 4, pp. 585–608.

Upadhyay, A.D., Bhargava, R. and Faircloth, S.D. (2014), "Board structure and role of monitoring committees", Journal of Business Research, Vol. 67 No. 7, pp. 1486–1492.

Excess momentum or excess inertia: do companies adopt technologies at the right time?

Anna Daviy – National Research University Higher School of Economics, St. Petersburg, Russia

adaviy@hse.ru

Elena Shakina – National Research University Higher School of Economics, St. Petersburg, Russia

Keywords: digital transformation, organisational change, time factor, company performance

1. Introduction

The digital transformation is considered one of the most critical technological and organizational changes influencing the current business environment. According to a global survey of managers and executives conducted by Kane, Palmer, Phillips, Kiron, and Buckley (2016), 26% of companies already consider themselves digitally maturing, and 42% of companies regard themselves as digitally developing companies. As the majority of companies embrace digital technologies and rapidly transform their technological structures, almost one third (32%) of companies are at the early stages of digital development. That means that while some companies already recognize the positive impact of digital transformation on business outcomes that is documented in some recent research (Gurumurthy, Schatsky, & Camhi, 2020), some companies are still struggling to initiate changes in their technological structure.

Comprehensive analysis of technology-enabled transformation run by Besson and Rowe (2012) revealed that understanding of circumstances under which companies undertake needed changes and overcome inertia successfully is one of the research streams that can be considered as very promising. While there are some papers that address this issue (ref), we see some limitations there. First, digital transformation is a relatively new phenomenon and it is already seen as a multifaced ones, that is why it has received a significant attention from scholars that discuss it from the different theoretical angles. Nevertheless, there is still a lack of empirical studies regarding this concept, while empirical papers are vital for better understanding of the current state of digital transformation and for its further theoretical development. Second, most empirical papers employ a cross-sectional research design, and, what is also important, use self-reported data. However, impact of digital technology as a general purpose technology (as well as transformation process itself) cannot be tracked immediately, therefore, longitudinal data is necessary to capture the effects of this phenomenon on business outcomes. With regard to self-reported data, it might be limited due to its being nonrepresentational, nonresponse-biased, and prone to self-selection problems.

Thus, to close this gap, this paper seeks to shed some light on the phenomenon of the digital transformation and its effect on the company performance taking into account different environmental conditions. Specifically, we would expect to clarify how the time moment when a company decides to adopt some digital technologies – early, that means that a company reflects the external demand, or later, that means that company prefers to stay inert, comparing with other companies from the same environment – impact its productivity and profitability with regard to industry and geographical location.

2. Theoretical Background and Literature Review

Relationship between information technologies and digital technologies and firm performance has been investigated by a number of researchers. Inconsistent results and rapid technological development motivated Sabherwal and Jeyaraj (2015) to conduct a meta-analysis of 303 studies to enhance the understanding of the factors that affect the business value of IT (BVIT), an aggregate indicator that reflects different measurements of firm performance. One of the hypotheses tested within the research was that there was a positive link between IT assets, IT adoption or use, IT infrastructure or capability, and firm performance. While the results of the meta-analysis demonstrated a nonsignificant effect of all three of the abovementioned variables on BVIT, post-hoc analyses revealed a moderation effect of IT adoption or IT use on the negative relationship between IT investment and BVIT. However, taking into account the limitations of current research, Sabherwal and Jeyaraj still claim that further research is needed to

additionally examine the effects of IT assets and IT infrastructure or IT capability on the organizational performance.

Chen *et. al.* (2016) study the effect of digital transformation on organizational performance of SMEs. This research employs non-physical IT resources instead of physical IT resources to measure digital transformation and investigate its impact on the company performance. The findings of this study appear to be in line with previous research that state that IT resources creates competitive value through cost reduction or increase in firm revenues.

One study by Brynjolfsson and Hitt (2000) proposes that the role of information technologies is that they trigger some internal changes, such as the development of new skills or new business processes, which fact, in turn, results in more effective use of these technologies. Mastering technologies, for instance, may significantly reduce the cost, time of the organizational processes, especially those related to interaction with customers or suppliers, thus effecting an increase in productivity.

An empirical research conducted by Leonhardt and Hanelt (2018) investigates the effect of digital institutional pressure on corporate IT. This study employs structural equation modeling approach and measures the relationship between the digital institutional pressure, the power of IT departments and digital innovation outcomes. While all the hypothesized relationships are confirmed, one of the main findings of this study is that it provides an additional evidence on the influence of external pressures on the adoption of IT. However, authors argue that 'despite evidence that organizations poorly aligned with the implications resulting from IT-related institutional pressures face challenges in adoption and implementation, the transformational effect on the organization itself remains black boxed' (Leonhardt, & Hanelt, 2018, p. 12).

Thus, it seems that some important observations that follow the analysis of the current research devoted to the relationship of technological transformation can be made. First, while these research claim that they are focused on digital transformation, in fact, most of these studies are examined IT transformation. Second, digital transformation is quite a popular term, but still is not well studied as a phenomenon. What is more important is that digital transformation is a process that requires sufficient timeline to be implemented in the company, after which it is only possible to measure the return of this transformation on companies' efficiency. However, the majority of published research use cross-sectional data that do not allow to capture the transformational aspect of this phenomenon. Third, while there are studies that discuss digital transformation in the context of organizational changes and in the context of institutional pressure, only a few of them try to measure the digital transformation and investigate it in a more complex framework. Thus, nowadays, it getting more important to consider the relationships between digital transformation and company productivity not isolated but within the framework of the technological environment in which the company operates.

3. Research Design, Methodology and Data Analysis

This research hypothesizes the relationship between technological environment of the company, the company digital transformation and its performance. The research design is based on quantitative data which describe usage of IT and digital technologies in companies using their official documents from open sources over a reasonably long historical period. Thus, longitudinal data on 1000 largest Russian companies (both public and non-public) for the years 2009–2018 was collected and used. The sample of companies was comprised on the basis of the RAEX-600 independent rating. To measure the digital transformation of the company, this study operationalized the construct of digital transformation through technological components that constitute this phenomenon. A list of indicators which might be used as a proxy of found components of technological transformation was developed.

4. Results/Findings and Discussion

To estimate the effect of digital transformation on corporate performance, we seek to construct and estimate the production function which is informative to explore how effectively digital resources are

163

processed and transformed into technological capabilities, which in their turn result in overall corporate performance. The production function for the purpose of our research question requires clustering of firms according to the technological environment they belong to and respond to. Moreover, based on the hypothesis that digital technologies should reach certain level saturation before being embedded into organizational processes and being transformed into corporate performance - we release a linearity assumption. Looking for possible non-linear relationship between digital transformation and a company performance we expect that this empirical estimation would bring broader opportunities in looking for local optimality and combination of digital resources.

5. Conclusion, Contribution and Implication

In this research, we expect to contribute to the development of theory of organizational changes. Moreover, we seek to offer new empirical evidence of the moderating effects of the competitive technological environment in the process of these critical organizational changes. First, we perform an in-depth literature review on the specifics of the relationship between the technological environment, the company digital transformation, and corporate performance. Second, we propose a methodology which describes constructs and set of measures to capture the essence of digital transformation and provides a reliable range of data sources to collect these data. Third, we observe and estimate the effect of digital transformation on performance under different conditions.

6. References

Besson, P., & Rowe, F. (2012). Strategizing information systems-enabled organizational transformation: A transdisciplinary review and new directions. The Journal of Strategic Information Systems, 21(2), 103-124.

Brynjolfsson, E., & Hitt, L. M. (2000). Beyond computation: Information technology, organizational transformation and business performance. Journal of Economic perspectives, 14(4), 23-48.

Chen, Y. Y. K., Jaw, Y. L., & Wu, B. L. (2016). Effect of digital transformation on organisational performance of SMEs: Evidence from the Taiwanese textile industry's web portal. Internet Research, 26(1), 186-212.

Gurumurthy, R., Schatsky, D., & Camhi, J. (2020), "Uncovering the connection between digital maturity and financial performance", Deloitte, available at: https://www2.deloitte.com/us/en/insights/topics/digital-transformation/digital-transformation-survey.html (accessed 02 September 2020).

Kane, G., Palmer, D., Phillips, A.N., Kiron, D., & Buckley, N. (2016), "Aligning the organisation for its digital future", MIT Sloan Management Review, available at: https://sloanreview.mit.edu/projects/aligning-for-digital-future/ (accessed 02 September 2020).

Leonhardt, D., & Hanelt, A. (December, 2018). Outsiders No More? An Empirical Investigation of the Effect of Digital Institutional Pressure on Corporate IT. International Conference on Information Systems (ICIS), San Francisco, USA. https://icis2018.aisconferences.org/

Sabherwal, R., & Jeyaraj, A. (2015). Information Technology Impacts on Firm Performance: An Extension of Kohli and Devaraj (2003). MIS quarterly, 39(4), 809-836.

Brand value prediction using public data and sentiment analysis

Sofia Paklina – National Research University Higher School of Economics, St. Petersburg, Russia
snpaklina@hse.ru

Petr Parshakov – National Research University Higher School of Economics, Perm, Russia

Elena Shakina – National Research University Higher School of Economics, St. Petersburg, Russia

Keywords: brand value, brand equity, big data, sentiment analysis

1. Introduction

Brands are considered the critical intangibles of companies. They generate a significant share of revenues and drive abnormal returns which constitute so called brand value. A vast conceptual and empirical literature is discussing brand value. Despite that, there is still an evident gap in its prediction. Being one of the financial output of companies, brand value is likely to be seen a part of the overall market value closely connected with sales growth. This close interrelation as implied in established methodologies of brans' evaluation, may work effectively under assumption that customer behavior is perfectly rational and ultimately converses in consumption and sales. However, this assumption not always transmits the reality. In the meantime, looking back to the origins of brand value, we have to account for customer perceptions, attitudes and believes. Moreover, it should be noticed an intention-action gap as discussed in studies by Assael (2001); Kardes (1998). These factors appear to be critical for brand evaluation. In this study, we suggest to predict brand value based on customer perceptions expressed in their statements, opinions, and subjective assessments of brands. For that, we propose a metric based on publicly available textual unstructured data which can be translated in measurable sentiments and introduced in the statistical prediction of brand value. Methodologically, we implement text-miming technique applied for narrative information about big companies' brands in the Internet. The predictive model based on top well-known brands may be implemented for any other brands which are out of the focus of reliable rating agencies.

2. Theoretical Background and Literature Review

Brand is one of the major determinants of companies' financial success (Chaudhuri & Holbrook, 2001; Farquhar, 1989; Kim & Kim, 2004). The competent marketing policies aim at the creation and development of brand equity. Generally, *brand equity* refers to the perception of consumers and how they feel about the brand (Keller, 1993; Lassar et al., 1995). Brand equity includes various elements and can be accumulated through different channels (Jones, 2005; Kamakura & Russell, 1993; Steenkamp & Geyskens, 2006).

Among different attributes of brand equity, the researchers distinguish, for instance, brand awareness, brand image, brand loyalty, and perceived quality. These attributes are hard to measure, because they represent some intangible perception. Since the source of brand equity is the customers, the majority of studies are based on their interviews and surveys (Hsieh et al., 2011; Srinivasan et al., 2002; Tong & Hawley, 2009). One more way to represent a brand equity is to calculate *brand value* – the financial amount the brand is worth. For instance, it can be done through cost or market approach (Ailawadi et al., 2002; Chandon, 2003; Simon & Sullivan, 1993).

Besides, there are several expert rankings that provide the idea about the monetary value of various brands, for example, Top 100 Most Valuable Global Brands by BrandZ, Best Global Brands by Interbrand and the

World's Most Valuable Brands by Forbes. These agencies have different approaches to calculate the brand value. The rankings by Interbrand and Forbes are based on financial, purchase and experts' perception indicators. The BrandZ ranking is based on survey data and it argues that this ranking is "the only brand valuations in the world that take into account what people think about the brands they buy".

Since the measurement of brand value brings with it many difficulties, new approaches continue to appear. The progressive digitalization causes in the creation of more massive and detailed data along with the development of advanced methods of data analysis. In particular, the internet has become a huge platform for its users for expressing their opinions and attitudes through companies' websites, forums and social media. The big volumes of textual data that reflects the customers' perceptions of brands encourage the researcher to collect and analyze it with the natural language processing algorithms (Baştuğ et al., 2020; Colicev et al., 2018; Fronzetti Colladon, 2018; Lim et al., 2020). This study contributes to the existing literature in providing the methodological extensions and empirical evidence in terms of brand evaluation through the sentiment analysis of public data.

3. Research Design, Methodology and Data Analysis

Brand is usually estimated qualitatively using the surveys (Gibson et al., 2008) and interviews (Knott et al., 2016) with a smaller group of people. Our approach is based on the evaluation of large corpus of texts, which are related to a brand. In order to get reliable result, the best option is to analyze all available information that is related to companies' brands. To do this, one should develop a software system that can search the internet for particular information, specified in a textual web search query. This is, however, the definition of a web search engine (Nasution, 2012). For that reason, we have decided to collect the corpus using Microsoft Bing Application Programming Interface (API). We have collected the number of mentions of a particular brand of Forbes Most Valuable Brands list together with positive and negative words for five languages: English, French, Spanish, Chinese and Russian. After this data is combined in a single metric of brands sentiment, which measures public perception of the brand. On the next step we use this metric to build a model which predicts brand value using the introduced metric of brand equity.

4. Results/Findings and Discussion

Our predictive regression has R^2 of 72%. We have found that our metric predicts brand value, and this relation is statistically significant. We plan to extend this analysis using the other methodologies.

5. Conclusion, Contribution and Implication

The main contribution of this study refers to the methodological design which allows predicting brand value of all products and services which are discussed by potential and real customers in Internet-based platforms. The accuracy of the prediction depends on a density of statements, opinions, and subjective assessments available for the analysis. Meanwhile, the current trends of digital marketing, namely, growing role of customer feedbacks and publications on various market places, aggregators, social networks significantly expand boundaries even for local and small brands which usually are not under focus of profound analysis.

6. References

Ailawadi, K. L., Lehmann, D. R., & Neslin, S. A. (2002). A product-market-based measure of brand equity. Marketing Science Institute Cambridege, MA.

Assael, H. (2001). Consumer behavior and marketing action / Henry Assael. Undefined. /paper/Consumer-behavior-and-marketing-action-%2F-Henry-Assael/42881d499131cfe40d40ae5d16e82b118fac6132

Baştuğ, S., Çalişir, V., Gülmez, S., & Ateş, A. (2020). Measuring Port Brand Equity: A Sentiment Analysis on Port Social Media Messages. Dumlupınar Üniversitesi Sosyal Bilimler Dergisi, 65, 85–106.

Chandon, P. (2003). Note on measuring brand awareness, brand image, brand equity and brand value. Insead Fontainebleau.

Chaudhuri, A., & Holbrook, M. B. (2001). The chain of effects from brand trust and brand affect to brand performance: The role of brand loyalty. Journal of Marketing, 65(2), 81–93.

Colicev, A., Malshe, A., & Pauwels, K. (2018). Social Media and Customer-Based Brand Equity: An Empirical Investigation in Retail Industry. Administrative Sciences, 8(3), 55. https://doi.org/10.3390/admsci8030055

Farquhar, P. H. (1989). Managing brand equity. Marketing Research, 1(3).

Fronzetti Colladon, A. (2018). The Semantic Brand Score. Journal of Business Research, 88, 150–160. https://doi.org/10.1016/j.jbusres.2018.03.026

Gibson, H. J., Christine Xueqing Qi, & Zhang, J. J. (2008). Destination Image and Intent to Visit China and the 2008 Beijing Olympic Games. Journal of Sport Management, 22(4), 427–450. https://doi.org/10.1123/jsm.22.4.427

Hsieh, J. J. P.-A., Rai, A., & Xu, S. X. (2011). Extracting Business Value from IT: A Sensemaking Perspective of Post-Adoptive Use. Management Science, 57(11), 2018–2039. https://doi.org/10.1287/mnsc.1110.1398

Jones, R. (2005). Finding sources of brand value: Developing a stakeholder model of brand equity. Journal of Brand Management, 13(1), 10–32. https://doi.org/10.1057/palgrave.bm.2540243

Kamakura, W. A., & Russell, G. J. (1993). Measuring brand value with scanner data. International Journal of Research in Marketing, 10(1), 9–22. https://doi.org/10.1016/0167-8116(93)90030-3

Kardes, F. (1998). Consumer Behavior and Managerial Decision Making. Undefined. /paper/Consumer-Behavior-and-Managerial-Decision-Making-Kardes/20226fa2e9bf62427e3379e9e3ffd3cbf9b7662f

Keller, K. (1993). Conceptualizing, Measuring, and Managing Customer-Based Brand Equity. Journal of Marketing, 57(1), 1–22.

Kim, W. G., & Kim, H.-B. (2004). Measuring Customer-Based Restaurant Brand Equity. Cornell Hotel and Restaurant Administration Quarterly, 45(2), 115–131. https://doi.org/10.1177/0010880404264507

Knott, B., Fyall, A., & Jones, I. (2016). Leveraging nation branding opportunities through sport mega-events. International Journal of Culture, Tourism and Hospitality Research, 10(1), 105–118. https://doi.org/10.1108/IJCTHR-06-2015-0051

Lassar, W., Mittal, B., & Sharma, A. (1995). Measuring customer-based brand equity. Journal of Consumer Marketing, 12(4), 11–19.

Lim, J.-S., Pham, P., & Heinrichs, J. H. (2020). Impact of social media activity outcomes on brand equity. Journal of Product & Brand Management, ahead-of-print(ahead-of-print). https://doi.org/10.1108/JPBM-03-2019-2298

Nasution, M. K. M. (2012). Simple Search Engine Model: Adaptive Properties. ArXiv:1212.3906 [Cs]. http://arxiv.org/abs/1212.3906

Simon, C. J., & Sullivan, M. W. (1993). The measurement and determinants of brand equity: A financial approach. Marketing Science, 12(1), 28–52.

Srinivasan, S. S., Anderson, R., & Ponnavolu, K. (2002). Customer loyalty in e-commerce: An exploration of its antecedents and consequences. Journal of Retailing, 78(1), 41–50.

Steenkamp, J.-B. E., & Geyskens, I. (2006). How country characteristics affect the perceived value of web sites. Journal of Marketing, 136–150.

Tong, X., & Hawley, J. M. (2009). Measuring customer-based brand equity: Empirical evidence from the sportswear market in China. Journal of Product & Brand Management, 18(4), 262–271. https://doi.org/10.1108/10610420910972783

Track: Data Analysis in the Industry 4.0 Era

Chairperson: Pawel Lula

The fourth industrial revolution understood as the fusion and synergy of physical, biological and digital reality and exponential development of smart technologies, IoT solutions, biotechnology and bio-inspired computational models have a huge impact on business, society, culture and individuals. These changes are noticeable for producers and consumers, they create a new model of the labor market and change the ways of design, production and consumption. These ideas have an impact on the governance and civil society, on democracy and on the way wars are conducted. In the era of the fourth revolution we can observe changes in culture and art. Mobile technologies have facilitated access to culture. But has technology increased its quality?

The manifestations of the fourth industrial revolution are important for every person who lives and works in a completely different way in the world of mobile technologies and artificial intelligence solutions. The issues of the fourth industrial revolution create the need for continuous research, which will contribute to the design and implementation of new products, solutions, models and tools, and will allow to gain knowledge about the impact of the idea of industry 4.0 on the economy, society, culture and individual people.

It seems that data analysis methods and tools can significantly contribute to a better understanding of these interesting aspects of the modern world.

Collaborative Public Management: The Mediating Effect of Shared Knowledge and Organizational Commitment

Juan J. García-Machado – University of Huelva, Spain machado@uhu.es

Minerva Martínez Ávila – Autonomous University of the State of Mexico, Mexico

Eréndira Fierro Moreno – Autonomous University of the State of Mexico, Mexico

Keywords: Collaborative public management, shared knowledge, organizational commitment, PLS-SEM, multiple mediating effects, hierarchical component models.

1. Introduction

Collaborative public management implies interdependence and collaboration among public organizations, by means of actions that require aspects and collaborative execution structures through the creation of links between different organizations (McGuire, 2006; O´Toole, 1997). Public sector organizations require collaborative work, which involves the operation and facilitation of intra-organizational and inter-organizational agreements to solve problems. This collaborative work involves co-participation and the achievement of common objectives in multi-actor and multi-sector relationships. It might be useful to view the benefits of collaboration as being based on the value of reciprocity (Blomgren and O´Leary, 2011).

Improving the management of public organizations requires new approaches to address public problems and these are based on the assumption that most public challenges will benefit from working with collaborative public management (Blomgren and O´Leary, 2011). Likewise, while technology and the exchange of knowledge can help, at the same time, they also force the government agencies to share information in an integrating and inter-operational way, and to generate integral processes of knowledge management, which can lead to new ways of solving problems in a collaborative way and to more effective action in the decision making process. Collaboration also implies that shared organizational values lead to better collaborative work (Quamrul, Md Humayun and Vivek, 2014).

2. Theoretical Background and Literature Review

In the review of the literature, little empirical evidence was found on the study of collaborative public management or on the arguments concerning its rationale so that the present investigation is an area of opportunity that can contribute to the debate on this type of management of public organizations. Collaborative public management has been studied under a strategic resources approach that allows for better organizational efficiency and effectiveness. Under this assumption, this research used the theoretical perspective of resources and capabilities (Penrose, 1959; Wernerfelt, 1984; Barney, 1991) and, specifically, the perspective which understands the organization as a repository of knowledge, which can be generated and applied by that organization (Grant, 1996; Conner and Prahalad, 1996; Kogut and Zander, 1992) and, where the resources linked to the knowledge of the organization are the first drives of organizational efficiency (Grant, 1996).

The fundamental purpose of this research is to determine the mediating effect of shared knowledge and organizational commitment in the relationship between organizational values and collaborative public management. Public management is related to the very values of organizations (Min-Seok, 2014; Vigoda-Gadot and Meiri, 2008). In organizations, members use and express themselves, through shared values, in their work roles and these values influence personal employee motivation and behavioral patterns, as revealed in their working commitment (Kahn, 1990; May, Gilson and Harter, 2004).

This research provides a contribution to scientific knowledge, through a theoretical model that supports the effect of mediating latent variables of shared knowledge and organizational commitment on collaborative public management (theoretical contribution). In addition, strategic actions are proposed for public organizations in order to generate better organizational efficiency and effectiveness (practical implications). In addition, there is a gap in the scientific research dealing with the limiting factors and the contingency variables that affect the strategies of organizations in emerging economies (Khanna and Palepu, 2010; Lazzarini, 2012; Vassolo, De Castro and Gómez-Mejía, 2011).

3. Research Design, Methodology and Data Analysis

Based on the research and theory, the following hypotheses are proposed as:

H1: Good organizational values have a direct positive effect on collaborative public management.

H2: Shared knowledge mediates the relationship between organizational values and collaborative public management.

H3: Organizational commitment mediates the relationship between organizational values and collaborative public management.

Figure 1 shows graphically the multiple mediator hierarchical model proposed in this research.

A quantitative approach was selected to test the relationships between constructs and mediation, with a non-experimental cross-sectional research design. The analysis units were public sector organizations at the level of executive, middle management, and administrative staff. The data collection tool was a self-administered questionnaire. This empirical study was carried out through a non-probabilistic sampling process (for convenience-voluntary subjects) to 110 public workers.

FIGURE 1
Research model and hypotheses
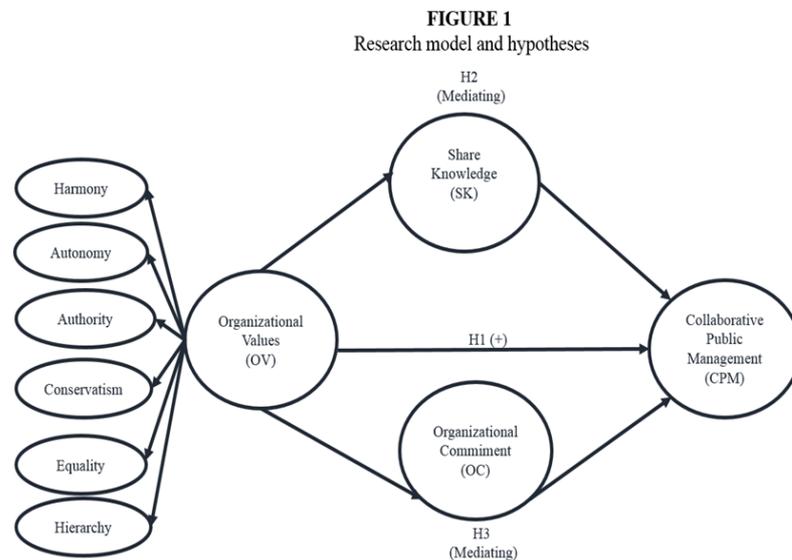
This study used PLS-SEM (Wold, 1985) for the analysis of data, which is a second-generation statistical technique, mainly focusing on complex, sophisticated and useful models for working with composites, which contain reflective and formative measurement models of constructs (Hair, Sarstedt, Ringle and Mena, 2012; Sarstedt, Ringle, Smith, Reams and Hair, 2014; Dijkstra and Henseler, 2015; Henseler, 2017; Duarte

and Amaro, 2018). This technique of modelling structural equations based on the variance (Lohmöller, 1989; Wold, 1982; Reinartz, Haenlein and Henseler, 2009; Henseler, Hubona and Ask, 2016; Hair, Hult, Ringle and Sarstedt, 2017; Memon, Ting, Ramayaht, Chuah, and Cheah, 2017; Roldan and Sánchez-Franco, 2012) applies a series of regressions based on ordinary least squares (OLS) that estimate the parameters of the model so that they maximize the explained variance (R^2) of the endogenous constructs (Cheah, Memon, Chuah, Ting and Ramayah, 2018).

This research presents a model of reflective-reflective hierarchical component (Type I HCM), which indicates that the model was operationalized with one-dimensional (first order) and multidimensional constructs, also called second order, higher order or hierarchical components (Hair, Sarsted, Ringle and Gudergan, 2018). A construct must be considered multidimensional if it consists of several distinct but interrelated dimensions, because a multidimensional construct is conceptualized in terms of its dimensions (Law, Wong, and Mobley, 1998). Thus, each dimension represents an aspect of the content domain of the concept or global construction (Polites, Roberts and Thatcher, 2012).

4. Results/Findings and Discussion

According to our findings, the mediating effect of shared knowledge and organizational commitment in the relationship between organizational values and collaborative public management is confirmed, in correspondence with the theoretical argumentation of Nitzl, Roldan and Cepeda (2016). Organizational values show a direct, but not significant, relationship, with collaborative public management (ß=0.152, p>0.05), and so does not support hypothesis H1. Regarding shared knowledge and organizational commitment as mediating variables in the relationship between organizational values and collaborative public management, our results show significant indirect effects (ß=0.186, p<0.05; ß=0.189, p<0.05) that support hypotheses H2 and H3. In addition, the model shows the values of R^2 (0.551, 0.538 and 0.351) of the latent endogenous constructs, in such a way that, the higher the value of R^2, the greater the predictive capacity. On the other hand, Falk and Miller (1992) consider that a R^2 must have a minimum value of 0.10; Chin (1998) considers 0.67, 0.33 and 0.10 (substantial, moderate and weak); while Hair et al. (2017) recommend 0.75, 0.50, 0.25 (substantial, moderate and weak). Although, the objective of PLS-SEM is to maximize the explained variance (R^2) of the endogenous latent variables in the path model, the results obtained in this study show a moderate R^2 predictive power.

According to Cepeda-Carrion, Nitzl and Roldan (2017), to estimate the type of mediation it is necessary to identify the significance of the mediation effects as well as the type of mediation and its magnitude. Therefore, if the direct effect is not significant and the indirect effects are significant, it is considered that there is complete or full mediation. In this case, a multiple full mediation is observed, since the direct effect of the construct organizational values on collaborative public management is not significant, while the indirect effects of mediation are significant. These results provide empirical evidence that shared knowledge and organizational commitment mediate the relationship between organizational values and collaborative public management. In other words, our findings provide empirical support for this multiple mediating role.

5. Conclusion, Contribution and Implication

Our findings provide empirical evidence that shared knowledge and organizational commitment mediate the relationship between organizational values and collaborative public management. Likewise, our results showed a non-significant direct effect of organizational values on collaborative public management, and significant indirect effects of the mediating variables, which are supported by the Theory of Resources and Capacities and, more specifically, in the perspective based on the knowledge. Therefore, to make collaborative public management more efficient, knowledge management strategies must be incorporated and implemented, in addition to designing practices aimed at retaining employees who are committed to the organization. These skills can be developed through organizational rules and values (Metaxiotisn, Ergazakis and Psarras, 2005; Chiu and Chen, 2016; Finegan, 2010). Furthermore, these results are

consistent with Anvari et al. (2014) and Pangil (2014), who suggest that shared knowledge and organizational commitment are mediator variables.

The results of the empirical model theoretically support the foundation so that the directors of collaborative public management can strengthen and seek out areas of opportunity for better and more effective management. Therefore, the improvement and effectiveness of the organization derive, amongst other things, from short and medium term strategies of knowledge management practices and sharing this knowledge, and thus building organizational competencies through strategic knowledge. To implement knowledge management strategies in public organizations, two elements are usually required: the willingness of individuals, groups and managers, as well as the organizational commitment to transfer this knowledge for their mutual benefit.

6. References

Anvari, R., Abu, N. N; Aisyah, Binti, R. (2014). Mediating Effects of Affective Organizational Commitment and Psychological Contract in the Relationship between Strategic Compensation Practices and Knowledge Sharing. Procedia - Social and Behavioral Sciences, 129, 111-118. https://doi.org/10.1016/j.sbspro.2014.03.655

Barney, J. (1991). Firm resources and sustained competitive advantage. Journal of Management, 17(1), 99-120. https://doi.org/10.1177%2F014920639101700108

Blomgren, L., & O´Leary, R. (2011). Federalist No.51: Is the past relevant to today´s collaborative public management. Public Administration Review. Special Issue, 578-582. https://doi.org/10.1111/j.1540-6210.2011.02465.x

Cepeda Carrión, G., Nitzl, C., & Roldán, J. L. (2017). Mediation Analyses in Partial Least Squares Structural Equation Modeling: Guidelines and Empirical Examples. In In: Latan H., Noonan R. (eds) Partial Least Squares Path Modeling (pp. 173–195). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-64069-3_8

Conner, K., & Prahalad, C.K. (1996). A Resource-Based Theory of the Firm: Knowledge versus Opportunism. Organization Science, 7, 477-501. https://doi.org/10.1287/orsc.7.5.477

Cheah, J.H., Memon, M.A., Chuah, F., Ting, H., & Ramayah, T. (2018). Assessing Reflective Models in marketing research: A Comparison between PLS and PLSc Estimates. International Journal of Business and Society, 19(1), 139-160.

Chiu, Ch. N., & Chen, H. (2016). The study of knowledge management and organizational effectiveness in Taiwanese public utility: the mediator role organizational commitment. *Springer Plus*, 5, 2-34. https://doi.org/10.1186/s40064-016-3173-6

Chin, W.W. (1998). The partial least squares approach to structural modelling. In Marcoulides, G.A (Ed.), *Modern methods for business research* (pp. 295-336). Mahwah, NJ: Lawrence Eribaum.

Dijkstra, T. K., & Henseler, J. (2015). Consistent partial least squares path modeling. MIS Quarterly, 39 (2), 297–316. https://doi.org/10.25300/MISQ/2015/39.2.02

Duarte, P., & Amado, S. (2018). Methods for modeling reflective-formative second order constructs in PLS. Journal of Hospitalary and Tourism Technology, 9(3), 295-313. https://doi.org/10.1108/JHTT-09-2017-0092

Falk, R., & Miller, N.A. (1992). Primer for Soft Modeling. OH, USA: The University of Akron Press.

Finegan, J. E. (2010). The impact person and organizational values on organizational commitment. Journal of occupational and organizational psychology, 73(2), 149-169. https://doi.org/10.1348/096317900166958

Grant, R.M. (1996). Toward a knowledge-based theory of the firms. Strategic Management Journal, 17 (Special Issue), 109-122. https://doi.org/10.1002/smj.4250171110

Hair, J.F., Sarstedt, M., Ringle, C., & Mena, J. (2012). An assessment of the use of partial least squares structural equation modeling in marketing research. Journal of the Academy of Marketing Science, 40(3), 414-443. https://doi.org/10.1007/s11747-011-0261-6

Hair, J., Hult, G., Ringle, C., & Sarstedt, M. (2017). A Primer on Partial Least Square Structural Equation Modeling (PLS-SEM). United States of America: Sage.

Hair, J., Sarsted, M., Ringle, C., & Gudergan, M. (2018). Advanced Issues in Partial Least Square Structural Equation Modeling. United States of America: Sage.

Henseler, J. (2017). Bridging seeding and behavioral research with variance-based structural equation modeling. Journal of Advertising, 46(1), 178-192. https://doi.org/10.1080/00913367.2017.1281780

Henseler, J., Hubona, G., & Ray, P.A. (2016). Using PLS path modeling in new technology research: updated guidelines. Industrial Management & Data Systems, 116(1), 2-20. https://doi.org/10.1108/IMDS-09-2015-0382

Kahn, W.A. (1990). Psychological conditions of personal engagement and disengagement at work. Academy of Management Journal, 33, 692-724. https://doi.org/10.5465/256287

Khanna, T., & Palepu, K. (2010). Winning in Emerging Markets: A Road Map for Strategy and Execution. Cambridge, MA: Harvard Business Press.

Kogut, B., & Zander, U. (1992). Knowledge of the firm, combinative capabilities, and the replication of technology. Organization Science, 3(3), 383-397. https://doi.org/10.1287/orsc.3.3.383

Law, K. S., Wong, C. S., & Mobley, W. H. (1998). Toward a taxonomy of multidimensional constructs. Academy of Management Review, 23, 741-755. DOI: 10.2307/259060

Lazzarini, L. (2012). Young Iberoamerican scholars leveraging the competitive advantage of Iberoamerican scholars. Management Research the Journal of the Iberoamerican Academy of Management, 10(1), 64-73.

Lohmöller, J., B. (1989). Latent variable path modeling with partial least squares. Heidelberg. Germany: Physical.

McGuirre, M. (2006). Collaborative Public Management: Assessing What We Know and How We Know It. Collaborative Public Management Review Special, 66(1), 33-43. https://doi.org/10.1111/j.1540-6210.2006.00664.x

May, D. R. Gilson, R. L., & Harter, L. M. (2004). The psychological conditions of mindfulness, safety and availability and the engagement of the human spirit of work. Journal of occupational and organizational psychology, 77, 11-38. https://doi.org/10.1348/096317904322915892

Memon, M. A., Ting, H., Ramayaht, T., Chuah, F., & Cheah, J. (2017). A review of the methodological misconceptions and guidelines related to the application of structural equation modeling: A Malaysian scenario. Journal of Applied Structural Equation Modeling, 1(1), I-xiii.

Metaxiotis, K., Ergazakis, K., & Psarras, J. (2005). Exploring the world of knowledge management: agreements and disagreements in the academic practitioner community. Journal of knowledge Management, 9(2), 6-18. https://doi.org/10.1108/13673270510590182

Min-Seok, P. (2014). IT governance and business value in the public sector organizations. The role of elected representatives in IT governance and its impact on IT value in U.S. state governments. Decision Support Systems, 59, 274-285. https://doi.org/10.1016/j.dss.2013.12.006

Nitzl, C., Roldan, J. L., & Cepeda, G. (2016). Mediation analysis in partial least squares path modeling: Helping researchers discuss more sophisticated models. Industrial Management Data Systems, 116(9), 1849–1864. https://doi.org/10.1108/IMDS-07-2015-0302

O´Toole, L. J. (1997). Treating Networks Seriously: Practical and Research-Based Agendas in Public Administration. Public Administration Review, 57(1), 45-52. DOI: 10.2307/976691

Pangil, F. (2014). The mediating effect of knowledge sharing on the relationship between trust and virtual team effectiveness. Journal of knowledge management, 18(1), 92-106. https://doi.org/10.1108/JKM-09-2013-0341

Penrose, E. (1959). The Theory of the growth of the firm. Oxford: Blackwell.

Polites, G.L., Roberts, N., & Thatcher, J. (2012). Conceptualizing models using multidimensional constructs: a review and guidelines for their use. European Journal of Information Systems, 21, 22–48. https://doi.org/10.1057/ejis.2011.10

Quamrul, A., Md Humayun, K., & Vivek, CH. (2014). Managing Infrastructure Projects in Australia: A Shift from a Contractual to a Collaborative Public Management Strategy. Administration & Society, 46(4), 422-449. https://doi.org/10.1177%2F0095399712459728

Reinartz, W.J., Haenlein, M., & Henseler, J. (2009). An empirical comparison of the efficacy of covariance-based and variance-based SEM. International Journal of Research in Marketing, 26(4), 332-344. https://doi.org/10.1016/j.ijresmar.2009.08.001

Roldan, J.L., & Sánchez-Franco, M. J. (2012). Variance-Based Structural Equation Modeling for Using Partial Least Squares in Information Systems Research. In M. Mora, O. Gelman, A. Steenkamp, & M. Raisinghani (Eds), Research Methodologies, Innovations and Philosophies in Software Systems Engineering and Information Systems (pp. 193-221). IGI Global DOI: 10.4018/978-1-4666-0179-6.ch010

Sarstedt, M., Ringle, C.M., Smith, D., Reams, R., & Hair, J.F. (2014). Partial least squares structural. Journal of Family Business Strategy, 5(1), 105-115. https://doi.org/10.1016/j.jfbs.2014.01.002

Vassolo, R. S., De Castro, J., & Gomez-Mejia, L.R. (2011). Managing in Latin America: Common issues and a research agenda. Academy of Management Perspectives, 25(4), 22-36. https://doi.org/10.5465/amp.2011.0129

Vigoda-Gadot, E., & Meiri, S. (2008). New Public Management Values and Person-Organization Fit: A Socio-Psychological Approach and Empirical Examination among Public Sector Personnel. Public Administration, 86(1), 111-131. https://doi.org/10.1111/j.1467-9299.2007.00703.x

Wernerfelt, B. (1984). A resource-based view of the firm. Strategic Management Journal, 5, 171-180. https://doi.org/10.1002/smj.4250050207

Wold, H. (1982). Soft Modeling: Intermediate between Traditional Model Building and Data Analysis. Mathematical Statistics, 6, 333–346.

Wold, H. (1985). Partial least squares. In S. Kotz and N. L. Johnson (Eds.), Encyclopedia of statistical Sciences 6 (pp. 581-591). New York: John Wiley & Sons.

Determinants of job satisfaction with respect to dominant residence and education before the end of the Golden Era. Evidence from SHARE-ERIC (Wave 7)

Daniel Homocianu – Department of Accounting, Business Information Systems and Statistics Faculty of Economics and Business Administration Alexandru Ioan Cuza University

Octavian Dospinescu – Department of Accounting, Business Information Systems and Statistics Faculty of Economics and Business Administration Alexandru Ioan Cuza University doctav@uaic.ro

Napoleon-Alexandru Sireteanu – Department of Accounting, Business Information Systems and Statistics Faculty of Economics and Business Administration Alexandru Ioan Cuza University

1. Introduction

This paper tries to identify significant predictors of complete job satisfaction among Europeans aged 50+ concerning their exposure or not to the communist regimes through their full-time education and living experience before 1989, latter by considering their dominant residences. The motivation of this paper originates in some more or less noticeable differences in terms of job satisfaction after the fall of the Berlin Wall (so-called end of the Golden Age) between people from countries never experiencing communist economic systems and those from the ones who did. Therefore, one of this paper's objectives is the exploration of specific influences for this criterion and the idea that living and graduating in a peculiar regime (ex-communist vs. capitalist) counts for the resulting differences in terms of job satisfaction.

2. Theoretical Background and Literature Review

Previous studies insisted on the role of school-age education, emotional context (Laudenbach, Malmendier, & Niessen-Ruenzi, 2019), and persistence over generations until fade away (Alesina & Fuchs-Schündeln, 2007), (Fuchs-Schündeln & Masella, 2016). After the fall of the Berlin Wall, a number of labor market trends emerged in Central and Eastern Europe. Thus, (Ilie & Preoteasa, 2017) notes that the private sector has developed by accepting foreign investment, but also by free private initiative, almost non-existent previously. A number of skills in the industrial area became unnecessary and the adaptation of the workforce to the new requirements of the market was slow. On a large scale, individuals began to feel job uncertainty, with the labor market moving from zero unemployment to low-paying jobs relative to the natural expectations of the population.

The hypotheses tested were: H1-The individuals mostly living and being educated in ex-communist countries were less likely to be completely satisfied by their jobs than those from capitalist ones; H2-The influences from the same work category as job satisfaction count the most when analyzing the latter; H3-The more educated and skilled people were more likely to be fully satisfied by their jobs; H4-The life satisfaction counts when analyzing the job satisfaction; H5-The personality traits matter for someone being fully satisfied with the job; H6-The individuals from countries with inferior levels of all six WGI (Kaufmann, Kraay, & Mastruzzi, 2010) are less likely to be satisfied by their jobs; H7-The ones from countries with lower ratios of SMC to GDP were less likely to be satisfied with their jobs.

3. Research Design, Methodology and Data Analysis

We started from the questions designed by the SHARE-ERIC consortium. In Wave 7 (2017), SHARE-ERIC collected 76.520 observations for citizens from most of the European countries. Several scientific principles (Munafò & Smith, 2018) have been considered to ensure the robustness of the results and more credibility and trust, namely triangulation, cross-validation and reproducibility. We performed succesive filters starting from the initial set which included only the observations of respondents aged 50 or more in 2017 (75.674). The final filter was on the dominant residence obtained using a combination of spreadsheet functions

(INDIRECT, ADDRESS and ROW). The resulting dataset had 35.182 valid observations divided between 19.246 responses for individuals from ex-communist countries and 14.584 for those who resided in several capitalist ones before '89. For variable selection we used the Naive Bayes technique in Microsoft's Data Mining add-in (1st round data mining). Next (2nd round data mining), we used rlasso, cvlasso, and lasso2 (Tibshirani, 1996) in Stata 16 MP. To analyze the determinant factors that influence the probability of being fully satisfied with the job, logit, scobit (Nagler, 1994) and melogit regressions have been performed for the overall subset and also for the two subparts. To correct for any form of heteroskedasticity, we used robust standard errors. The resulting influences were retained only if they met the selection rules, namely: low p-values (Lin, Lucas, & Shmueli, 2013); low correlation coefficients in predictors' matrix (Mukaka, 2012); larger values for AUROC (Jiménez-Valverde, 2012) and R-squared (Miles, 2014). More, we generated logit prediction nomograms (Zlotnik &Abraira, 2015).

4. Results/Findings, Discussion

After applying logit, scobit and melogit regressions, latter type only for individual level influences, the results obtained reveal the following primary findings: (1) The influences of the variables associated with workplace atmosphere (w_atmosph) and recognition of the work done (w_gave_recog) seem to be the most important ones; consequently we will also referred to these two as dual-core (Homocianu et al., 2020) later in this paper; (2) A set of seven variables common to the two particular models and corresponding to the dual-core above and also to: paid_job_aft_retir, hsl, isced2011scale, perseverance, and no_jobs, with the mention that the latter acts differently (opposite sign) in these two models; (3) A set of four variables which are specific to the first particular model – ex-communist from which two individual level ones, namely: relig_import and sociable and another two country level ones, namely: avgSMC2GDP_under_median and avgVA_under_median; (4) Another set of four ones which are particular to the second specific model – capitalist from which two individual level ones, namely: rich_imagination and ev_usd_comp_wrk and another two country level ones, namely: avgPSNV_under_median and avgRQ_under_median. The results indicate a more intense tendency of being totally satisfied with the job in the particular case of respondents with main residence in capitalist countries before '89 (full validation of H1). Moreover, all models suggest the prevalence of the individual level influences from the same category (work) as the outcome (full validation of H2). In the case of the education and skills related predictors corresponding to H3, the component corresponding to computer skills required for the job is validated only in the case of the second particular model while the ISCED scale related one stands in both cases (partial validation of H3). In addition, the confirmation of the positive and significant correlation between full life satisfaction and being completely satisfied with the job in both models also means the full validation of H4. In addition, the confirmation of some personality traits (perseverance, being imaginative, sociable or even religious) made us state that H5 is confirmed. In terms of concluding about the 6th hypothesis (H6) related to country level influences, the effect of WGI indicators is not always a positive one. Therefore H6 is partially validated. H7 is infirmed because SMC2GDP was significant only in the first particular model (ex-communist) and indicated the opposite sign of the influence when compared with the one assumed.

5. Conclusion, Contribution and Implication

This paper strongly confirms that being fully satisfied with the job is strongly linked to other work-related predictors, such as the ones associated with workplace atmosphere, received recognition of the work done, number of previous jobs, or having a job after retirement. These and some other individual-level powerful influences, both common to those two sides and particular depending on being educated and mostly living or not in communist countries before the fall of the Berlin Wall, proved to be robust also when tested in many ways, including automatic cross-validations and some based on mixed-effects with country-level random ones. Concerning the common individual-level influences from other non-work categories, we also found strong and reliable predictors such as life satisfaction, a higher education level (ISCED), and perseverance as a personality trait. Regarding the peculiarities of the two distinct models detailed in this

paper, certain personality traits, such as being imaginative, on the one side and social, and even religious, on the other, have been confirmed as positive influences on being fully satisfied with the job. We also certified some country-level predictors. First is the stock market capitalization to gross domestic product for the ex-communist models. The other three are governance indicators that mattered in this study, namely the political stability and absence of violence/terrorism, the regulatory quality (capitalist models), and the voice and accountability (ex-communist models). For both particular models and the overall one, we generated three corresponding Zlotnik nomograms.

6. References

Alesina, A., & Fuchs-Schündeln, N. (2007). Good bye Lenin (or not?). The effect of communism on people's preferences. American Economic Review, 97(4), 1507-1528. doi:https://doi.org/10.1257/aer.97.4.1507

Fuchs-Schündeln, N., & Masella, P. (2016). Long lasting effects of socialist education. Review of Economics and Statistics, 98(3), 428-441. doi:http://dx.doi.org/10.1162/REST_a_00583

Homocianu, D., Plopeanu, A., Florea, N., & Andries, A. (2020). Exploring the Patterns of Job Satisfaction for Individuals Aged 50 and over from Three Historical Regions of Romania. An Inductive Approach with Respect to Triangulation, Cross-Validation and Support for Replication of Results. Applied Sciences, 10, 2573. doi:https://doi.org/10.3390/app10072573

Ilie, S., & Preoteasa, A. (2017). O perspectiva asupra ocuparii atipice: Romania in comparatie europeana. Revista Calitatea Vietii, XXVIII(3), 243-266.

Jiménez-Valverde, A. (2012). Insights into the area under the receiver operating characteristic curve (AUC) as a discrimination measure in species distribution modelling. Global Ecology and Biogeography, 21(4), 498-507. doi:https://doi.org/10.1111/j.1466-8238.2011.00683.x

Kaufmann, D., Kraay, A., & Mastruzzi, M. (2010). The worldwide governance indicators: Methodology and analytical issues, Draft Policy Research Working Paper. Retrieved 2020, from http://info.worldbank.org/governance/wgi/pdf/wgi.pdf

Laudenbach, C., Malmendier, U., & Niessen-Ruenzi, A. (2019). Emotional tagging and belief formation - The long-lasting effects of experiencing communism. AEA Papers and Proceedings, 109, 567-571. doi:https://doi.org/10.1257/pandp.20191051

Lin, M., Lucas, H., & Shmueli, G. (2013). Too big to fail: Large samples and the p-value problem. Information Systems Research, 24(4), 906-917. doi:https://doi.org/10.1287/isre.2013.0480

Miles, J. (2014). Squared, adjusted r squared. In Encyclopedia of Statistics in Behavioral Science. Wiley. doi:https://doi.org/10.1002/9781118445112.stat06627

Mukaka, M. (2012). A guide to appropriate use of correlation coefficient in medical research. Malawi Medical Journal, 24(3), 69-71.

Munafò, M., & Smith, G. (2018). Robust research needs many lines of evidence. Nature, 553, 399-401. doi:https://doi.org/10.1038/d41586-018-01023-3

Nagler, J., & Scobit, E. (1994). An alternative estimator to Logit and Probit. American Journal of Political Sciences, 38(1), 230-255.

Tibshirani, R. (1996). Regression shrinkage and selection via the LASSO. J R Stat Soc Ser B (Meth), 58(1), 267-288.

Zlotnik, A., & Abraira, V. (2015). A general-purpose nomogram generator for predictive logistic regression models. The Stata Journal: Promoting Communications on Statistics and Data, 15(2), 537-546. doi:https://doi.org/10.1177/1536867X1501500212
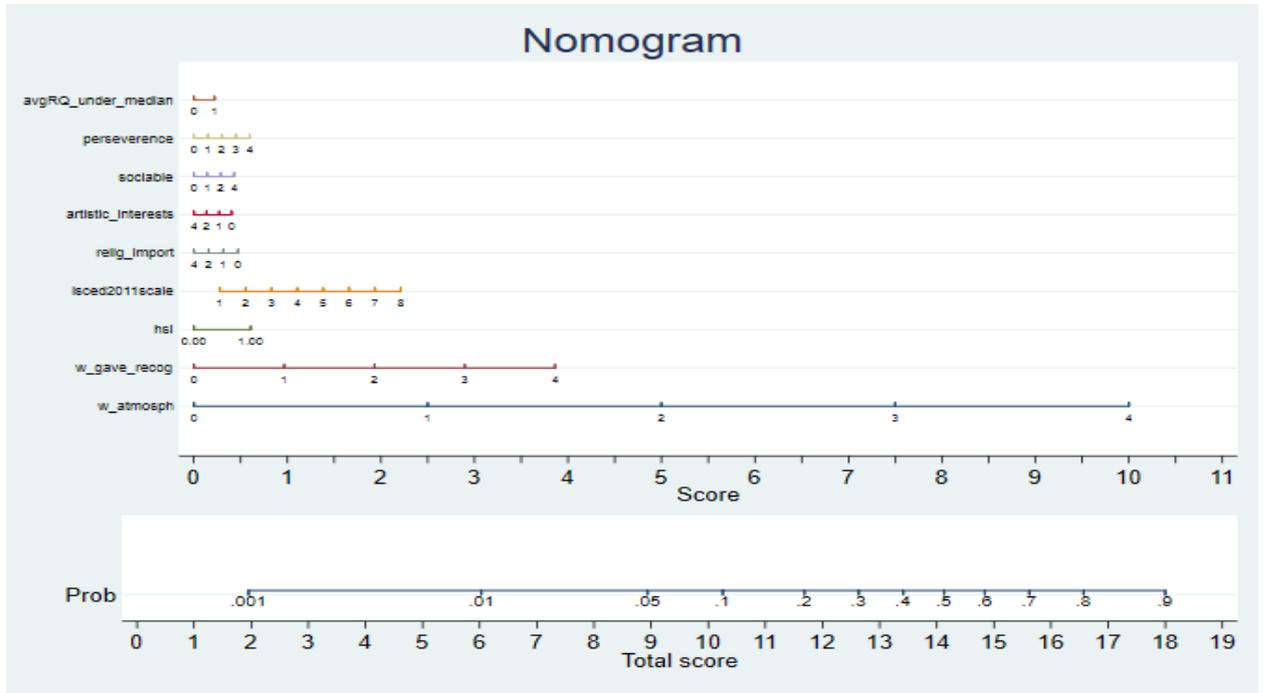
Figure 1. Zlotnik binary logistic-based nomogram to support the intuitive computing of the probability of being fully satisfied with the job for respondents with full-time education and main residence in ex-communist countries
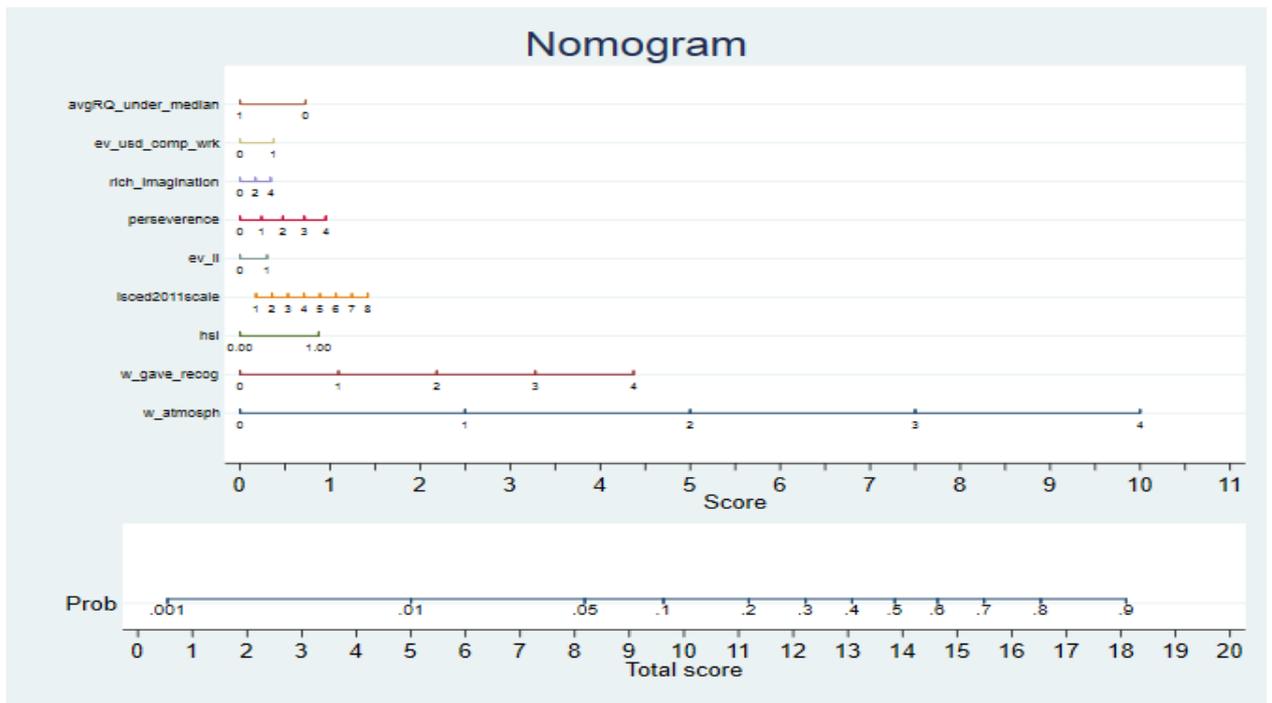
Figure 2. Zlotnik binary logistic-based nomogram to support the intuitive computing of the probability of being fully satisfied with the job for respondents with full-time education and main residence in capitalist countries

Income Effect on an Individual's Choice of Provider for Outpatient Care in Russia

Alina Fomenko – National Research University Higher School of Economics, Russia
avfomenko@edu.hse.ru

Nadezhda Shevacheva – National Research University Higher School of Economics, Russia
nashevacheva@edu.hse.ru

Nur Al-Khamad – National Research University Higher School of Economics, Russia
nvalkhamad@edu.hse.ru

Keywords: healthcare, income, outpatient care, state clinic, private clinic

1. Introduction

The spectrum of possibilities people can choose from when it comes to maintaining their health is enormous. Not only are there public healthcare facilities that are available to all who are in need of getting medical help, but there are also private medical services available for those who prefer a more individual approach and a faster provision of necessary services. Given the differences between the existing healthcare systems and the types of care provided, it is crucial to understand whether income, seemingly one of the main differentiators of people, influences their choice to use private or public clinics' services of outpatient care. This information would be useful for both types of clinics to develop according to the important needs of their audience. Since Russia is the country with so much potential for the analysis of the topic and yet so few articles related to it, it is also the country this analysis is focused on, which leads the reader to the main question of the paper — how does income influence the choice between private and state clinics in the sphere of outpatient care in Russia?

2. Theoretical background and literature review

Most authors state that a higher income leads to increased use of paid medical services, including ones provided in private clinics. This can be explained through the mechanism that consumers with a higher income don't consider the price of the service as long as it is provided qualitatively (Pallegedara & Grimm, 2017). That is also complemented by an idea that service delivered by a private provider is a normal good, as the demand for it is positively correlated with income, and service delivered by a state provider is an inferior good, that is if an increased wealth increases the demand for these types of facilities or vice versa and whether there is a positive correlation between income and demand for each of these sectors (Acton, 1975). However, some researchers point out that income does not have an effect as strong as may be expected: in some countries fees charged by private clinics are low (Pullicino et al, 2015). Moreover, according to some studies, the quality of services is a more crucial determinant of the choice of provider, than income (Hanson, Yip & Hsiao, 2004).

Other factors that could be positively associated with the choice of private clinics can be divided into two groups: choice-specific and individual-specific. The choice-specific factors include time intensity and quality of outpatient care, with lower time costs and higher perceived quality having a positive effect on the choice of private clinics. The individual-specific factors can be divided into sub-groups: socio-demographic, behavioral, and other individual-specific factors. Socio-demographic factors include:

➔ Gender, with women being more likely to visit private clinics (Mwabu, 1989; Pullicino et al, 2015);

➔ Education, with a higher level of education inducing a visit to a private facility (Acton, 1975);

➔ Age, with younger people being more prone to visiting private facilities according to some authors (Pullicino et al, 2015; Kim, Cho & Kim, 2018), and older people according to other authors (Mwabu, 1989).

Behavioral factors that increase the probability of using a private facility include trust and habit of using private clinics. Other individual-specific factors encompass out-of-pocket expenses, reflecting the overall preference to use paid services, and the presence of voluntary medical insurance, which allows for visits to both private and public sectors.

3. Research design, Methodology and Data Analysis

Rosstat's data of "Selective supervision of quality and availability of services in education, health care and social service, the assistance of employment of the population 2017" (KDU 2017) was chosen as an empirical base for the research. It contains the latest information on the socio-demographic and economic state of an individual, statistics about his/her working conditions - these will be very useful for econometric models and analysis of factors influencing the demand for outpatient care in private and public clinics. Some factors mentioned in the literature were not present in KDU 2017, other factors were not the subjects of literature analyses but still seemed to play an important role in the topic. The final choice of the variables used included the following: clinic chosen for outpatient care (state or private), household income per person, age, age2, gender, education, region, area, job status, marital status, presence of child(ren), presence of chronic disease(s), self-assessed health, presence of disability(ies), previous experience in the clinic an individual is attached to.

Cross tables and statistical tests were used to provide necessary descriptive statistics for outcome variable (choice of provider), explanatory variable (income), and control variables (social, demographic, and economic factors). These methods allow to get a broad understanding of health care utilization in Russia, obtain the portrait of people using private and state facilities and get some useful insights about the significance of the relationship between some variables for further regression analysis. To inspect the relationship between some factor and the choice of provider, made by an individual, several logit models were built, and the robustness of obtained results was checked. Two proxies for income were tested and post-estimation procedures were conducted in order to choose the better model.

4. Results and Discussion

The results of the regression analysis and statistical tests proved the positive effect of higher household income per person on the probability of choice of private provider for outpatient care in Russia, with the increased wealth of the population increasing its switch from public to private clinics and the impoverishment of the population leading to impaired growth or even decline of demand for private clinics' services (see Tables 1 and 2). This finding permits to conclude that the services provided by public facilities can be considered an inferior good, while those provided by private facilities are a normal good. Other factors such as age, area of living, region, education, job status, and marital status, presence of children, presence of chronic diseases and presence of disabilities, self-assessed health, and previous experience had an effect on the choice of a provider for outpatient care, which made it possible to understand the target audience for both private and public clinics — young and old people with a lower level of income, living in a rural area, in less developed regions, unmarried, unemployed, with lower education level, having some disabilities are the target audience of public clinics and middle-aged people with higher income, living in an urban area, in developed regions, married, employed, having a higher level of education, without disabilities are the target audience of private ones.

Table 1. Paired samples t-test for the logarithm of income, by type of clinic chosen

Group	Obs	Mean	Std. Err.	Std. Dev.	[95% Conf. Interval]	
state	39,644	11.03463	.0026743	.532475	11.02939	11.03987
private	1,303	11.26981	.0168423	.6079574	11.23677	11.30285
combined	40,947	11.04211	.0026519	.5366227	11.03692	11.04731
diff		-.235176	.0150638		-.2647014	-.2056505

diff = mean(state) - mean(private)		**t = -15.6120**
Ho: diff = 0		**degrees of freedom = 40945**
Ha: diff < 0	**Ha: diff != 0**	**Ha: diff > 0**
Pr(T < t) = 0.0000	**Pr(T >t) = 0.0000**	**Pr(T > t) = 1.0000**

Table 2. The average marginal effect of the logarithm of income on the probability of choosing a private provider[10]

	dy/dx	Delta-method Std. Err.	z	P>z	[95% Conf. Interval]	
Log(income)	.0216469	.0020437	10.59	0.000	.0176413	.0256526

---

[10] The effect is calculated on the basis of logit model using the main set of control variables

5. Conclusion, Contribution and Implication

Given the fact that income indeed has a positive effect on the choice of private clinics, it is important both for businesses providing the service of outpatient care and policymakers in the sphere of outpatient care to adjust to this feature of Russian customers. With the availability of services provided by public clinics for free given the presence of obligatory medical insurance, it is crucial for private clinics to possess such qualities that would still create demand despite the obligation to pay for the services provided. For these reasons, private clinics must either have a higher quality of services compared to those in state clinics, that would be a valid reason for customers to switch the provider of healthcare services from public to private, or to provide value in any other way. Moreover, promotions and discounts would be an efficient way of attracting new customers to private clinics that usually prefer public clinics given their level of income. Public clinics, however, must be able to identify the relation between the level of income and the choice of clinics, and that the increased wealth of the population increases its switch from public to private clinics. Therefore, as the country evolves, so does the wealth of its citizens. That means that, at a certain point, the fact that the service is free will not be enough for the customers to choose it rather than the service that comprises a fee but also better quality, better choice of doctors, and better equipment. The biggest potential for future research lies in the investigation of a broader set of indicators, accounting for specific individuals' features, infrastructure, and peculiarities of clinics.

6. References

Acton, J. P. (1975). Nonmonetary Factors in the Demand for Medical Services: Some Empirical Evidence. Journal of Political Economy, 83(3), 595-614. https://doi.org/10.1086/260342

Hanson, K., Yip, W. C., & Hsiao, W. (2004). The impact of quality on the demand for outpatient services in Cyprus. Health Economics, 13(12), 1167-1180. https://doi.org/10.1002/hec.898

Kim, A., Cho, S., Kim, H., Jo, M., Eun, S., & Lee, J. (2018). Rethinking the Role of the Public Health Clinic: Comparison of Outpatient Utilization in the Public Health Clinics and Private Clinics in Korea. International Journal of Environmental Research and Public Health, 15(7), 1312. https://doi.org/10.3390/ijerph15071312

Mwabu, G.M. (1989). Nonmonetary Factors in the Household Choice of Medical Facilities. Economic Development and Cultural Change, 37(2), 383-392. https://doi.org/10.1086/451728

Pallegedara, A., & Grimm, M. (2017). Demand for private healthcare in a universal public healthcare system: Empirical evidence from Sri Lanka. Health Policy and Planning, 32(9), 1267-1284. https://doi.org/10.1093/heapol/czx085

Pullicino, G., Sciortino, P., Calleja, N., Schäfer, W., Boerma, W., & Groenewegen, P. (2015). Comparison of patients' experiences in public and private primary care clinics in Malta. European Journal of Public Health, 25(3), 399–401. https://doi.org/ 10.1093/eurpub/cku188

Impact of digital transformation on Corporate Governance. Empirical evidence

Ilya Ivaninsky – National Research University Higher School of Economics, Russia

ilya.ivaninskiy@gmail.com

Irina Ivashkovskaya – National Research University Higher School of Economics, Russia

1. Introduction

We analyze the impact of digital transformation of business and particularly the blockchain technology on the principal-agent conflict between management and shareholders within an organization. Blockchain technology has the ability to change fundamentally the distribution of power within an organization potentially mitigating the conflict. While there are several studies of blockchain impact on the corporate governance, the empirical evidence has so far been scarce.

2. Research Design, Methodology and Data Analysis

We analyze the sample of 2813 of NYSE, Nasdaq and AMEX-traded firms for the 2018, which is marked with a rapid blockchain adoption. To explore the impact of the blockchain technology on the intensity of the conflict, we apply several metrics: number of shareholder-sponsored proposals submitted for the shareholder meeting, level of support for management-sponsored proposals and the frequency of proxy contests at the firm. We contribute to the literature by providing empirical evidence on the impact of blockchain on mitigating the principal-agent conflict.

3. Results/Findings and Discussion

We find that firms exploring the blockchain technology in general have shareholders that are more active and submit more proposals for the annual meetings, which indicates the environment less fertile for the conflict. While on average, proposals submitted by the management receive less support during the voting, the share of approved proposals does not change.

4. Conclusion, Contribution and Implication

We find additional evidence that proxy contests are relatively rare among the adopters of the blockchain technology. However, there is not enough data to confidently confirm this. Our research is still ongoing and we are actively working on expanding the dataset and including additional factors in the analysis.

5. References

Available upon request

Toward an Ontology of Consumer Behaviour: Fostering Academic Knowledge Utilization by Marketing Practitioners

Ksenia Golovacheva – Graduate School of Management, St. Petersburg University, Russia
k.golovacheva@gsom.spbu.ru

Maria Smirnova – Graduate School of Management, St. Petersburg University, Russia

Dmitry Kudryavtsev – Graduate School of Management, St. Petersburg University, Russia

Tatiana Gavrilova – Graduate School of Management, St. Petersburg University, Russia

1. Introduction

The role of knowledge about consumer behaviour in managerial decision making is tremendous. The fundamental principle of marketing is customer orientation that implies that the customer represents the focal point of strategic planning and execution (Brady, Cronin, 2001). The importance of knowledge about consumer behaviour is reflected in popular management frameworks and approaches (such as Osterwalder's business model canvas, design thinking, STP marketing) that put customer understanding and analysis as a starting point of many marketing activities.

Knowledge about customers may come from different sources. While a significant portion of customer knowledge results from firm-initiated marketing research and analytics, there are multiple academic studies on consumer behaviour that may be of use to marketers as they give a general understanding of how and why consumers behave, and how marketers may influence consumers with various instruments. The importance of utilizing knowledge produced in the academia is reflected in the concept of evidence-based management that manifests in making decisions through the conscientious, explicit and judicious use of the best available evidence (Rousseau, Manning, Denyer, 2008).

Still the utilization of scientific knowledge about consumer behaviour is very scarce among practitioners. Academics prepare research artifacts in the form of scientific publications that report study results or review previous literature on the topic. The publications are stored in special databases (Google Scholar, Mendeley, Scopus, Web of Science, etc.). The extraction of knowledge from those publications and databases require special competences and expertise that practitioners do not always possess. Hence, scientific publications that contain useful evidence become a science-to-science product: academics produce knowledge that is consumed predominantly by other academics rather than practitioners. A format of knowledge representation that rely on the characteristics of both practitioners' and academics' mental models and decision-making routines is needed to facilitate the knowledge utilization produced in academia by practitioners.

The objective of this paper is to develop an upper-level ontology of consumer behaviour domain that outlines the main constructs, their definitions, attributes, and relationships. The ontology represents knowledge about consumer behaviour in a format that is accepted by both academics as knowledge producers and practitioners as knowledge consumers, thus, fostering the utilization of scientific knowledge about consumer behaviour by practitioners. Additionally, the ontology should be machine-readable, so that it eventually can be used as a basis to construct various expert systems and software products (complementing currently existing Google Scholar, Mendeley, Scopus, Web of Science, etc.) that could store information about scientific findings in a format that is tailored to the needs of practitioners.

2. Theoretical Background and Literature Review

Academic consumer behaviour studies seek general knowledge, explanations that make useful predictions about a common reality in a replicable fashion. They create theories that explain regularities in consumer behaviour. A lot of empirical evidence on consumer behavior has been produced in academia recently, but its practical application is connected to a number of challenges (Nyilasy, Reid, 2007). First, the empirical evidence is not structured. A lot of time is needed to synthesize data. Second, academics have their own language that is different from practitioners. Moreover, the common terminology may be absent even among academics, which creates frustration and make academic publication hard to understand for practitioners. Third, different academic sources have different levels of reliability which is reflected in journal rankings (e.g. SCImago Journal Rank, Assoctiation of Business Schools journal ranking). However, practitioners are not aware of quality standards accepted in academia. Forth, review articles that are intended to provide a structured overview of the topic (and thus represent an attempt of researchers to synthesize knowledge and make it easier to apply) focus on researchers' objectives (in particular identification of research gaps) and do not facilitate domain knowledge reuse to answer specific practical questions. Hence the academic knowledge about consumer behavior is scarcely used by decision-makers. Instead managers rely on the advises of popular management gurus, stick to management fads, and trust speculative conclusions.

One of the reasons behind practitioners' unacceptance of academic knowledge representation formats is differences in mental models and decision-making routines among knowledge producers (academic researchers in the consumer behaviour domain) and knowledge consumers (marketers that may use knowledge about consumer behaviour principles and regularities to make decisions). Mental models and routines define the format of knowledge representation preferred by a party. Academics work within a disciplinary matrix that is taken-for-granted, while providing a framework for seeing it is effectively invisible to the scientist who operated within it. The wider the disciplinary matrix the more difficult it is to see. The disciplinary matrix is 'natural' to scientists in the sense that scientists 'grow into' or 'uncritically absorb' the disciplinary matrix as intrinsic to scientific endeavour (Harvey, 2012). Analogously, practitioners their own institutional logics that are the basis of taken-for-granted rules guiding behaviour of field-level actors, and they 'refer to the belief systems and related practices that predominate in an organizational field' (Scott 2013).

3. Research Design, Methodology and Data Analysis

This paper fits the paradigm of design science research, in accordance with which the researcher solves relevant problems by creating innovative artefacts suitable for reuse and contributing to scientific knowledge. In accordance with Peffers et al, (2007), design science research includes 6 steps: (1) identification and justification of the problem (relevance); (2) identification of goals, requirements and limitations; (3) design and development of the artefact; (4) demonstration of the use (approbation) of the created artefact; (5) evaluation of the created artefact in terms of its effectiveness, efficiency, etc.; (6) publication of obtained results.

The paper reports the results of first three steps. The artifact developed within this project is the ontology of consumer behaviour domain that helps in representing the academia-produced knowledge about consumer behaviour and meet the following requirements: (1) value in providing answers to practical questions; (2) applicability to different consumer behaviour research sub-domains; (3) stickiness to the conventions accepted in the consumer behaviour field; and (4) machine-readability to ensure the ontology can be used as a basis to construct various expert systems and software products that could store information about scientific findings in a format that is tailored to the needs of practitioners.

187

To build the ontology that is shared by both practitioners and academics, there ia a need to understand the mental models of both parties. To represent the mental model of academics, there were analyzed the most widely used frameworks and theories of consumer behavior. To represent the mental model of practitioners, there were analyzed the case studies on the application of consumer behavior to develop marketing tactics and strategies that are posted on widely used media platforms (vc.ru, cossa.ru, habr.com). Text-based cognitive mapping methodology is used to represent mental models. The insights from the analyses were further used in a series of interdisciplinary discussion sessions with marketing practitioners, consumer behavior researchers, and knowledge engineers to construct a preliminary version of ontology.

4. Results/Findings and Discussion

The preliminary ontology of consumer behaviour is proposed. It outlines the main constructs, their definitions, attributes, and relationships. Additionally, ontology links specified constructs to a set of special competency questions that are relevant to marketing practice. The ontology relies on mental models of both academics as knowledge producers and practitioners as knowledge consumers, thus, fostering the utilization of scientific knowledge about consumer behaviour by practitioners.

5. Conclusion, Contribution and Implication

The contribution of the paper is two-fold. First, it makes a comparative analysis of mental models of consumer behaviour domain held by academics and practitioners. Second, it proposes an integrative ontology that reunites the differences in academics' and practitioner' mental models.

6. References

Brady, M. K., & Cronin Jr, J. J. (2001). Customer orientation: Effects on customer service perceptions and outcome behaviors. Journal of service Research, 3(3), 241-251.

Harvey, L. (2012–14) Social Research Glossary, Quality Research International, http://www.qualityresearchinternational.com/socialresearch/

Nyilasy, G., & Reid, L. N. (2007). The academician–practitioner gap in advertising. International Journal of Advertising, 26(4), 425-445.

Peffers, K., Tuunanen, T., Rothenberger, M. A., & Chatterjee, S. (2007). A design science research methodology for information systems research. Journal of management information systems, 24(3), 45-77.

Rousseau, D. M., Manning, J., & Denyer, D. (2008). 11 Evidence in management and organizational science: assembling the field's full weight of scientific knowledge through syntheses. Academy of Management Annals, 2(1), 475-515.

Scott, W. R. (2013). Institutions and organizations: Ideas, interests, and identities. Sage publications.

Robust Regression Discontinuity Estimates of the Causal Effect of the TripAdvisor's Bubble Rating on Hotel Popularity

Elena B. Pokryshevskaya – National Research University Higher School of Economics, Russia

Evgeny A. Antipov – National Research University Higher School of Economics, Russia eantipov@hse.ru

Keywords: regression discontinuity, ratings, sales, booking, hotel reviews, TripAdvisor

1. Introduction

The effect of consumer reviews on sales has been widely studied and the importance of the word-of-mouth has been shown for many industries, including the hospitality industry. However, in fact existing studies have merely shown the usefulness of ratings as predictors of hotel performance because user ratings are inevitably correlated with unobserved hotel quality and word-of-mouth sentiments, which causes omitted variable bias. As a result, existing estimates of the sensitivity of hotel performance to changes in user ratings themselves cannot be claimed to be causal effects of ratings that would ideally be obtained in an experiment where otherwise identical hotels were randomly assigned slightly different ratings. Not accidentally, the meta-analysis of Yang et al. (2018) has shown that the link between electronic word of mouth (eWOM) and hotel performance was significantly lower in panel data studies which are known to capture at least the time-invariant portion of unobserved heterogeneity of hotels.

In this study we seek to answer whether an increase in a hotel's bubble rating at TripAdvisor increases the hotel's popularity. Despite non-disclosure of actual booking data, data from TripAdvisor provides settings where causal effects of changes in bubble ratings on hotel popularity can be estimated:

- TripAdvisor reports ratings rounded to the nearest half-bubble. This allows utilizing these rounding rules and comparing hotels in the vicinity of each threshold. Because of this rounding, two nearly identically rated products could have different displayed ratings if they lie on opposing sides of a rounding threshold.
- TripAdvisor provides the number of people viewing each hotel's page at the current moment, which can serve as a good proxy for the hotel's popularity in the absence of the number of daily bookings.

2. Theoretical Background and Literature Review

There have been only a few studies employing rigorous quasiexperimental causal analysis techniques to identify distorting effects of systems reporting rounded ratings (usually depicted using stars, bubbles or other graphical images) and none of them was related to hotels. Anderson and Magruder (2012) employed a quasi-experimental design (regression discontinuity) to estimate the effect of average Yelp.com ratings on restaurant reservations in San Francisco. They found that a half-star increase in rating results in a 19 percentage points increase in the probability of selling out during prime dining times, and this effect is even larger for restaurants that have external accreditation. Their results provide evidence on the importance of aggregate consumer reviews in informing restaurant quality. In line with Anderson and Magruder (2012), Luca (2016) used Yelp.com ratings and data from the Washington State of Revenue to associate average ratings with restaurant revenue. Luca (2016) found that an increase of one-star in the average rating in Yelp leads to an increase in revenue of about 5-9 percent for restaurants. However, in contrast, Duan et al. (Duan et al., 2008) did not find a significant influence of the average rating on movies' box office revenues. Even

more interestingly, according to a recent regression discontinuity study of online consumer reviews the star presentation can create negative, rather than positive, jumps at cutoffs (Wang et al., 2019).

3. Research Design, Methodology and Data Analysis

Data on 4,599 hotels located in Rome, Italy were collected in December 2019. They represent all hotels found on TripAdvisor in that region except for a small number of cases for which some of the key information was missing. Our dependent variable is the number of people viewing the hotel's page at the time of data collection, i.e. its popularity at a given point in time. As zero number of views prevails in the sample, we also use an alternative binary dependent variable that equals 1 if there were any views and 0 otherwise.

We employ sharp regression discontinuity design (RDD) - a rigorous method for causal analysis, applications of which have received a lot of attention as being close to those from truly randomized experiments (Hill et al., 2017). The regression discontinuity (RD) approach with application to the estimation of the impact of online ratings on demand is based on the idea that we can compare products that are characterized by similar continuous scores but different bubble ratings to isolate the impact of the bubble rating. For instance, two hotels with average ratings of 3.74 and 3.75 will be presented as 3.5- and 4-bubble hotels, respectively. The causal impact of the bubble ratings can be obtained by comparing demand for hotels marginally above and marginally below the rounding threshold.

In order to detect whether there is evidence of self-selection (manipulation) around a cutoff where a bubble rating changes by a half-bubble we employ a manipulation testing procedure using the local second-order polynomial density estimator, a robust data-driven density test of falsification. Regression discontinuity estimates of treatment effects were obtained for each cutoff of the underlying exact rating using the optimal automatically selected bandwidth as well as the fixed bandwidth of 0.1. The estimation was conducted with a triangular kernel using a local-linear (order p=1) estimator with a local-quadratic (order q=2) bias-correction estimate. Robust standard error estimators were computed using 3 nearest-neighbors. P-values associated with robust local-polynomial RD estimates are reported. Since the validity of the regression discontinuity design relies on those that were just barely treated (just above the cutoff) being the same as those who were just barely not treated (just below the cutoff), we examined the differences not only in the dependent variables, but also in all available covariates as well. Although some variables may differ for the two groups merely based on random chance, most of these covariates should be the same for the RDD analysis to be trustworthy.

4. Results/Findings and Discussion

No systematic discontinuities in the density around thresholds have been detected by manipulation tests: none of the differences in density estimates at the cutoff is statistically significant (all p-values>0.05), which supports the validity of the regression discontinuity design. It is not surprising as the site uses an algorithm to look at any "content integrity issues, animal welfare policies, and/or fraudulent activity" connected to the listing[11].

Similarity of treatment units to control units near the cutoffs has been checked using a rich set of covariates and almost no significant differences in observable characteristics just above and just below the cutoffs have been found. Significant jumps of neither the number of views (views) nor the probability of any views (views_binary) have been detected (Table 1).

Table 1. Robust bias-corrected regression discontinuity estimates of the bubble rating's treatment effect for various cutoffs and dependent variables

---

[11] https://www.TripAdvisor/TripAdvisorInsights/w604

Dependent variable	Cutoff	Data-driven optimal bandwidth (varies across dependent variables and cutoffs)		Constant bandwidth=0.1	
		Point Estimate	Robust p-value	Point Estimate	Robust p-value
Number of views	3.25	0.131	0.163	0.007	0.809
Number of views	3.75	-0.025	0.905	-1.231	0.342
Number of views	4.25	-0.039	0.885	-0.189	0.579
Number of views	4.75	-0.356	0.414	-0.174	0.756
Indicator of any views (1/0)	3.25	0.035	0.126	0.004	0.619
Indicator of any views (1/0)	3.75	0.008	0.743	-0.086	0.392
Indicator of any views (1/0)	4.25	0.014	0.711	0.018	0.710
Indicator of any views (1/0)	4.75	-0.027	0.527	-0.031	0.566

5. Conclusion, Contribution and Implication

The number of people viewing a particular hotel is an indicator of the property's popularity, which is publicly available from TripAdvisor. Out study is the first to investigate the distribution of this indicator among hotels with various bubble ratings, as well as to figure out the impact of these bubble ratings themselves on hotel popularity. We have found no evidence that the rounding of bubble ratings to the nearest half-bubble creates discontinuities in the relationship between demand and bubble ratings similar to those found in previous studies based on other review platforms (e.g., Yelp.com and Meituan.com). The absence of a significant discontinuity implies that hotels of essentially the same quality (as measured by the exact score from 1 to 5 underlying the rounded bubble rating) but with a half-bubble difference attract the same level of attention at TripAdvisor. This implies that TripAdvisor's rounded bubble rating system does not bias hotel quality signals, at least in the case of hotels with satisfactory to excellent ratings hotels

located in Rome. Further comparative research is needed on what features of review websites are responsible for mitigating such biases, but in the case of TripAdvisor it can possibly be the quality of summary information available before users click at the hotel's link, including hotel class (star rating), information about awards, some of the key amenities and, more importantly, a comprehensive set of more than 10 filters, each containing multiple checkboxes to select from in order to shortlist the hotels. Another possible explanation for non-significant effects of bubble ratings (holding other things equal) is the role of traditional third-party star ratings as indicators of the hotel's class, which do not exist in most other markets.

6. References

Duan, W., Gu, B., & Whinston, A. B. (2008). Do online reviews matter? - An empirical investigation of panel data. Decision support systems, 45(4), 1007-1016.

Hill, R. C., Fomby, T. B., Escanciano, J. C., Hillebrand, E., & Jeliazkov, I. (2017). Regression Discontinuity Designs: Theory and Applications. Emerald Group Publishing.

Luca, M. (2016). Reviews, reputation, and revenue: The case of Yelp. com. Com (March 15, 2016). Harvard Business School NOM Unit Working Paper, (12-016).

Wang, W., Li, F., & Yi, Z. (2019). Scores vs. stars: A regression discontinuity study of online consumer reviews. Information & Management, 56(3), 418-428.

Yang, Y., Park, S., & Hu, X. (2018). Electronic word of mouth and hotel performance: A meta-analysis. Tourism management, 67, 248-260.

Concepts Related to Industry 4.0 in Research Papers in the Field of Economics

Urszula Cieraszewska – Cracow University of Economics, Poland

Anna Drabina – Cracow University of Economics, Poland

Monika Hamerska – Cracow University of Economics, Poland

Anna Kovaleva – Saint Petersburg State University of Economics, Russia

Paweł Lula – Cracow University of Economics, Poland

Janusz Tuchowski – Cracow University of Economics, Poland janusz.tuchowski@uek.krakow.pl

Keywords: industry 4.0, economics, computer science, ontology-based analysis, graph models

1. Introduction

In a constantly changing world, a huge revolution has occurred in technological progress. Like any progress, it has a big impact on every sphere of life. Industry 4.0 is another revolution we are dealing with. It does not concern whether we want to buy a new machine or collect data. It is a process that continues, changing the world as much as steam or electricity did.

Therefore, an attempt was made at work to analysis of issues related to industry 4.0 in research papers in the field of economics is the main goal of the paper. The authors are going to analyse abstracts of research papers related to the field of economics and published by authors from 36 European countries and registered in Scopus database in the period 2011-2020. The main steps of the research were to prepare data set with abstracts from this article and to identify of concepts appearing in abstracts related to economics, computer science and industry 4.0. The ontology-based approach will be used for identification of concepts related to computer science, economics and industry 4.0.

2. Theoretical Background and Literature Review

Industry 4.0 means a new level of organization and control of the entire product life cycle. This cycle is oriented towards more and more individualized customer wishes and covers all stages - from the initial concept, development and production order, through the execution and delivery of the product to the customer, to recycling (Kiraga, 2016). The concept of Industry 4.0 entails necessary changes in the operational processes of companies and forces changes in doing business in the field of relations with clients, work environment, production, technology etc. The fourth industrial revolution is driven primarily by the increase in the amount of available data and its analysis using artificial intelligence.

The emergence artificial intelligence (AI) is affecting more and more sectors. For instance, AI is expected to affect global productivity, equality and inclusion, environmental outcomes, and several other areas, both in the short and long term (Vinuesa et al., 2020). AI rests on technologies like machine learning, deep neural networks, big data, internet of things and cloud computing (Wagner, 2020). AI can be also used to analyse complex and high-dimensional dynamic economic models (Maliar Maliar, & Winant, 2019). AI is used in trade and logistics, e.g. to design efficient warehouse facilities. It also shapes the way customers interact with businesses through smart websites and bots, and these tools are increasingly integrated into everyday work.

Another technology that has revolutionized the industry and has received significant attention in recent years is blockchain technology. The four main kinds of blockchain applications are money transfer and

payments, property registries, contractual agreements, and identity confirmation (Swan, 2017). Blockchain facilitates the management of an innovative supply chain. The technology allows companies to record every transaction and process - from production to sale, storage and shipping - in decentralized blocks. Thus, reduce the risk of delays, human error and related costs (Bhardwaj, 2019).

New computational technologies play an important role in the development of the economy according to the Industry 4.0 concept. This is due to the need to process huge amounts of data, known as big data. Conscious use of big data can bring many benefits to the entire economy. They include: production of new goods (including those made to order), optimization of business processes, better management of the organization, more targeted marketing that uses customer feedback in product design, more efficient use of resources, reducing energy consumption.

Technology based on virtual reality can help organizations improve operational efficiency and individual productivity, according to the report. Virtual reality experiments are framed field experiments, which allow testing the effect of contextual cues on economic behaviour under the strict control of the experimenter (Innocenti, 2017).

The biopharmaceutical sector is faced with such challenge of Industry 4.0 as personalized medicine also being under pressure to make production faster and cheaper. In this regard using digital and automated technologies are used as the key technologies to develop these biotechnologies according to the new industry revolution requirements.

Macdonald (Macdonald, 2020) also underlines the short-term difficulties of biomanufacturing which are trying to overcome traditional models of production. For example, adoptive cellular therapy demands the new technologies (Marks, 2017). In general, pharmaceutical sector with new biotechnologies has a great potential of long-term benefits.

Robotics is another cutting-edge technology of Industry 4.0 impacting on traditional manufacturing system (Mourtzis, Fotia, Boli, & Vlachou, 2019). Thus, adaptive robots have new advantages thanks to other technologies as artificial intelligence, big data and embedded systems (Bayram & İnce, 2018). Notwithstanding the specificity of robotics (such as replacement of human labour) (Pfeiffer, 2018), these technologies allowing manufacturing goods with better quality, less time and costs (Goel & Gupta 2020).

3D printing or additive manufacturing adds new power to manufacturing industry giving ability to fabricate items with complex characteristics (Goh, Sing, & Yeong, 2020). However, the implementation of additive manufacturing is faced with some barriers such as productivity limitations, new requirements for production processes and skills of workers (Korner et al., 2020).

Industrial revolution is based on cyber physical systems generating new features and benefits making system of production more flexible, visible, creating new planning methods (Fakhri et al., 2020). Internet emerged the new way of automation of the industrial processes as Internet of Things (IoT) (Aazam, Zeadally, & Harras, 2018). It's worth to underline that IoT requires other technologies of Industry 4.0 such as robots, appliances, big data analysis and new business models (Wan et al., 2016).

Using of technologies of Industry 4.0 put new requirements to energy capture, storage and transmission. Thus, smart factories based on technologies of Industrial Internet reduce energy consumption (Mohamed, Al-Jaroodi, & Lazarova-Molnar, 2019).

In general, Industry 4.0 combines core technologies such as Internet of Things, Big Data and Cyber-Physical Systems to increase the operational efficiency, productivity and automatization (da Silva, da Costa, Crovato, & da Rosa Righi, 2020). All these technologies are connected with each other and they give rise to general and specific problems. Thus, new computational technologies and Internet of Things should to manage the problems of cyber security (Gasimov & Aliyeva, 2020).

3. Research Design, Methodology and Data Analysis

The analysis of appearance and significance of concepts related to the fourth industrial revolution in research papers prepared in the area of economics in the period 2011-2020 is the main goal of the analysis. During the study, abstracts of all papers registered in the Scopus database from 2011 to 2020 were used.

The research process was composed of the following steps:

1. selection of ontologies appropriate for description of economics, computer science and industry 4.0 areas,
2. identification of concepts in abstracts of research papers,
3. evaluation of significance of concepts related to Industry 4.0 area,
4. analysis of relationships between concepts related to Industry 4.0 and concepts related to computer science and to economics.

a. Selection of ontologies for description of economics, computer science and industry 4.0 areas

The approach used for research process has ontology-based character. It means, that the scope and the structure of scientific areas were defined in formal way with the use of ontologies. In the case of economics, the JEL classification system was used (https://www.aeaweb.org/econlit/jelCodes.php). For computer science area, the CSO ontology was used (https://cso.kmi.open.ac.uk/home). Concepts related to Industry 4.0 scope were defined by authors with the use of main groups of concepts:

- 3d graphics,
- 3d printers,
- agent based approach,
- augmented reality,
- biometrics,
- blockchain,
- cloud computing,
- control systems,
- cyber security,
- data analytics,
- embedded systems,
- human machine interface,
- "Industry 4.0" concept (indicates that phrase "industry 4.0" or "fourth industrial revolution" appeared in the text),
- internet of things,
- mobile systems,
- ontology based approach,
- robotics,
- sensors,
- wearables.

Every group of concepts from the above list was defined as a set of concepts choosing from the CSO ontology. Therefore the description of Industry 4.0 area had a form of the sub-ontology of the CSO ontology.

b. Identification of concepts in abstracts

During the next stage of the research process, the analysis of abstracts was carried out. During this stage, 124,460 abstracts from the Scopus database were browsed and the following numbers of concepts were identified:

- 1,283,253 concepts related to economics,
- 288,898 concepts related to computer science,
- 3,763 concepts related to the fourth industrial revolution field.

Concepts related to Industry 4.0 appeared in 3456 abstracts.

The system used for concepts' identification was prepared by authors in R language and has an ability to annotate parts of text document with ontology concepts according to rules defined in the form of patterns which can be assigned to every concept. The detailed description of the system used for concepts' identification can be found in (Kovaleva, Lula, & Tuchowski, 2020).

c. Analysis the significance of concepts related to Industry 4.0 area

Having Industry 4.0 concepts identified, their importance was evaluated. Two approaches were used for achieving this goal:

- the analysis of concepts' frequency (concepts: *agent-based approach*, *data analytics*, *internet of things*, *control systems* and *cyber security* were found as the most important),
- the analysis of concepts' centrality (in this case *data analytics*, *internet of things*, *control systems* and *sensors* were evaluated as the most significant).

d. Analysis of relationships between concepts related to Industry 4.0 and concepts related to computer science

The next step of the research was focused of analysis relationships between concepts belonging to Industry 4.0 area and concepts related to computer science and economics. Using the information about co-occurrence of these two groups of concepts in abstracts, a bipartite graph model was built. It allowed to find the most frequent relations observed in the corpus of abstracts. The results showed that:

- *internet of things* (concept related to industry 4.0 area) is strongly connected with the following topics from the CSO ontology: *computer systems*, *Internet*, *networks*, *software engineering*,
- *data analytics* (as an Industry 4.0 concept) is related to: *computer systems*, *artificial intelligence*, *data mining*, *hardware* and *computer aided design*,
- *agent-based approach* (Industry 4.0 concept) is connected with *artificial intelligence* from computer science area.

Also the specificity of concepts was evaluated. Measures of specificity calculated for individual concepts as well as the index for the whole model were rather low (the H_2' was equal to 0.056).

Very interesting conclusions may be formulated based on the results of cluster analysis of concepts belonging to industry 4.0 and two domain ontologies. To perform this analysis, the co-occurrence matrix of concepts from Industry 4.0 area and concepts from one domain ontology was decomposed with the use of SVD decomposition and next, the coordinates of all concept in a new, common space were calculated. After this transformation, the cluster analysis could be performed (thanks to the fact that vectors representing all concepts in a new space had the same length). The calculations were carried out with the use of Ward's method with Euclidean distance matrix. This analysis recognized a very well-defined cluster

containing concepts related to Industry 4.0 (*agent-based approach*, *internet of things*, *data analysis*) and concepts from the CSO ontology (*artificial intelligence*, *computer systems*, *software engineering*, *networks* and *Internet*). The remaining concepts were assigned to the second cluster. It is very useful, that the results formed a dendrogram showing required level of details.

The same methodology was used for analysing relationships between Industry 4.0 concepts and concepts related to economics. The results indicated that the most relevant relationships can be observed between Industry 4.0 concepts: *agent-based approach*, *data analysis* and *internet of things* and economics concepts represented by JEL classes: *D* (microeconomics), *L* (industrial organization), *C* (mathematics and quantitative methods) and *O* (economics development, innovation, technological change and growth). The specificity index for the whole network is extremely low and is equal to 0.0058.

4. Results/Findings and Discussion

The following conclusions can be drawn from the studies carried out:

- ontology-based approach was positively verified as a method for annotating documents with large number of concepts having hierarchical or network-centric structure;
- the JEL classification system is the most popular system of concepts used for annotating research papers in the field of economics. However, JEL concepts have rather general character and are not convenient for identification of detailed topics;
- the CSO ontology covers the scope of computer science area; the number of concepts is incomparably higher than in the JEL ontology. It should be underlined that the CSO ontology has a network-like, not hierarchical, structure;
- ontology-based approach is very flexible and allows to define sub-ontologies containing choosing set of concepts;
- undirected and bipartite graphs are very useful for modelling and evaluation relationships between concepts within the same or belonging to two different ontologies;
- the SVD decomposition of the co-occurrence matrix calculated for concepts taken from two different ontologies used together with the methods of cluster analysis can be used for studying similarity of concepts from various ontologies.

5. Conclusion, Contribution and Implication

The authors are going to develop methodological and empirical part of their research and are going to include other domain ontologies (Universal Decimal Classification System, MeSH ontology) and design and implement linguistic tools for analysing document prepared in various languages.

6. References

Aazam, M., Zeadally, S., & Harras, K. A. (2018). Deploying fog computing in industrial internet of things and industry 4.0. IEEE Transactions on Industrial Informatics, 14(10), 4674-4682. https://doi.org/10.1109/TII.2018.2855198

Bayram, B., & İnce, G. (2018). Advances in Robotics in the Era of Industry 4.0. In Bayram, B., & İnce, G., Industry 4.0: Managing the Digital Transformation (pp. 187-200). Springer International Publishing.

Bhardwaj, Ch. (2019) Beyond the Hype: The Real Impact of Blockchain on Economy [Blog]. https://appinventiv.com/blog/real-impact-of-blockchain-technology-on-economy/

da Silva, F. S. T., da Costa, C. A., Crovato, C. D. P., & da Rosa Righi, R. (2020). Looking at energy through the lens of Industry 4.0: A systematic literature review of concerns and challenges. Computers & Industrial Engineering, 106426. https://doi.org/10.1016/j.cie.2020.106426

Fakhri, A. B., Mohammed, S. L., Khan, I., Sadiq, A. S., Alkazemi, B., Pillai, P., & Choi, B. J. (2020). Industry 4.0: Architecture and equipment revolution. Computers, Materials & Continua. Retrieved from https://wlv.openrepository.com/bitstream/handle/2436/623464/Al_Shakarchi_Industry_Four_Point_Zero_2020.pdf?sequence=3&isAllowed=y

Gasimov, V., & Aliyeva S. (2020). Basic components of the digital business: cryptocurrency, blockchain, cloud technologies and internet of things. International Journal of 3D Printing Technologies and Digital Industry, 4(2), 97-105. https://doi.org/10.46519/ij3dptdi.734633

Goel, R., & Gupta, P. (2020). Robotics and industry 4.0. In Nayyar, A. & Kumar, A. (Ed.) A Roadmap to Industry 4.0: Smart Production, Sharp Business and Sustainable Development (pp. 157-169). Springer International Publishing.

Goh, G. D., Sing, S. L., & Yeong, W. Y. (2020). A review on machine learning in 3D printing: applications, potential, and challenges. Artificial Intelligence Review, 1-32. https://doi.org/10.1007/s10462-020-09876-9

Hernandez Korner, M. E., Lambán, M. P., Albajez, J. A., Santolaria, J., Ng Corrales, L. D. C., & Royo, J. (2020). Systematic Literature Review: Integration of Additive Manufacturing and Industry 4.0. Metals, 10(8), 1061. https://doi.org/10.3390/met10081061

https://appinventiv.com/blog/real-impact-of-blockchain-technology-on-economy/

https://cso.kmi.open.ac.uk/home

https://www.aeaweb.org/econlit/jelCodes.php

Innocenti, A. (2017). Virtual reality experiments in economics. Journal of Behavioral and Experimental Economics, 69, 71–77.

Kiraga, K. (2016). Przemysł 4.0: 4. Rewolucja przemysłowa według Festo. Autobusy: Technika, Eksploatacja, Systemy Transportowe, 17(12), 1603–1605.

Kovaleva, A.S., Lula, P., Tuchowski, J. (2020). Ontology-Based Measurement of Study Program Innovativeness in the Area of Economics and Management. In Babić, V., Nedelko, Z. (Ed.), Handbook of Research on Enhancing Innovation in Higher Education Institutions (pp. 381-407). IGI Global. http://dx.doi.org/10.4018/978-1-7998-2708-5.ch017

Macdonald, G. J. (2020). Biomanufacturing Makes Sense of the Industry 4.0 Concept. Genetic Engineering & Biotechnology News, 40(S3), S7-S10. https://doi.org/10.1089/gen.40.S3.03

Maliar, L., Maliar, S., & Winant, P. (2019). Will Artificial Intelligence Replace Computational Economists Any Time Soon? CEPR Discussion Papers, 14024.

Marks, L. (Ed.). (2017). Engineering Health: How Biotechnology Changed Medicine. Royal Society of Chemistry.

Mohamed, N., Al-Jaroodi, J., & Lazarova-Molnar, S. (2019). Leveraging the capabilities of industry 4.0 for improving energy efficiency in smart factories. IEEE Access, 7, 18008-18020. https://doi.org/10.1109/ACCESS.2019.2897045

Mourtzis, D., Fotia, S., Boli, N., & Vlachou, E. (2019). Modelling and quantification of industry 4.0 manufacturing complexity based on information theory: a robotics case study. International Journal of Production Research, 57(22), 6908-6921. https://doi.org/10.1080/00207543.2019.1571686

Narayanan, H., Luna, M. F., von Stosch, M., Cruz Bournazou, M. N., Polotti, G., Morbidelli, M., & Sokolov, M. (2020). Bioprocessing in the digital age: The role of process models. Biotechnology Journal, 15(1), e1900172. https://doi.org/10.1002/biot.201900172

Pfeiffer, S. (2018). Industry 4.0: Robotics and Contradictions. In Bilić, P., Primorac, J. & Valtýsson, B. (Ed.), Technologies of Labour and the Politics of Contradiction (pp. 19-36). Palgrave Macmillan.

Salkin, C., Oner, M., Ustundag, A., & Cevikcan, E. (2018). A conceptual framework for Industry 4.0. In Bayram, B., & İnce, G., Industry 4.0: Managing the Digital Transformation (pp. 3-23). Springer International Publishing.

Swan, M. (2017). Anticipating the Economic Benefits of Blockchain. Technology Innovation Management Review, 7(10), 6–13.

Vinuesa, R., Azizpour, H., Leite, I., Balaam, M., Dignum, V., Domisch, S. & Nerini, F. F. (2020). The role of artificial intelligence in achieving the Sustainable Development Goals. Nature Communications, 11(1). https://doi.org/10.1038/s41467-019-14108-y

Wagner, D. N. (2020). Economic patterns in a world with artificial intelligence. Evolutionary and Institutional Economics Review, 17, 111–131.

Wan, J., Tang, S., Shu, Z., Li, D., Wang, S., Imran, M., & Vasilakos, A. (2016). Software-Defined Industrial Internet of Things in the Context of Industry 4.0, in IEEE Sensors Journal, vol. 16, no. 20, pp. 7373-7380. https://doi.org/10.1109/JSEN.2016.2565621

Key Skills Extraction on Local Labour Market in IT sphere

Andrei Ternikov – National Research University Higher School of Economics, Russia aternikov@hse.ru

Ekaterina Aleksandrova – National Research University Higher School of Economics, Russia

1. Introduction

The process of employment in labour market involves several sides: employers, employees, educational system and state authorities. From the economic point of view a labour market is close to the market with imperfect competition. The information asymmetry problem, in general, could be overcame with the use of signals from potential employees. Mentioned above signals contain of different characteristics, that are usually placed in curriculum vitae (CV), such as level of education, job experience in years, age, declared salary, skills, etc. The one of the most informative indicators is skills, which provide an extensive information about competences and abilities of the worker. However, the sets of such skills are dynamically changing in different industries, organizations and even certain vacancies. The last process is connected to economic system fluctuations and labour market restructuring. Moreover, the professional standards that are set up by the educational system become obsolete and inflexible to such changes. The particular interest of this study relates to the problem of key skills investigation required by employers.

2. Theoretical Background and Literature Review

Several authors highlight issues of skills determination in the sphere of Information Technologies (IT). Firstly, this branch of the labor market relates to high volatility of technical and soft skills required, that is actual to analyze in time prospective (Bensberg, Buscher, & Czarnecki, 2019; Florea & Stray, 2018; Goles, Hawk, & Kaiser, 2008; Johnson, 2016; Kappelman, Jones, Johnson, McLean, & Boonme, 2016; Litecky, Arnett, & Prabhakar, 2004). Secondly, skills, especially technical, have an outstanding structure due to the presence of precise formulation of programming languages, technological stack, interface instruments, etc., that is easier to classify them in attribution to several job positions (Havelka & Merhout, 2009; Hussain, Clear, & MacDonell, 2017; Mammadova, Jabrayilova, & Mammadzada, 2015; Wowczko, 2015). Thirdly, the adoption of new technologies requires to change combinations of skills of workers in order to perform newly created tasks (Bailey & Mitchell, 2006; Brooks, Greer, & Morris, 2018; Casado- Lumbreras, Colomo-Palacios, & Soto-Acosta, 2015; Foll & Thiesse, 2017; Stal & Paliwoda-Pekosz, 2019; Yamauchi et al., 2018). Moreover, the sphere of IT has penetrated the large part of labor market. Technical specialists with certain set of competences and knowledge are hired in sphere of economics and finance, public management, retail industry, etc. Thus, such specialists are also required to be competent in the professional activities of particular company. Such cases could broaden the traditional understanding of overskilled workers and rethinking of the educational policies aimed to prepare well-matching labour force.

3. Research Design, Methodology and Data Analysis

Methodology of the research is based on works of Lovaglio (2018) and Colombo (2019). In the first one, online job advertisements from Italian web sites between June and September 2015 were collected. The portion of 6,222 job vacancies (the set of statistician-related vacancies) is used (occupation classification uses a 'bag of words' approach). 6 occupations were used for classification: ISCO-08 classifier of occupations; groups of IT professions extracted ("high-level" statisticians, "low-level" statisticians, others [Engineering professionals, Software developers, Web and multimedia developers, Database designers and administrators]). Main type of skills for each group are extracted: Soft skills,

Profession skills, ICT skills. Several ML algorithms of classification are used and compared via Accuracy, Error Rate and Brier Score metrics. In the second work, the source of the data is Wollybi, a project that collects online vacancies in Italy from job-portals. Authors concentrate on 2016 and 2017 containing approximately 2 million of vacancies. ISCO taxonomy for occupations. ESCO taxonomy for skills. Types of skills selected: Information brokerage skills, Basic ICT skills, Applied/Management ICT skills, ICT technical skills, Soft skills (Thinking skills, Social interaction, Application of knowledge, Attitudes and values). 22 occupation subgroups of IT specialists (2nd level of ESCO). Soft and hard skills influence on labour market automation process (probability). Portions of soft and hard skills are calculated and distribution according to different occupations is presented.

In this research we concentrate on Russian labour market (Saint-Petersburg IT-sphere in particular) and the online job database HeadHunter. We try to fill the gap in determination of the set of skills demanded by companies and provide recommendations for educational system requirements (to shorten the gap between process of education and demanded skills and competencies from the market). First sample: Saint-Petersburg; sphere – Information Technologies. With determined skills: 63,869 vacancies from May 2015 till September 2019. Each vacancy includes from 1 to 6 professional area codes. The distribution is obtained by each professional area (163,665 pairs of vacancy and the specific professional area code) in accordance to HH professional area classifier (36 areas inside the group of IT sphere). We select sub-classes of vacancies and separation between soft and digital (hard) skills. The skills (descriptions) were classified semi-manually (with mark-up procedure) using n-Grams for TF-iDF approach and matching procedure for distributing sets of skills, that are specifically and commonly defines the separation between classes of particular areas and influences on the determination of the particular profession. Raw skills (unique) 13,347 (text strings from 1 to 100 symbols) were unified and used in classification (classification and NLP).

4. Results/Findings and Discussion

Results of the work allow to get key skills itself, their pairwise combinations and triplets. The obtained approach and methods, that validated on the portion of the real market data could be used in its extension for provision of new educational policy (or in-time corrections for matching to real labour market demand). Further implications could be extended for economic implications in the part of analysis of salaries, working experience and the other factors along with the demanded skills of potential workers.

5. Conclusion, Contribution and Implication

The results of clustering provide some insights for further research. For example, the algorithm detects some supporting areas such as marketing and management that are obtained separately from the main provided IT technologies. So, the researcher may decide about the comparison of managerial skills and senior positions or just concentrate on the technical skills only. The other advantage relates to the quite clear separation between "hard" and "soft" skills. It allows to maintain and update already existing databases of such the skills. In future work, the relation between demanded combinations of "hard" and "soft" skills could be found. Moreover, such data could be analyzed in order to represent regional differences and trends in the skills required. Finally, the large part of data, where fields with skills are not separated from the overall description could be added to further analysis after running several algorithms of such skills detection. The last proposed can significantly increase the reliability of the obtained results.

6. References

Bailey J., Mitchell R.B. (2006). Industry perceptions of the competencies needed by computer programmers: Technical, business, and soft skills. Journal of Computer Information Systems, vol. 47, no 2, pp. 28–33.

Bensberg F., Buscher G., Czarnecki C. (2019). Digital transformation and IT topics in the consulting industry: A labor market perspective. Advances in consulting research: Recent findings and practical cases (ed. V. Nissen). Cham, Switzerland: Springer, pp. 341–357.

Brooks N.G., Greer T.H., Morris S.A. (2018). Information systems security job advertisement analysis: Skills review and implications for information systems curriculum. Journal of Education for Business, vol. 93, no 5, pp. 213–221.

Casado-Lumbreras C., Colomo-Palacios R., Soto-Acosta P. (2015). A vision on the evolution of perceptions of professional practice. International Journal of Human Capital and Information Technology Professionals, vol. 6, no 2, pp. 65–78.

Colombo E., Mercorio F., Mezzanzanica M. (2019). AI meets labor market: Exploring the link between automation and skills. Information Economics and Policy, vol. 47, pp. 27–37.

Florea R., Stray V. (2018). Software tester, we want to hire you! An analysis of the demand for soft skills. Proceedings of the 19th International Conference, XP 2018, Porto, Portugal, May 21–25, 2018. Agile processes in software engineering and extreme programming (eds. J. Garbajosa, X. Wang, A. Aguiar), pp. 54–67.

Foll P., Thiesse F. (2017). Aligning is curriculum with industry skill expectations: A text mining approach. Proceedings of the 25th European Conference on Information Systems, ECIS 2017, Guimarães, Portugal, June 5-10, 2017 (eds. I. Ramos, V. Tuunainen, H. Krcmar), pp. 2949–2959.

Goles T., Hawk S., Kaiser K.M. (2008). Information technology workforce skills: The software and IT services provider perspective. Information Systems Frontiers, vol. 10, no 2, pp. 179–194.

Havelka D., Merhout J.W. (2009). Toward a theory of information technology professional competence. Journal of Computer Information Systems, vol. 50, no 2, pp. 106–116.

Hussain W., Clear T., MacDonell S. (2017). Emerging trends for global DevOps: A New Zealand perspective. Proceedings of the IEEE 12th International Conference on Global Software Engineering, Buenos Aires, Argentina, 22-23 May 2017 (ed. R. Bilof), vol. 1, pp. 21–30.

Johnson K.M. (2016). Non-technical skills for IT professionals in the landscape of social media. American Journal of Business and Management, vol. 4, no 3, pp. 102–122.

Kappelman L., Jones M.C., Johnson V., McLean E.R., Boonme K. (2016). Skills for success at different stages of an IT professional's career. Communications of the ACM, vol. 59, no 8, pp. 64–70.

Litecky C.R., Arnett K.P., Prabhakar B. (2004). The paradox of soft skills versus technical skills in is hiring. Journal of Computer Information Systems, vol. 45, no 1, pp. 69–76.

Lovaglio P.G., Cesarini M., Mercorio F., Mezzanzanica M. (2018). Skills in demand for ICT and statistical occupations: Evidence from web-based job vacancies. Statistical Analysis and Data Mining, vol. 11, no 2, pp. 78–91.

Mammadova M.H., Jabrayilova Z.G., Mammadzada F.R. (2015). Managing the IT labor market in conditions of fuzzy information. Automatic Control and Computer Sciences, vol. 49, no 2, pp. 88–93.

Stal J., Paliwoda-Pekosz G. (2019). Fostering development of soft skills in ICT curricula: A case of a transition economy. Information Technology for Development, vol. 25, no 2, pp. 250–274.

Wowczko I. (2015). Skills and vacancy analysis with data mining techniques. Informatics, vol. 2, no 4, pp. 31–49.

Yamauchi F., Nomura S., Imaizumi S., Areias A.C., Chowdhury A.R. (2018). Asymmetric information on noncognitive skills in the Indian labor market: An experiment in online job portal. Policy Research Working Paper Series No. 8378.

Track: Sports Analytics: Economics, Management and Performance

Chairperson: Thadeu Gasparetto

Sports analytics undertake a fundamental role in professional sports nowadays. The accurate collection, analysis and interpretation of the data can maximize both managerial decisions and sports performance and, therefore, professional clubs have to adopt the best practices to compete in the global sport business environment. Professional sports disciplines offer a large amount of detailed data, being exceptional laboratories for testing theories as well as for searching ways to maximize individual and team performance.

Another Outlook on the Promotion and Relegation System

Thadeu Gasparetto – National Research University Higher School of Economics, Saint Petersbur, Russia
tgasparetto@hse.ru

Angel Barajas – National Research University Higher School of Economics, Saint Petersbur, Russia

1. Introduction

One of the key distinctions between international football and North-American leagues is the promotion and relegation system. Under the open scheme, the worst performing teams in top tiers are relegated to lower ones while the best clubs from lower ties are promoted to the upper divisions. These movements of clubs among tiers cause different impacts on professional football clubs and the literature has been scrutinizing them over the last decades.

Negative effects on attendance are somehow expected after relegation. The relegation to a lower tier implies many undesirable features. Beyond a likely disgraceful feeling for many supporters, clubs will naturally face a large decline on its revenues, most of best players tend to leave the squads and some unattractive matches shall happen in the following season, due to the lower level of playing. The combination of such elements, among others, unsurprisingly may reduce the supporters' willingness to attend matches.

The current research aims to inspect the effects of promotion and relegation on attendances through a different perspective. Previous research focused on league match' attendances, but what happen to attendance rates on other simultaneous tournaments remains unclear and this study sheds light on it.

2. Theoretical Background and Literature Review

The Solberg and Haugen (2010) claim that the organization of European football creates a cost push effect once clubs constantly increase expenses in order to achieve promotion, avoid relegation and classify to international competitions. As consequences, such mechanism makes clubs to spend more than they can afford. Many papers corroborate with these assumptions, showing that clubs are regularly facing insolvency risks in England (Beech, Horsman & Magraw, 2010), France (Scelles, Szymanski & Dermit-Richard, 2018), Germany (Szymanski & Weimar, 2019) and Spain (Barajas & Rodríguez, 2010), for example.

Noll (2002) earlier analysed the consequences of promotions and relegations in the English football. Among his main findings, it is highlighted that this structure leads a net positive effect on attendances, where the boost on attendances are higher after promotions than the reductions from relegations. However, Buraimo, Simmons and Szymanski (2006) pointed out a large fall on attendances after relegations on English football, similarly to what Cerqua (2014) has found on Italian football. These papers also emphasize the drops on revenues of clubs as consequence of relegation.

The former evidences highlight variations in attendances during league matches. However, no previous work inspected what happen on attendance during simultaneous competitions. For that, the Brazilian football presents an optimal setting to analyse this. Besides league (4 tiers) and national cup, there are state championships, where clubs from 1st, 2nd, 3rd, 4th and non-division clubs play among them for a professional regional title every season. Therefore, this work tries to understand the impacts of promotions and relegations at a national league-level on attendance at regional-level championships.

3. Research Design, Methodology and Data Analysis

Panel Data Ordinary Least Squares (OLS) models are employed to explain seasonal variations on average attendance (a) and average match day revenues (r) on each championship i and on each season t (models 1 and 2, respectively). The explanatory factors are dummy variables with value 1 for each specific condition: promotion from 2nd tier to 1st tier ($p1$); promotion from 3rd tier to 2nd tier ($p2$); promotion from 4th tier to 3rd tier ($p3$); relegation from 1st tier to 2nd tier ($d1$); relegation from 2nd tier to 3rd tier ($d2$); and relegation from 3rd tier to 4th tier ($d3$). The dummies assume value 0 when no promotion or relegation happened. Population, income per capita and number of clubs are used as control variables (CV). The dataset comprises twenty State Championships from 2013 to 2017. The models are presented below:

$$a_{it} = \beta_0 + \beta_1 p1_{it} + \beta_2 p2_{it-1} + \beta_3 p3_{it-1} + \beta_4 d1_{it-1} + \beta_5 d2_{it-1} + \beta_6 d3_{it-1} \quad (1)$$
$$+ \nu CV_{it} + \epsilon_i$$

$$r_{it} = \delta_0 + \delta_1 p1_{it-1} + \delta_2 p2_{it-1} + \delta_3 p3_{it-1} + \delta_4 d1_{it-1} + \delta_5 d2_{it-1} + \delta_6 d3_{it-1} \quad (2)$$
$$+ \tau CV_{it} + \varepsilon_i$$

4. Results/Findings and Discussion

The outputs of both models are presented in the Table 1. These results show evidence that the promotion of clubs from the 3rd to 2nd tier in the national league significantly drives larger average attendances as well as higher match day revenues on State Championships. On the other hand, relegations from the 1st to the 2nd and from the 2nd to the 3rd national-levels decrease both average attendance and match day revenues on Brazilian State Championships. The findings presented here corroborate with the net positive impact indicated by Noll (2002) for clubs promoted to 2nd tier and then relegated to 3rd tier. However, one may notice that a promotion to Brazil's top tier does not drive higher attendances and revenues on State Championships – indeed, a negative relationship is indicated and no statistical significance is observed. Although the econometric model does not allow inferences regarding the reasons of this result, a conceivable explanation would a potential adverse demand effect, where many fans do not attend *minor matches* since the club is now playing in the top domestic tier.

Table 1. Attendance and Revenue models.

Variables	Attendance (a)	Revenues (r)
Promotion to 1st ($p1$)	-269.8	-5.453
	(346.8)	(12,555)
Promotion to 2nd ($p2$)	843.5***	24,376**
	(271.0)	(9,810)
Promotion to 3rd ($p3$)	-112.8	-6,938
	(219.2)	(7,934)
Relegation to 2nd ($d1$)	-657.4**	-29,851**
	(315.9)	(11,437)
Relegation to 3rd ($d2$)	-679.3**	-23,518**
	(308.4)	(11,165)
Relegation to 4th ($d3$)	119.5	2,461
	(232.5)	(8,415)

Control Variables	Yes	Yes
Championship FE	Yes	Yes
Year FE	Yes	Yes
Constant	207,912	5.347e+06
	(212,491)	(7.692e+06)
Observations	80	80
R^2	0.925	0.942
Adjusted R^2	0.876	0.905

Standard   errors   in   parentheses
*** p<0.01, ** p<0.05, * p<0.1

5. Conclusion, Contribution and Implication

The current paper inspects the impacts of promotion and relegation in the Brazilian League for both attendance and revenue of clubs in simultaneous competitions (State Championships). The results provided evidence that, in general, promotions to higher tiers (2nd and 3rd) tend to increase attendance and revenues of clubs as well as relegation to lower divisions impact negatively them. However, the no effect of promotion to the top tiers, although initially surprisingly, would suggest a potential adverse demand effect. The main limitation of the present work is that it evaluates changes on seasonal average attendance and match day revenues. For this reason, individual characteristics of clubs are ignored and promotions and relegations are taken as independent facts, being alike for all clubs. Further research would expand this analysis from tournament- to club-level perspective, inspecting how relegations and promotions impact attendances on a match-by-match basis.

6. References

Barajas, A., & Rodríguez, P. (2010). Spanish Football Clubs Finances: Crisis and Player Salaries. International Journal of Sport Finance, 5 (1), 52-66.

Beech, J., Horsman, S., & Magraw, J. (2010). Insolvency events among English football clubs. International Journal of Sports Marketing and Sponsorship, 11 (3), 53-66.

Buraimo, B., Simmons, R., & Szymanski, S. (2006). English Football. Journal of Sports Economics, 7(1), 29–46.

Cerqua, A. (2014). If You Get Knocked Down, How Long Before You Get Up Again? International Journal of Sport Finance, 9 (4), 284-304.

Noll, R. G. (2002). The Economics of Promotion and Relegation in Sports Leagues: The Case of English Football. Journal of Sports Economics, 3 (2), 169-203.

Scelles, N., Szymanski, S., & Dermit-Richard, N. (2018). Insolvency in French soccer: The case of payment failure. Journal of Sports Economics, 19 (5), 603-624.

Solberg, H. A., & Haugen, K. K. (2010). European club football: why enormous revenues are not enough? Sport in Society, 13 (2), 329-343.

Szymanski, S., & Weimar, D. (2019). Insolvencies in Professional Football: A German Sonderweg? International Journal of Sport Finance, 14 (1), 54-68.

Necessary and Sufficient Factors for Stadium Attendance of the Minas Gerais State Championship between 2015 and 2018

Felipe Nunes – Universidade Federal de Minas Gerais, Belo Horizonte, Brazil fasfn@adm.mest.ufmg.br

Jonathan Freitas – Universidade Federal de Minas Gerais, Belo Horizonte, Brazil

1. Introduction

Recent studies in the Marketing area have sought to identify the motivations of fans to attend stadiums and support their favorite football teams (Fagundes et al., 2013; Gasparetto et al., 2018). Some papers and thesis describe the structure of Brazilian football consisting of four main divisions of the national championship organized by the Brazilian Football Confederation (CBF) and other state professional championships, 27 just like the number of states in the country and each organized by their respective football federation.

A recent study showed that there are more than 28 thousand professional soccer players registered in Brazil, with the vast majority (82.4%) receiving monthly salaries close to the national minimum wage (CBF, 2019). This great mass of athletes acts, mainly, in the state championships which, although they are not more prestigious as in the past, still work as showcases for foreign markets, just like the negotiation of striker Gabriel Martinelli who worked in a state championship and was negotiated directly with Arsenal[12].

Although they are fundamental to the working ecosystem of Brazilian football, a portion of the Brazilian sports press calls for a significant change in the format of these tournaments:

"I do not defend the end of the States, but their total reformulation"[13]

"The state championships as we know them ended today"[14]

An important metric to guide a change in the format of competitions is to understand what reasons are necessary to attract the public to the stadiums to follow a match of these levels. The purpose of this work was to analyze 291 matches of the first division of the championship of the state of Minas Gerais to point out necessary and sufficient factors for the presence of the public in the stadiums between 2015 and 2018.

2. Theoretical Background and Literature Review

The occupancy rate of Brazilian stadiums is lower than other competitions in the world, such as the MLS or the Bundesliga, which denotes the importance of knowing the configurations that mobilize the presence

---

[12] https://www.express.co.uk/sport/football/1107467/Arsenal-transfer-news-Gabriel-Martinelli-Unai-Emery-Yannick-Carrasco

[13] https://twitter.com/maurocezar/status/447879239300567040

[14] https://www.uol.com.br/esporte/futebol/ultimas-noticias/2020/07/02/os-campeonatos-estaduais-como-a-gente-conhece-acabaram-hoje-diz-pvc.htm

of the fans in following the matches (Azevedo et al., 2019). The complex behaviour of these industry spectators is due to the demands and objectives of the various factors involved.

The literature points factors as possible contributors to attendance in a match more than in others. This work used some of them as the average income of the city hosting the match, the importance of the match, the proportion of points earned by the teams, the squad value of the home team and visiting team and the rivalry between the teams (Azevedo et al., 2019). Likewise the classification of the visiting team and the home team in the championship, the average price of ticket and the reputation of the teams (Gasparetto et al., 2018).

3. Research Design, Methodology and Data Analysis

Provided by the Minas Gerais Football Federation we access the game registers of the Module I championships between 2015 and 2018 and organized the attendance rate, proportion of points in the championship and revenues. In sequence, we extract the squad values from the Transfermarkt's platform and the city's average income data through the government report of Instituto Brasileiro de Geografia e Estatística.

The approach used for analysis was the Coincidence Analysis with calibration for fuzzy-set which makes possible understand the notion of equifinality, that is, the various combinations and causal paths for a given event (Baumgartner, 2009). The set of crossover point was the median of attendance distribution data, the squad values, proportion of points earned and average city income.

4. Results/Findings and Discussion

We found a solution with parameters of consistency and coverage within the ideal values. It can be transcribed as:

There is a public presence in the stadium if and only if, the match involves a visiting team with a good position in the league table AND a non low value of average ticket OR, alternatively, the visiting team with a good proportion of points in the championship AND a high value of the visiting team squad OR a good ranking of the home team AND a good reputation from the visiting team AND an absence of importance of the round for the championship.

5. Conclusion, Contribution and Implication

In two of the conjunctions of the solution that point the cause of the public's presence in the stadiums, are present the value of the visiting team and the reputation of the visiting team. This implies the importance of high-ranking teams in attracting an audience to the stadiums for these competitions, leading to a strategy of maintaining these teams in the competition in view of the possible proposal to withdraw them from these tournaments.

This study expands the findings of Gasparetto et al. (2018) on the Brazilian state championships and their importance in the football work ecosystem. In addition, brings notes to the possible reformulations proposed by the sports media and the importance of high-ranking teams in the dispute.

6. References

Azevedo, L., Marchioro, L., & Troyner, L. R. (2019, agosto 27). País do futebol? A porcentagem de ocupação nos estádios e a sua variabilidade no Campeonato Brasileiro 2018. Anais do V Encontro de Economia da UEPG. V Encontro de Economia da UEPG, Ponta Grossa.

Baumgartner, M. (2009). Inferring Causal Complexity. Sociological Methods & Research, 38(1), 71–101. https://doi.org/10.1177/0049124109339369

CBF. (2019). Impacto do Futebol Brasileiro (No 1; p. 73). Confederação Brasileira de Futebol.

Fagundes, A. F. A., Veiga, R. T., Sampaio, D. de O., Sousa, C. V. e, Santana, É. E. de P., & Lara, J. E. (2013). Um estudo sobre a satisfação do consumidor esportivo que frequenta estádios de futebol em Belo Horizonte. Revista Eletrônica de Ciência Administrativa (RECADM), 12(1), 121–135. https://doi.org/10.5329/RECADM.2013004

Gasparetto, T., Barajas, A., & Fernandez-Jardon, C. M. (2018). Brand teams and distribution of wealth in Brazilian State Championships. Sport, Business and Management: An International Journal, 8(1), 2–14. https://doi.org/10.1108/SBM-03-2017-0016

Minimally sufficient conditions of the public at the stadiums in the lowest levels of football in Brazil.

Felipe Nunes – Universidade Federal de Minas Gerais, Belo Horizonte, Brazil fasfn@adm.mest.ufmg.br

Jonathan Freitas – Universidade Federal de Minas Gerais, Belo Horizonte, Brazil

Keyword: football, Brazilian state championships, Brazilian football, consumer behavior, coincidence analysis

1. Introduction

The professional football ecosystem in Brazil encompasses four main divisions of the national league, two main interstate championships and another 27 state championships. The great mass of athletes works in the most basic structure of this system, which are state championships. Some of the Brazilian states have many registered clubs, which causes even lower divisions in this structure. At these levels, revenue sources vary from investors, sponsorship, public funds and box office. This work aims to understanding the combinations of factors that cause the public to go to the stadiums to follow the games of these championships.

2. Theoretical Background and Literature Review

Brazil has more than 850 professional football clubs and only 128 of these teams compete in one of the four divisions of the national championship. There are also state championships in all 27 units of the Brazilian federation, with a second division in 26 of those states. A few states still have a third division and others have a fourth and fifth division of the state championship (CBF, 2019).

The football clubs in the state of Minas Gerais, that are active, are divided into three levels: Module I, Module II and the so-called Second Division, which in practice is equivalent to the third category. Between 2015 and 2018, Module II was played in two different formats. In the years of 2015, 2016 and 2017 the teams played for 10 rounds and then the six best placed teams faced each other in two rounds in a hexagonal of 10 more rounds. In 2018, 11 rounds were played and the best four went on to a semi-final and final playoff with two matches in each of these stages.

Studies like (Serrano, 2018) and (Gasparetto et al., 2018) point to the importance of regional championships in the Brazilian football ecosystem. Although they are important, these tournaments face a decline in prestige with the public. The work of (Silveira & Melo, 2018) shows the difficulties faced by clubs in the lower divisions in generating income to guarantee the subsistence of these organizations. Among the origins of the resources are the sale of tickets, related products, public resources and local sponsorship. Therefore, for these championships, there is the challenge to attract the public to watch the games in the stadium.

3. Research Design, Methodology and Data Analysis

Provided by the Minas Gerais Football Federation we access the game registers of the Module II championships between 2015 and 2018 totalling 332 matches. We removed from the sample the matches that resulted in the defeat by WO of one of the teams and that, motivated by punishment, had been held with the gates closed.

Then, data on stadium attendance rates, proportion of points earned and game revenues were organized. Other data were researched on public access sources, such as the distance between the cities of the teams participating in the game, the average income of the city where the game was played, the year the teams were founded, if there was historical rivalry between the teams and if the game would be played in the host

city of the home team. This last data was necessary because, due to the structure of the stadiums, the Federation can determine the realization of the match in a different place that can hold the event.

The approach chosen to analyse the data was the Coincidence Analysis with the use of the fuzzy-set calibration. This configurational comparative approach allows the understanding of conditions minimally sufficient to cause an event (Baumgartner & Ambühl, 2018). Calibration used the medians for the distribution of stadium occupancy rates as a crossover point. We used this same logic for the calibration of the other factors.

4. Results/Findings and Discussion

The analysis did not find complex causal solutions within the ideal parameters of consistency and coverage proposed by (Baumgartner & Ambühl, 2018). This result does not preclude observing secondary analyses such as evaluating, for example, the existence of minimally sufficient conditions to cause a good attendance rate in stadiums.

These conditions are recognized in the Regularity Theories as conjunctions of factors that may explain the causality of the event, although they do not cover all the possible cases. We found four minimally sufficient conditions of maximum consistency. In three of these conditions, there is the presence of the classification factor of the home team (CLAM) AND absence of the factor that points game town is the same as that of the home team (cinat). These three conditions are in conjunction with a third factor [respectively a low average income of the game city (rmcid), a low average ticket (TM) and a high distance between the cities of the clubs participating in the game (dist)]. The fourth condition presents the presence of good proportion of points earned by the home team (APM) AND absence of the factor that points game town is the same as that of the home team (cinat) AND absence of importance of the round (roda). See Table 1.

Minimally Sufficient Conditions	Consistency	Coverage
CLAM*rmcid*cinat -> OCU	1	0.01559
CLAM*TM*cinat -> OCU	1	0.01400
CLAM*cinat*dist -> OCU	1	0.01066
roda*APM*cinat -> OCU	1	0.00983

Table 1 - Minimally Sufficient Conditions with maximum Consistency

The minimally sufficient conditions found with maximum consistency values show the importance of some factors. The absence of the hometown factor, that is, when the match takes place in another city than the host city of the home team, is present in all conjunctions presented. The combination of this element with factors related to the performance of the home team, both the classification of the team in the championship

211

and its proportion of points earned, may suggest a certain attraction of fans who – not necessarily – are loyal supporters of the teams, but only curious spectators. Other elements pointed out in the combinations, such as low average ticket, low average income of cities, absence of importance of the round and a great distance between the cities, in which the teams participating in the game are located, seem to compose this characteristic of opportunist spectator. In other words, these combinations seem to point to the presence of an audience attracted by the performance of the home team, who are doing games away from their host city and with some other element that contributes to their presence in the match.

To complement this analysis with minimally sufficient conditions, we reduced the values of the consistency parameter to 0.95. This action resulted in four other different conditions, which showed the importance of the rivalry (RIV) factor in the cause of a good stadium occupancy rate. Factors related to performance, such as the ranking of the home team in the championship and its proportion of points earned, make up the combinations again. This point to the importance of a competitive team in the presence of the public in the stadiums. Another factor that repeat under these conditions is that which points to an absence of high average incomes in the city. This element may suggest football as a leisure alternative in cities whose average income is low (See Table 2). These conditions serve as support in the study of the analysis to establish criteria for decision making in relation to the state championships in the future.

Minimally Sufficient Conditions	Consistency	Coverage
CLAM*cinat -> OCU	0.954	0.01575
CLAM*RIV*rmcid -> OCU	0.969	0.09968
RIV*rmcid*APM -> OCU	0.974	0.09252
TM*RIV*rmcid -> OCU	0.958	0.06351

Table 2 - Minimally Sufficient Conditions with a high level of Consistency

5. Conclusion, Contribution and Implication

The minimally sufficient conditions found denote the relationship between the performances of the home team in motivating the fans to accompany the club in the stadium. It was also possible to note the rivalry as a contributing factor to a good public presence. This study contributes to the work of (Gasparetto et al., 2018) who addresses the importance of state championships for Brazilian football. It also expands the findings of (Silveira & Melo, 2018) about the clubs that dispute the lowest echelons of professional football in Brazil. This work becomes relevant because it addresses a scenario that covers most professional clubs in this country and distant from the eyes of the great public fan of the sport.

As a suggestion for future investigations are the deepening of the relationship between the performance of the teams and the presence of the public in the football stadiums. It is also suggested to investigate the relevance of rivalry as a stimulating element for the public's presence. Finally, the detection of stadium occupation occurring in low-income cities points to the need for a more detailed understanding of this relationship.

6. References

Baumgartner, M., & Ambühl, M. (2018). Causal modeling with multi-value and fuzzy-set Coincidence Analysis. Political Science Research and Methods, X, 1–17. https://doi.org/10.1017/psrm.2018.45

CBF. (2019). Impacto do Futebol Brasileiro (No 1; p. 73). Confederação Brasileira de Futebol.

Gasparetto, T., Barajas, A., & Fernandez-Jardon, C. M. (2018). Brand teams and distribution of wealth in Brazilian State Championships. Sport, Business and Management: An International Journal, 8(1), 2–14. https://doi.org/10.1108/SBM-03-2017-0016

Serrano, R. (2018). Ecossistema produtivo do esporte: Modelagem e análise sistêmica a partir do futebol brasileiro [Tese de Doutorado]. Universidade do Vale do Rio dos Sinos.

Silveira, H. D. da, & Melo, E. de L. (2018). Captação de recursos nos clubes de terceira divisão do futebol cearense em 2017. Revista de Gestão e Negócios do Esporte, 3(1), 115–126.

Competitive Balance and Accounting Numbers: The case of Brazilian Championship

Monique Cristiane de Oliveira João Henrique Krauspenhar – Universidade Federal de Santa Catarina, Florianópolis, Brazil

Fábio Minatto João Henrique Krauspenhar – Universidade Federal de Santa Catarina, Florianópolis, Brazil

fabio_minatto@hotmail.com

João Henrique Krauspenhar – Universidade Federal de Santa Catarina, Florianópolis, Brazil

1. Introduction

Competitive Balance (CB) can be defined as the degree of control exerted by some teams due to the quality of their performance in a league (Ruiz & Avila-cano, 2019). The CB literature is well established, especially in Europe (Scelles et al., 2020). The focus has been to analyze the determinants of CB. Variables used in this context are country income inequality (Dobson & Goddard, 2004; Mourão & Teixeira, 2015; Scelles et al., 2020), the country economic power, the country climate, financial regulation (Scelles et al., 2020) and athletes transfers.

In the related literature, the use of economic, sportive and climate measures is well established, as aforementioned. We noted a caveat, however. The use of accounting variables published in the financial statements is rarely used. Revenues were already used (Peeters, 2011) but we could not find papers that used intangible assets and fixed assets, for example. If there is a relationship between economic variables related to the country, we think it is possible that the concentration of points earned by a club could be related with the concentration of revenue earned and the concentration of intangible and fixed assets. Therefore, in this study, we investigate the relationship between CB and the concentration of accounting variables in the league. We look at the Brazilian Championship first division over 2012-2018 period.

2. Theoretical Background and Literature Review

The positive relationship between income equality and CB is established and commonly used in the literature (Dobson & Goddard, 2004; Mourão & Teixeira, 2015; Scelles et al., 2020). Mourão and Teixeira (2015) tested the hypothesis that the degree of income inequality in the country influences the competitive balance between clubs. The results of their study indicated that the concentration of points and the mean distance separating the number of final points obtained by the teams were affected by the degree of income inequality in the country. (Scelles et al., 2020) argued that in countries with low-income inequality, there is a higher probability that the revenues would be more evenly balanced between clubs, making the league more competitive.

In the European scenario, the football leagues' balance is relevant because, as it is reduced, decreases are quickly perceived in their value, team revenues and the threat of uncontrolled debt accumulation (Mourão & Teixeira, 2015). The authors verified that specific teams' dominance in their respective leagues could lead to unequal income for the clubs because the better-ranked ones increase their revenues and others could not have the same increase. Dobson and Goddard (2004), analyzing the English Premier League, observed that competition becomes more unbalanced if there is a divergence between team's base levels of spectator demand or if the elasticity of revenue concerning win ratio increases.

The league's attractiveness can be measured by its demand, in terms of the television audience and its market size (Dobson & Goddard, 2004). Therefore, considering that CB is driven by demand, it is possible to expect that the concentration of revenue between clubs in a competition could affect its CB. We expect that clubs which concentrate more revenue will also concentrate more points.

H_1: The concentration of points is associated with the concentration of revenues between clubs.

If the club has more revenue than the competitors, it may have more resources to attract better players and improve its sports performance. The registration of a contract related to a player signing is made in the club's financial statement's intangible assets. If the club has a higher concentration of player talent, this will be expressed in the concentration of its intangible assets. Thus, it is expected that clubs that concentrate more intangible assets will concentrate more points.

H_2: The concentration of points is associated with the concentration of intangible assets between clubs.

A club's structure in terms of stadium, training center, and other tangible assets is disclosed of in a club's financial statement's fixed assets. We expect that clubs that concentrate more on the physical structure will concentrate more points.

H_3: The concentration of points is associated with the concentration of fixed assets between clubs.

The total assets usually measure the size of a club. As we already use some elements of a club's total assets in the previous hypotheses, we could use the total assets the minus intangible and fixed assets as a proxy of a club's size.

H_4: The concentration of points is associated with the concentration of residual assets between clubs.

3. Research Design, Methodology and Data Analysis

Our sample is composed of thirty-one clubs that participated in the Brazilian Championship first division in the 2012-2018 period. This competition has a double round-robin system and the four worst teams are relegated to the second division. The four best teams from second division are promoted. Therefore, we do not have a balanced panel data because every year we have four different teams that did not disputed the competition in the previous year. However, we do have twenty observations per year, resulting in 140 observations in total. We analyse clubs' financial and sports performance. To measure financial performance, we use accounting variables published in the financial statements such as revenue earned, intangible assets, fixed assets, and total assets. To measure the sports performance, we use the points earned in the competition.

We use Herfindahl-Hirschman Index to measure the concentration of each of these variables per team. This index is used frequently to measure the competitive balance of leagues (Mourão & Teixeira, 2015; Scelles et al., 2020). We use with a different approach in this study, whereas we are interested in the concentration that each team has in each competition over the years.

Since we have panel data, we compared pooled ordinary least squares regression with fixed effects and random effects models using Chow, Breusch-Pagan, and Hausman tests. The tests indicated to use the random effects model. Since we have heteroskedasticity problems, we estimate the regression with robust standard errors. We present our model in Formula 1.

$$HHI\_Points_{it} = \alpha + \beta1 HHI\_Revenue_{it} + \beta2 HHI\_Intangible\_Assets_{it} + \beta3 HHI\_Fixed\_Assets_{it} + \beta4 HHI\_Assets\_Residuals_{it} \ (1)$$

4. Results/Findings and Discussion

The results indicate, based on the random effects model, that the variation between clubs is higher than the variation within clubs over time. We expected that because the clubs tend to perform similar over time and with less variation than compared between clubs. Our hypothesis H1 was accepted, therefore we can conclude that clubs with greater concentration of revenues tend to concentrate more points. The intangible and fixed assets variables, based on hypothesis H2 and H3, were also significant. Therefore, we can also conclude that clubs with more expensive players and physical structure compared to the other clubs tend to concentrate more points. Based on the variables' coefficients we observe that the effect of revenues is higher compared to the other variables. Therefore, if the league could distribute the revenues this could have a positive effect in competitive balance, making the competition more attractive and possible elevating the demand for it (Dobson & Goddard, 2004).

Table 1 – Regression Results

Variables	Coefficients	
	Random Effects	**Pooled**
Constant	0.0020***	0,002***
HHI Revenue	0.0842***	0,0865***
HHI Intangible	0.0350**	0,3333**
HHI Fixed	0.0190**	0,0179
HHI Residual	0.0020*	0,0061
R² within 0.0571		R² 0.2928
R² between 0.6146		F statistics 9.62
R² overall 0.2928		F p-value 0
* p < 10%; ** p < 5%; *** p < 1%		

5. Conclusion, Contribution and Implication

We present shreds of evidence that accounting variables make an impact on the concentration of points in the Brazilian league's first division. Mourão and Teixeira (2015) pointed out that leagues with a relegate system tend to be less balanced because the best-ranked teams tend to earn more (e.g. classification to international competitions) and the worst-ranked will be relegated. Furthermore, related studies suggested that countries' income inequality is a factor in the competitive league balance (e.g. Dobson & Goddard, 2004; Mourão & Teixeira, 2015; Scelles et al., 2020). Based on that related studies and using accounting variables such as revenues, intangible and fixed assets, our results indicated that clubs that concentrate more revenues, intangible and fixed assets tend to concentrate more points. Hence, clubs with higher economic resources, expensive players and better structural conditions tend to accumulate more points than their rivals. Finally, we aim to contribute to the literature within an accounting perspective affecting the competitive balance.

6. References

Dobson, S., & Goddard, J. (2004). Revenue divergence and competitive balance in a divisional sports league. Scottish Journal of Political Economy, 51(3), 359–376. https://doi.org/10.1111/j.0036-9292.2004.00310.x

Mourão, P. R., & Teixeira, J. S. (2015). Gini playing soccer. Applied Economics, 47(49), 5229–5246. https://doi.org/10.1080/00036846.2015.1044650

Peeters, T. (2011). Broadcasting rights and competitive balance in European soccer. International Journal of Sport Finance, 6(1), 23–39.

Ruiz, F. T., & Avila-cano, A. (2019). The distance to competitive balance : a cardinal measure. Applied Economics, 51(7), 698–710. https://doi.org/10.1080/00036846.2018.1512743

Scelles, N., François, A., & Dermit-richard, N. (2020). Managing Sport and Leisure Determinants of competitive balance across countries : insights from European men ' s football first tiers , 2006 – 2018. Managing Sport and Leisure, 0(0), 1–18. https://doi.org/10.1080/23750472.2020.1784036

Who wants football back? Brazilian fans' survey during COVID pandemic

Thadeu Gasparetto – National Research University Higher School of Economics, Saint Petersburg, Russia

Ary José Rocco Júnior – University of São Paulo, São Paulo, Brazil aryrocco@usp.br

Erinaldo Chagas – University of São Paulo, São Paulo, Brazil

Luis M. Barros – NOG Sou Do Esporte, Brazil

Luiz Augusto Brum – Dentsu, Brazil

Marina Tranchitella – Sport Club Internacional, Porto Alegre, Brazil

Rômulo O. Macedo – Confederación Sudamericana de Fútbol, Brazil

1. Introduction

In the second week of March 2020, the World Health Organization (WHO) declared the new coronavirus (Covid-19) a global pandemic. This fact motivated the prohibition of diverse outdoors activities to avoid the crowding of people, one of the main causes of the spread of the virus. As a result, official football competitions have been suspended indefinitely in most of the countries. Brazil's domestic football market is one of those that has been affected by these measures. At that time, Brazilian football clubs were playing regional and continental tournaments and they suddenly stopped.

Since May 22nd, Brazil has been the second country with most confirmed cases of Covid-19, behind only the United States. Currently, Brazil is the third one in such *ranking*, being surpassed by India on September 9th. Although Brazil is one of the most-affected countries by this outbreak, a relevant part of its population is constantly declaring itself against many measures to control the spread of the virus (e.g., use of masks, lockdown, social distancing). At the same time, most of them are also claiming the return of professional football, arguing about the *need of entertainment* during lockdown, that professional players will *unlikely suffer* with this disease or economic activities *should not stop*.

The aim of the current research is to investigate whether, in the face of the pandemic, fans were willing to return to football stadiums as well as uncover the characteristics of those individuals that are more likely to support the return of professional football.

2. Theoretical Background and Literature Review

Football can be consumed in several ways. According to Smith and Stewart (2014), there are at least four different ways of consuming sport: as consumers of sporting goods, as consumers of sporting services, as participants and volunteers and, finally, as spectators and fans. Football consumers, like any other consumer, have motivations related to desires and needs to be fulfilled. According to Engel, Blackwell and Miniard (1995), the need is a central variable of motivation. It can be divided into two basic categories: utilitarian needs, defined as functional and practical benefits, and hedonistic needs, defined as subjective benefits and emotional.

Several studies addressed the motivation in the consumption of sport from the perspective of fans and spectators (Sloan, 1989; Wann, 1995; Funk, Mahony, Nakazawa & Hirakawa, 2001; Mahony, Nakazawa, Funk, James & Gladden, 2002). The characteristics of the society where a supporter is involved are clearly relevant aspects. One of the features of the postmodern society culture, which Debord (2000) defines as

Spectacle Society, is being a consumer culture society. This society, which characterizes the moment in which we live, reduces the individual to the condition of consumer as a result of the automation of the production system. With the Covid-19 pandemic, all of the elements mentioned above should have some impact. This exactly impact, in the Brazilian context, that we intend to investigate. More specifically, the main interest of this research lies in knowing which fans want the return of football and, also, whether they feel safe to return to stadiums.

3. Research Design, Methodology and Data Analysis

The current work has an exploratory research design. This study aims to uncover the characteristics of individuals who support the return of professional football matches during the Covid-19 pandemic. Primary data has been gathered through online surveys using Google Forms. The survey comprises questions regarding personal characteristics, socio-economic factors, and consumer behaviour. The sample has 2827 observations. It initially had 3022 observations but some of them were excluded due to wrong and/or missing information. The survey has been answered between May 5th and May 8th – a period when Brazil had on average 9.5 thousand new cases of Covid-19 per day.

The econometric approach consists in a logistic regression to model a binary dependent variable – 1 if a person supports the return of the football; 0 otherwise. The explanatory variables address these elements: gender, age, level of education, monthly income, whether is a socio or not, how often attend a football match, how safe you feel to attend a football match in 2020, how willing you are to comply with security protocols while attending football matches, and how willing you are to follow WHO recommendations. All explanatory variables are categorical.

4. Results/Findings and Discussion

A descriptive analysis indicates that 35.63% of the sample supports the return of football matches during the COVID pandemic. The sample is mostly constituted by man (81.22%) and no large differences are observed regarding educational level and monthly income among respondents. 38.52% of man and 23.16% of woman were in favour of returning football matches in May. Figure 1 shows the output of the econometric model.

Figure 1. Logit Regression – COVID Survey in Brazil.

VARIABLES	COVID Survey 1-yes; 0-no
A: 1. Most of matches	-0.483**
	(0.213)
A: 2. Frequently	-0.409**
	(0.201)
A: 3. Only derby and decisive matches	0.150
	(0.235)
S: No.	-0.739**
	(0.326)

S: Yes, only after vaccine	-0.0935
	(0.325)
S: Yes, under new protocols	1.257***
	(0.321)
S: Yes, regardless any measure	3.063***
	(0.473)
W: 2	0.542
	(0.334)
W: 3	0.413
	(0.342)
W: 4	-0.726*
	(0.415)
W: 5	-0.678*
	(0.401)
WHO: Unconcerned	0.531*
	(0.319)
WHO: Little concerned	0.306
	(0.309)
WHO: Very much concerned	-0.607**
	(0.300)
Socio: Yes	-0.111
	(0.111)
Age: 18-25	-0.191
	(0.446)
Age: 26-35	0.142
	(0.445)
Age: 36-50	0.323
	(0.445)
Age: +50	0.387
	(0.458)
Gender: Male	0.581***
	(0.134)
I: From R\$1,000 to R\$3,000	0.0653
	(0.190)
I: From R\$3,001 to R\$6,000	0.191
	(0.204)

I: From R$6,001 to R$10,000	0.248
	(0.216)
I: More than R$10,001	0.453**
	(0.218)
E: High-School	-0.319
	(0.407)
E: Bachelor Degree	-0.810**
	(0.411)
E: Postgraduate	-0.844**
	(0.418)
Constant	-0.842
	(0.684)
Observations	2,825
Prob > Chi^2	0.000
Pseudo R^2	0.2638

*Notes: **A**=How often do you attend football matches?; **S**=Do you feel safe attending football matches in 2020?; **W**= How much willing you are to comply additional security protocols for attending football matches? **WHO**= How much are you concerned about the World Health Organization recommendations? **I**= Monthly income; **E**= Level of education.*

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The outcomes show some expected results: Those individuals who are more concerned about security measures and recommendations from health bodies tend to be against the return of professional football, while those who manifested less concern on these points are in favour of professional football matches returning. However, an interesting result is that those who often attend football games are statistically against the return of the matches. A potential explanation is that the football games would clearly return without fans on the stadiums and, since they are those who habitually attend the matches, they would rather prefer no football at all than football matches without their presence. Furthermore, the outcomes evidence that those individuals with higher formal education are statistically against the return of football matches than others, while those with highest monthly incomes have an opposite behaviour – they are statistically in favour of the return of football matches during the pandemic.

5. Conclusion, Contribution and Implication

This research concludes that socio-economic conditions statistically impacts the sports consumer behaviour, influencing the opinion of a person regarding the return of football under a global pandemic. Moreover, the results show evidence that the person's level of concern regarding safety statistically affects

his/her judgment. The main contribution of this work is to explore for the first time the people's perceptions regarding a potential return of professional football matches. Since group of fans tend to react differently under identical conditions (i.e., pandemic), football governing bodies and health bodies should work together for deciding when and how matches have to happen, not being affected by biased fans' desires. Further research may explore these elements in different settings and sports for providing a general global understanding on this matter and hence help decision-makers.

6. References

Debord. G. (2000). Society of the Spectacle. London: Black & Red.

Engel, J., Miniard, P. W., & Blackwell, R. (1995). Comportamento do consumidor. Rio de Janeiro: LTC–Livros Técnicos e Científicos Editora, 439.

Funk, D. C., Mahony, D. F., Nakazawa, M., & Hirakawa, S. (2001). Development of the Sport Interest Inventory (SII): implications for measuring unique consumer motives at team sporting Events. International Journal of Sports Marketing & Sponsorship, 3(3), 291-317.

Mahony, D. F., Nakazawa, M., Funk, D. C., James, J. D., & Gladden, J. M. (2002). Motivational factors influencing the behaviour of J. League spectators. Sport Management Review, 5(1), 1-24.

Sloan, L. R. (1989). The motives of sports fans. Sports, games, and play: Social and psychological viewpoints, 2, 175-240.

Smith, A. C., & Stewart, B. (2014). Introduction to sport marketing. Routledge.

Wann, D. L. (1995). Preliminary validation of the sport fan motivation scale. Journal of Sport and Social Issues, 19(4), 377-396.

Where put the money in Formula One: car or pilot?

Luis Carlos Sanchez – University of Oviedo, Oviedo, Spain luiscarlos@uniovi.es

Carlos Varela-Quintana – University of Oviedo, Oviedo, Spain

Keywords: Sports economics, Formula One, Laboral Economics

1. Introduction

The most basic investment decision is to choose the Capital and labour are the main inputs in all industries. The importance of the investment in capital has increased for the development of new technologies. This is not the case of sport industries where the role of labour is key as investment in players surpassing in capital as Sanchez et al. (2019) showed for football. The relevance of technology has increased in sport performance in recent years. This happens even in sports as swimming or marathons with aerodynamic swimsuits or helper sneakers. On the other hand, the importance of technology has been relevant in motorsports throughout history. However, not all competitions have taken the same strategic decisions. NASCAR and IndyCars decided to limit the capacity of innovation of the teams, prioritizing the role of the pilots.

Formula 1 is the main motor competition in the world. However, their importance has declined in recent times with a decreasing TV audience and fewer teams participating. Judde et al. (2013) and Schreyer and Torgler (2018) pointed that lack of competitive balance as a cause of this decline. Although Formula 1 has changed norms repeatedly with the objective of improving its competitive balance. For instance, changing mechanical characteristics or point system (Mastromarco and Runkel, 2009).

This paper has two objectives. Firstly, we would try to find out where manager should allocate their budgets between a better technology in cars or better drivers. Secondly, we will study the influence of pay inequality in the team performances.

2. Theoretical Background

The substitutability between capital and labour has been studied widely since the seminal work of Arrow et al. (1961). However, there is a lack about the topic in sport industry. This substitutability is very important in the economic decision of Formula 1 teams. Team owner need to decide between investing in better cars or better drivers where budget is better invested. Formula 1 is an individual and a team competition at a time. Bell et al. (2016) found that the importance of the car has increased over time, whilst the importance of the driver has slightly decreased

Managers also must decide how much pay to each pilot. Pay inequality have been studied showing a mixed influence depending the competition (Frick et al. 2003; Berri and Jewell, 2004; Simmons and Berri, 2011; Breunig et al. 2014).

In the case of Formula 1, drivers of the same collaborate rarely. So that an inequality should not affect in the same way that other sports as football or basketball. On the other hand, a limited importance of drivers would make useless to pay very differently to both drivers.

3. Research Design

The study analysis the Formula 1 seasons from 2009 to 2018 considering separately budgets spent in drivers salaries and the rest of the cost related to the car (fabrication, mechanics, engineers, pieces, design,…). Although norms have changed several times in the period under study, sport performance is measured thought the current point system letting to compare homogeneously our sample. Given that the punctuation is a censured variable, we use tobit regression with panel data.

In a first model, we will study the influence of car budget (CAR) and driver salaries (DRI) in pilots' sport performance.

$$SP_{it} = \beta_0 + \beta1\ CAR_{it} + \beta_2\ DRI_{it} + \varepsilon_{it}$$

In a second model, we will study the influence of inequality in team performance introducing a third variable as the difference of salary between the two pilots of the team (DIF).

$$SP_{it} = \beta_0 + \beta1\ CAR_{it} + \beta_2\ DRI_{it} + \beta_3\ DIF_{it} + \varepsilon_{it}$$

4. Results

Table 1 shows the results of both models. The investment in car budget provides to the teams 2,8 times more points than if they spend it in the wage of the pilot.

VARIABLES	(1) Ln Points	(2) Ln Points
Ln Car Budget	0.968***	0.960***
	(0.134)	(0.172)
Ln Pilot Wage	0.344***	0.241***
	(0.0296)	(0.0339)
Ln Pilot Wage difference		0.173***
		(0.0435)
Year dummies	Yes	Yes
Team dummies	Yes	Yes
Constant	-5.280***	-5.028***
	(0.694)	(0.818)
Chi2	511.04***	457.98***
Observations	4,469	3,514
Number of cod_chassis	21	21

224

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

5. Conclusion

Although pilots go to the podium to celebrate the victories, the money spent in the cars is much more important in the success of the team than the retribution of the pilots. In this way, teams should focus on achieving the best cars instead to compete for the most expensive pilots. Unlike other sports as football, the players' talent is not key to win the competition. This could affect competitive balance of the Formula One and the interest of fans. Organizers should consider introducing changes to reduce the importance of the car in the competition.

6. References

Arrow, K., Chenery, H., Minhas, B. & Solow, R. (1961). Capital-labor substitution and economics efficiency. The Review of Economics and Statistics, 43(43), 225-250.

Bell, A., Smith, J., Sabel, C. E., & Jones, K. (2016). Formula for success: multilevel modelling of Formula One driver and constructor performance, 1950–2014. Journal of Quantitative Analysis in Sports, 12(2), 99-112.

Berri, D. J., & Jewell, R. T. (2004). Wage inequality and firm performance: Professional basketball's natural experiment. Atlantic Economic Journal, 32(2), 130-139.

Breunig, R., Garrett-Rumba, B., Jardin, M., & Rocaboy, Y. (2014). Wage dispersion and team performance: a theoretical model and evidence from baseball. Applied Economics, 46(3), 271-281.

Frick, B., Prinz, J., & Winkelmann, K. (2003). Pay inequalities and team performance. International Journal of Manpower, 24 (4), 472-488.

Judde, C., Booth, R., & Brooks, R. (2013). Second place is first of the losers: An analysis of competitive balance in Formula One. Journal of Sports Economics, 14(4), 411-439.

Simmons, R., & Berri, D. J. (2011). Mixing the princes and the paupers: Pay and performance in the National Basketball Association. Labour Economics, 18(3), 381-388.

The Effect of Intangible Characteristic of a Player Performance on Player Valuation in Traditional Sports (on case of English Premier League)

Roman Poyan – National Research University Higher School of Economics, Saint Petersburg, Russian Federation rpoyane@hse.ru

1. Introduction

This paper is devoted to studying the player's money-wise value in traditional sports on the case of the English Premier League (EPL). The main aim of the paper is to measure the effect of the various intangible characteristics of a player on the that player's wage, using the audience's discussion of that player. The main idea is that those intangible characteristics of player performance (like leadership, mentorship, development etc.) can be obtained through the audience perception of a player. Along with the discussion of the player's performance, the audience will discuss his leadership qualities if a player shows himself as a leader on the field. Considering the fact, that there are no exact set of intangible characteristics of professional athletes being defined analytically yet, those intangibles would be defined through the study and coding of how people discuss players in general.

2. Theoretical Background and Literature Review

There is a broad discussion in academia on the topic of how professional players in traditional sports should be evaluated in terms of wage.

Most of the studies are considering inequality of wage distribution between different leagues or inside the team. Simmons found out that players in National Football League tend to be underpaid, and they tolerate it as long as salaries are rising generally (with the growth of revenue through broadcast rights sales). On the other hand, in European Football contracts rely more on performance-related bonuses and different clauses. In most cases, underpaid athletes are those young players who break into the first squad from age-restricted squads and who's contracts aren't immediately renegotiated [Simmons, 2007]. In the research of Bryson et al. authors found inequality of how wages distributed in Serie A: the nationality of a player has a highly positive effect on a player's wage - non-Italian players tend to have higher wages [Bryson et al., 2014].

In some cases, those studies are considering transfer markets affecting players' wages. Ribeiro et al. found that transfer event with vertical growth (player is moved to the club from a higher league) is positively affecting a player's chances to get a higher salary. Horizontal movement of a player, between clubs in the same league is positively affecting players' wages only in the highest league of a country. Any other inside country movement is negatively affecting players' salaries [Ribeiro et al., 2019]. Also, there are studies, that consider players' personal characteristics (like anthropometry, age e.t.c), player performance, and player's popularity as factors on which player's value is based. The research of Müller et al. is aimed to model a player's transfer market value based on those characteristics. The authors created a model that predicts the player's transfer value better than crowd judgments on players' value on Transfermarkt.de. The resulting model tends to be more accurate for low- to medium-priced players, while the crowd tends to be more accurate for high-priced players [Müller et al., 2017]. Stanojevic et al. also consider team performance metrics as predictors for a player transfer value. Authors use almost the same approach as in the research of Müller et al., and their model also tends to predict players' transfer value slightly better than crowd judgments on Transfermarkt.de [Stanojevic et al. 2016]. In most cases, any combination from the set of those metrics (player's personal characteristics, player performance, team performance, player's popularity) is used in different studies, while only the complexity of used analysis techniques is growing. For example,

Yiğit et al. authors use more complex methods such as models' ensembles to increase predictive accuracy [Yiğit et al. 2019]. While this is a valuable technique to boost the quality of player valuation, there are some valuable characteristics are missed, such as player's effect on the locker room, leadership, mentorship, players progress, attitude during the game etc., which can affect player's salary drastically. Also, most of those studies consider transfer market value, not actual wages, due to the actual wages' values being confidential.

Therefore, the main research questions of this study are the following:

How to operationalize the intangible characteristics of a player, which can affect this player's wage?

What is the effect of those intangible characteristics of a player on the actual wage?

3. Research Design, Methodology and Data Analysis

To understand how intangibles can be operationalized first step was to analyze the discussions about EPL players. To do so I have used the topic modeling method: Latent Dirichlet Allocation (LDA) algorithm with Gibbs sampling. LDA is one of the most convenient methods for processing large sets of texts to conduct quantitative textual analysis [DiMaggio et al., 2013]. The Gibbs sampling, in contrast to the classical VME sampling, allows us to significantly speed up the model building process [Phan et al., 2008], which, in turn, allows constructing a model several times with a different specified number of topics. Repeated model building, in turn, contributes to validation and improved modeling results [Blei et al., 2003].

LDA works with a bag of words logic - the only factor which affects the topic definition is the co-occurrence of certain words in it. The most common words in one text are collected into one topic. The output of LDA topic model is two things: first, is the list of words associated with each topic with a certain probability of words occurring in that particular topic (per-word-per-topic probability), second, is the assignment of each topic to a document with a certain probability of a topic manifesting in a document. LDA topic model is a mixed membership model: each word can occur in several topics with a high probability, and each document can be a mixture of different topics. It allows to better understand the contextual part of the text.

After the analysis of a topic model and operationalizing the set of intangible characteristics the index of intangible characteristics would be calculated for each player, as % of documents with certain topics describing each intangible characteristic out of the total number of documents for that player. Later, the following linear regression model would be built:

$$Average\ Annual\ Wage = \beta 0 + \beta 1 * Index\ of\ Characteristic + \beta 2 * Personal\ Characteristics + \varepsilon$$

The data consist of 331 athletes who were listed in clubs' squads in the 2019/2020 season of the English Premier League. The data on the salaries of those athletes was obtained from spotrac.com [Spotrac.com]. Following variables would later be used as control variables in regression analysis:

Player's height

Player's weight

Years of experience – the number of years since 16 till the age when the current contract was signed

The descriptive statistics of variables of interest are presented in Table 1.

	Average Annual Wage, GBP	Height, m	Weight, kg	Years of Experience
Min	5200	1.63	59	0

1st Quartile	1300000	1.78	70	6
Median	2340000	1.83	76	9
Mean	3115972	1.823	75.71	8.792
3rd Quartile	4160000	1.88	81	11

Table 3. Descriptive statistics of the data

Audiences' discussions of the players from the sample were downloaded from reddit.com. Reddit is an online forum that consists of different communities with more than 300 million unique users. The downloaded with the following logic: for each player from the sample comments in the 2-year period before the current contract signed was downloaded.

4. Results/Findings, Discussion

After the analysis of the resulting topic model the following results are expected:

Tagging of resulting topics would allow to identify set of intangible characteristics

Also, for each player and topic the sentiment analysis could be done, to understand in what context each characteristic-player combination is used (e.g. if a player's attitude is good or bad etc.), which would better suit the resulting player valuation model

The results above would be helpful in further work dedicated to the topic of the player valuation if the sample of discussion would be expanded and other more complex and precise machine learning models would be used.

The following results of regression analysis are expected:

Experience level should positively affect player wage

At least some of the intangible characteristics should have a statistically significant effect on wage

5. Conclusion, Contribution and Implication

In this paper, the proposal of a study on how to operationalize a set of intangible characteristics of a player performance was presented. The main idea is to find the set of those intangible characteristics through the analysis and coding of discussions of players. Later, those characteristics would be used in modeling players' value. This data-driven (in opposite to analytically defined) approach is the new way to look at player valuation, and it wasn't considered in previous researches. Later, the resulting distribution of intangibles for each player would be used with the more complete model, which would also include player and team performance metrics, and player's popularity.

Not to mention, there are some limitations to this study. The list of players, whose salaries are available is rather small, which would implicit smaller documents (crowds discussions) sample. Therefore, some intangible characteristics might be missing, if they are not associated with those players from the data sample.

6. References

Blei, D. M., Ng, A. Y., & Jordan, M. I. (2003). Latent dirichlet allocation. Journal of machine Learning research, 3(Jan), 993-1022

Bryson, A., Rossi, G., & Simmons, R. (2014). The migrant wage premium in professional football: a superstar effect?. Kyklos, 67(1), 12-28.

DiMaggio, P., Nag, M., & Blei, D. (2013). Exploiting affinities between topic modeling and the sociological perspective on culture: Application to newspaper coverage of US government arts funding. Poetics, 41(6), 570-606.

Müller, O., Simons, A., & Weinmann, M. (2017). Beyond crowd judgments: Data-driven estimation of market value in association football. European Journal of Operational Research, 263(2), 611-624.

Phan, X. H., Nguyen, L. M., & Horiguchi, S. (2008, April). Learning to classify short and sparse text & web with hidden topics from large-scale data collections. In Proceedings of the 17th international conference on World Wide Web (pp. 91-100). ACM.

Ribeiro, A. S., & Lima, F. (2019). Football players' career and wage profiles. Applied Economics, 51(1), 76-87.

Simmons, R. (2007). Overpaid athletes? Comparing american and european football. WorkingUSA, 10(4), 457-471.

Spotrac.com. URL: https://www.spotrac.com/epl/contracts/sort-value/limit-2000/

Stanojevic, R., & Gyarmati, L. (2016, December). Towards data-driven football player assessment. In 2016 IEEE 16th International Conference on Data Mining Workshops (ICDMW) (pp. 167-172). IEEE.

Yiğit, A. T., Samak, B., & Kaya, T. (2019, July). Football Player Value Assessment Using Machine Learning Techniques. In International Conference on Intelligent and Fuzzy Systems (pp. 289-297). Springer, Cham.

Job Change and Productivity: The Effect of High Performance Expectations

Petr Parshakov – National Research University Higher School of Economics, Perm, Russia

Elena Shakina – National Research University Higher School of Economics, Saint Petersburg, Russia

Dennis Coates – University of Maryland, Baltimore, United States

Sofiia Paklina – National Research University Higher School of Economics, Saint Petersburg, Russia

1. Introduction

When changing their jobs, some people experience high-performance expectations and may feel psychological pressure. This phenomenon is widely studied in the literature (…). However, any empirical examination of this kind of market pressure is impeded due to the latent nature of the phenomenon.

2. Theoretical Background and Literature Review

The major problem of all of the empirical tests, especially on traditional business cases, is the lack of individual longitudinal data on performance. Meanwhile, professional sports and football, in particular, delivers an explicit measure of performance expectations expressed by transfer fees. Expensive transfers of star players, like the €105 million transfer of Paul Pogba from Juventus to Manchester United, cause debates in media on whether the player is worth its price. Such discussion in media, between fans or even teammates, puts external pressure on the player being under the transfer process.

3. Results/Findings and Discussion

On the one hand, employees who face high-performance expectations might exert more effort into completing a task, and, therefore, demonstrate better performance. On the other hand, a well-known psychological pressure may negatively correct individual performance. In our study, we use football labor market data to test whether a phycological pressure due to high expectations affects players' performance in case of transfers between clubs. Our main finding is that the effect of high-performance expectations is generally negative. Still, the magnitude of this effect is heterogeneous, depending on the personal characteristics of a particular player.

4. References

Available upon request

Does beauty affect salary? An empirical analysis of Major League Soccer data

Petr Parshakov – National Research University Higher School of Economics, Perm, Russia
parshakov.petr@gmail.com

Thadeu Gasparetto – National Research University Higher School of Economics, Saint Petersburg, Russia

Nadezhda Votintseva – National Research University Higher School of Economics, Perm, Russia

Elena Shakina – National Research University Higher School of Economics, Saint Petersburg, Russia

Keywords: football, beauty premium, salary, attractiveness, facial symmetry

1. Introduction

Previous research indicates a discriminatory practice in the labour market based on physical attractiveness. Professional sports are highly competitive settings where one would expect that wages are essentially driven by performance rather than physical characteristics of the players. However, there is a limited literature regarding this topic on sports and only a single evidence which points out that beauty does influence players' salaries. Therefore, the present paper aims to shed light on this matter and re-examine whether players' salaries are influenced by their physical characteristics. Accordingly, two research questions are developed: 'Do professional football players enjoy a premium beauty in their salaries?' and 'Is the effect similar among all players?'.

2. Theoretical Background and Literature Review

Hamermesh and Biddle (1994) earlier identify that better-looking attorneys earn higher salaries than those with below-average beauty. Harper (2000) offers similar evidence, showing that physical appearances significantly impact salaries and working patterns among British people, as well as Hamermesh, Meng and Zhang (2002) also observe that beauty enhance women's earning in China. The discussion regarding the impact of beauty on workers' earnings is relevant since Hamermesh and Biddle (1994) underline that it is economically comparable to gender and race discrimination in the US labour market.

Mobius and Rosenblat (2006) inspect this question by an alternative approach, conducting an experiment with students as 'employers' and 'employees'. Their results corroborate with previous findings, indicating that physically attractive workers are systematically considered more able workers and earn higher salaries. Moreover, they also indicate that physically attractive workers have higher levels of confidence, a feature which implies higher earnings as well.

Previous works analysing the impact of beauty on professional sports are focused on the relationship between physical attractiveness and demand. Trail and James (2001) show that physically attractive players motivate season ticket holders to attend Major League Baseball (MLB) matches, while Dietl, Özdemir and Rendall (2019) evidence that the facial attractiveness of women tennis players significantly boost TV-viewership.

To the best of our knowledge, Berri, Simmons, Van Gilder & O'Neill (2011) is the single evidence that attractiveness leads greater earnings on professional sports. They use facial symmetry as a metric of attractiveness and show that National Football League (NFL) quarterbacks who are more facial attractive earn higher salaries, even controlling by performance. Nevertheless, a single manifest is not enough to

finish this discussion and the current paper seeks to examine whether a premium beauty exists within a different sport discipline: professional football (soccer).

3. Research Design, Methodology and Data Analysis

We use data of Major League Soccer (MLS) in this research. MLS is a growing league and an excellent platform to test labour economics theories since microdata on both salary and performance is available. We have collected data for players' salaries, their performance and their profile photos on the mlssoccer.com website. We use Microsoft Face API to get the coordinates of the face elements and then evaluate the facial symmetry, which is the proxy of beauty.

The dependent variable in our econometric model is the salary of the players. Once the distribution of salaries is skewed, we use logs in the regression analysis. The set of explanatory variables includes: face symmetry, goals, assists, age and age2 and a dummy for designated players. A dummy variable for the continent where the player was born is used for controlling any effect from race that might impact the results. Clubs' and season' fixed effects are also included. To have a reliable performance indicator, we concentrate only on forwards. We use goals and assists per 90 minutes as a performance indicator. Our sample includes 373 observations for the period 2007-2018.

4. Results/Findings and Discussion

The results indicate that both assists and goals positively affects salary, which is somehow expected. However, interestingly, the premium for assists is even higher than for goals. Age and age squared are jointly significant in all models. A paradoxical result is observed regarding facial symmetry. Unlike previous research, a negative beauty premium is found on professional football. It means that MLS players with more asymmetric faces earn significant higher salaries than their counterparts. A robustness check changing the proxy of beauty is also carried out and similar results are observed. All variables have same direction and significance with only small changes in their magnitudes.

Our finding contradicts previous evidence from Berri et al. (2011) on NFL. Indeed, we offer here the first sign of a negative premium beauty on professional sports. Such result would suggest that each sport setting has its own behaviour regarding facial attractiveness and players' compensations. Therefore, further research inspecting this relationship on other sports disciplines are encourage. At the same time, most of previous work focused on the positive impact of beauty on salaries. However, our finding might suggest that asymmetric faces might be awarded on other jobs. This point can be examined further.

5. Conclusion, Contribution and Implication

The present paper concludes that beauty does not always matter. Indeed, out results indicate the existence of a negative beauty premium on professional football contradicting previous research. One would speculate that such behaviour might occur in different settings and further research is needed to elucidate it.

6. References

Berri, D. J., Simmons, R., Van Gilder, J., & O'Neill, L. (2011). What does it mean to find the face of the franchise? Physical attractiveness and the evaluation of athletic performance. *Economics Letters*, 111 (3), 200-202.

Dietl, H., Özdemir, A., & Rendall, A. (2019). The role of facial attractiveness in tennis TV-viewership. Sport Management Review. Forthcoming. https://doi.org/10.1016/j.smr.2019.04.004.

Hamermesh, D., & Biddle, J. (1994). Beauty and the Labor Market. *The American Economic Review*, 84 (5), 1174-1194.

Hamermesh, D., Meng, X., & Zhang, J. (2002). Dress for success--does primping pay? *Labour Economics*, 9 (3), 361-373.

Harper, B. (2000). Beauty, Stature and the Labour Market: A British Cohort Study. *Oxford Bulletin of Economics and Statistics*, 62, 771-800.

Mobius, M. M., & Rosenblat, T. S. 2006. Why Beauty Matters. *American Economic Review*, 96 (1): 222-235.

Trail, G. T., & James, J. D. (2001). The Motivation Scale for Sport Consumption: Assessment of the scale's psychometric properties. *Journal of Sport Behavior*, 24 (1), 108–127.

Do stereotypes bias judgement? Evaluation of elite football women's and men's performance

Cornel Nesseler – Norwegian University of Science and Technology, Trondheim, Norway
cornel.m.nesseler@ntnu.no

Helmut Diet – University of Zurich, Zurich, Switzerland

Carlos Gomez – University of Zurich, Zurich, Switzerland

Denis Becker – Norwegian University of Science and Technology, Trondheim, Norway

Keywords: Performance, Product quality, Gender differences, Evaluation differences

1. Introduction

The quality of a product is important for consumers. All else equal, consumers will prefer the product with the highest quality. However, the evaluation of the quality of a product is not always straightforward and behavior may hide biases. Research shows that gender stereotypes can negatively affect judgments and evaluations. Producers amplify that process as they produce what the consumers demand.

Professional sport attracts the attention of mass media. The overwhelming majority of the attention is directed towards men sports. Performance is generally described to be responsible for demand differences. In this paper, we theorize that by the time consumers observe gender attributes, the evaluation of performance and consumption preferences already reflect a gender bias. We use the performance of high-skilled women and men football players to test this bias.

2. Theoretical Background and Literature Review

Biological differences between men and women are, to some extent, responsible for performance differences. Research shows differences for children and grown-ups in sports (Nelson et al., 1986; Caprancia et al. 2013, respectively) as well as in the business environment (e.g., Tsui and Gutek, 1984; Ichino and Moretti, 2009). The crucial point for consumers, however, is if they can detect performance differences. General demand theory says that if one product is superior, consumers prefer this product. Thus, when producing a good, performance differences have severe implications regarding the demand of the product.

Accordingly, a standard explanation regarding the underrepresentation of female sports in television, newspaper, or internet is that the quality of female sport is too low for consumers. This explanation implicitly assumes that consumers are able to detect performance differences. Research has, however, neglected to prove this link.

3. Research Design, Methodology and Data Analysis

By manipulating a set of videos containing plays from international women´s and men´s competitions, we hide the information that is subject to bias the evaluation and the preferences of consumers. Each video shows the last 10-15 seconds before a goal is scored. Every goal is showed twice. We use only videos that show a goal that was ranked a top ten goal for the last European club and the last worldwide national championship. We show participants three different sets of videos. The first set contains blanked videos where the gender of the players and the supporters are not visible. The second set contains blanked videos where the gender of the players are not visible but the supporters are visible. The third set contains the original videos.

We ask participants to evaluate the quality of the plays and state their willingness to consume the product. Participants never see more than one set. A set contains eight videos. We randomize the position of each goal. This ensures that the position is not responsible for the participants evaluation.

4. Results/Findings and Discussion

Because of the Corona virus we had to postpone several parts of the data gathering. Therefore, the current results are very preliminary (n=30) and are not sufficient for an interpretation. These results show that viewers cannot detect a difference between female and male football when the videos are blurred.

5. References

Capranica, L., Piacentini, M. F., Halson, S., Myburgh, K. H., Ogasawara, E., & Millard-Stafford, M. (2013). The gender gap in sport performance: Equity influences equality. International Journal of Sports Physiology and Performance, 8(1), 99-103.

Ichino, A., & Moretti, E. (2009). Biological gender differences, absenteeism, and the earnings gap. American Economic Journal: Applied Economics, 1(1), 183-218.

Nelson, J. K., Thomas, J. R., Nelson, K. R., & Abraham, P. C. (1986). Gender differences in children's throwing performance: Biology and environment. Research Quarterly for Exercise and Sport, 57(4), 280-287.

Tsui, A. S., & Gutek, B. A. (1984). A role set analysis of gender differences in performance, affective relationships, and career success of industrial middle managers. Academy of Management Journal, 27(3), 619-635.

Track: Advances in Business Analytics

Chairperson: Kristof Coussement

Given the recent advances in technology, many companies do collect large sets of various types of data sources. The main challenge nowadays is how to convert that data into information, and how to create knowledge from that data to further advance business. Therefore, business analytics has become an important asset for organizations to build up a competitive advantage. The field of data science has naturally attracted interest from both researchers and business managers. This session is devoted to the studies of business analytics.

Extending Business Failure Prediction Models with Textual Website Content Using Deep Learning

Philippe Borchert – IESEG School of Management, Rue de la Digue 3, 59000 Lille, France; LEM-CNRS 9221, Rue de la Digue 3, 59000 Lille, France; KU Leuven, Naamsestraat 69, 3000 Leuven, Belgium
philipp.borchert@ieseg.fr

Kristof Coussement – IESEG School of Management, Rue de la Digue 3, 59000 Lille, France; LEM-CNRS 9221, Rue de la Digue 3, 59000 Lille, France

Jochen De Weerdt – KU Leuven, Naamsestraat 69, 3000 Leuven, Belgium

Arno De Caigny – IESEG School of Management, Rue de la Digue 3, 59000 Lille, France; LEM-CNRS 9221, Rue de la Digue 3, 59000 Lille, France

Keywords: Business Failure Prediction, Text Analytics, NLP, Deep Learning, Machine Learning

1. Introduction

Business failure prediction (BFP) is an important instrument in assessing the risk of corporate failure. While a large body of research has focused on BFP, recent research in operations research and analytics acknowledges the beneficial effect of incorporating textual data for predictive modelling. However, extant BFP research that incorporates textual company information is very scarce. Based on a dataset containing 13,571 European companies provided by the largest European data aggregator, this study investigates the added value of extending traditional BFP models with textual website content. We further benchmark various feature extraction techniques in natural language processing (i.e. the vector-space approach, neural networks-based approaches and transformers) and assess the best way of representing and integrating textual website features for BFP modelling.

2. Theoretical Background and Literature Review

Previous BFP research focused on incorporating textual content based on annual disclosures to the respective authorities (Ahmadi et al., 2018; Cecchini et al., 2010; Mai et al., 2019). The business reports are often published alongside the accounting ratios and therefore largely overlap in content (Ahmadi et al., 2018). We contribute to the existing literature in the following ways: First, we explore added value of the company's website content as a new source of unstructured data in BFP. As a public data source, websites are available regardless of company size and whether a company is publicly listed. Second, we introduce transformer models to the BFP context. Transformer-based models like BERT utilize context dependent word representations and rank high in recent performance benchmarks.

3. Research Design, Methodology and Data Analysis

In order to incorporate the unstructured textual data with the structured financial rations, payment timeliness indicators and firmographics, the following NLP techniques are used to extract features from the company website data: Vector-space approach (TF-IDF), (deep) Neural Networks (Doc2Vec, CNN), transformer-based approach (fine-tuned BERT). For all NLP techniques, we benchmark performance based on two base classifiers, namely logistic regression (LR) and multi-layer perceptron (MLP).

4. Results/Findings and Discussion

Our findings show, that all models including textual features extracted from the company website perform better predicting BFP than the model considering structured inputs only. For the Doc2Vec, CNN and BERT model the performance differences are significant (p-value < .01). In order to evaluate the feature extraction approach resulting in the best predictive performance, we conduct pairwise comparisons. Based on the findings, the vector-space approach (TF-IDF) is the least performing NLP technique. For the (deep) neural network approaches, the CNN is preferred over Doc2Vec. The CNN is also the preferred model, comparing it with the transformer approach (BERT).

5. Conclusion, Contribution and Implication

The results clearly confirm that including textual website data improves BFP predictive performance, and that textual features extracted by convolutional neural networks and transformer models add the most value to the BFP models in our benchmark setting.

6. References

Ahmadi, Z., Martens, P., Koch, C., Gottron, T., & Kramer, S. (2018). Towards bankruptcy prediction: Deep sentiment mining to detect financial distress from business management reports. *Proceedings - 2018 IEEE 5th International Conference on Data Science and Advanced Analytics, DSAA 2018*, 293–302. https://doi.org/10.1109/DSAA.2018.00040

Cecchini, M., Aytug, H., Koehler, G. J., & Pathak, P. (2010). Making words work: Using financial text as a predictor of financial events. *Decision Support Systems*, *50*(1), 164–175. https://doi.org/10.1016/j.dss.2010.07.012

Mai, F., Tian, S., Lee, C., & Ma, L. (2019). Deep learning models for bankruptcy prediction using textual disclosures. *European Journal of Operational Research*, *274*, 743–758. https://doi.org/10.1016/j.ejor.2018.10.024

Risk Dynamics Analysis in Russian Innovative Companies

Anton Sobolev – Management Consultant, Russia dr.anton.sobolev@outlook.com

Keywords: risk, risk mitigation, neural net, clustering, innovative company

1. Introduction

Russian innovative companies operate in a climate of continued uncertainty in global economic processes while increasing international competition. Risk elimination helps them optimize business processes, determine the required size of resources, anticipate changes in the market, and their impact on the organization's total cash flow. This paper describes the approach for applying intelligent risk analysis and assessment systems to investigate risk dynamics in Russian innovative IT companies.

2. Theoretical Background and Literature Review

In the case of innovative companies, the effectiveness of risk management technologies is not related to the concept of absolute security, which involves the maximum elimination of all possible risks, but to the achievement of an outcome that meets the criteria of practical applicability and sustainable determination of the level of integral risk in the area of its acceptable values (Croughy et al., 2014). Building an effective integrated risk management framework in a company is a complex task, including the need for flexible selection of classes of risk mitigation strategies in each specific situation, as well as the ability to quickly switch between them in the event of changes in the business environment (Shvets, 2016). To analyze the risk profile of an organization, various internal control procedures are used to ensure transparency and effectiveness of risk management procedures (Shvets, 2015), the most important stage of which is constant monitoring of quantitative indicators of risk levels. Intelligent systems (neural networks) can provide a researcher with hidden information discovered in addition to a traditional study (Kohonen, 2001). The mechanism of using non-teacher learning neural networks to solve problems of object visualization and clustering was proposed in 1984. It is a matter of projecting a multi-dimensional space of features of objects into space with a lower size, most often a two-dimensional space. This makes it possible to clearly show the degree of commonality between objects and to combine them into stable classes. The mathematical work of Kohonen maps is algorithms as follows:

- selection of the training step, usually within the range 0.1-0.7;
- the weighting of the neural network is initiated with random values or values from the eigenvector of the objects being clustered;
- scales are adjusting - for each input vector:
  - calculation of outputs from the Kohonen layer and selection of the winning neuron with the highest output value;
  - adjustment of the weight of the winning neuron;
  - normalizing the vector of weights of the winning neuron.
  - cycle repetition.

3. Research Design, Methodology and Data Analysis

The free cash flow of an innovative company represents the amount of capital that owners can withdraw from the business without compromising its continuation in the future. The traditional approach to calculating this metric is as follows.

$$FCF = EBITDA (1 - Tax) - \Delta WC - CAPEX, \text{ where:} \qquad (1)$$

- FCF – free cash flow;
- EBITDA - cash flow from core operations prior to adjustments;
- Tax - tax rate;
- ΔWC - changes in working capital;
- CAPEX - capital investments.

For innovative companies, two additional notes can be made. First, payments for the renovation, upgrade, and purchase of the equipment that forms the basis of the production base may form a significant part of their expenses. Second, financial outflows can be represented not only by the payment of dividends to shareholders but also by the repayment of their existing promissory notes, which creates great opportunities both for optimizing the tax base and for managing the investment policy of an innovative company through the use of special conditions for fundraising, often not available in ordinary commercial lending.

During the research, 15 Russian IT companies were surveyed within 5 years. At the end of each year, free cash flow was calculated, and then its sensitivity to changes in its components and FCF variation (figure 1) were analyzed.
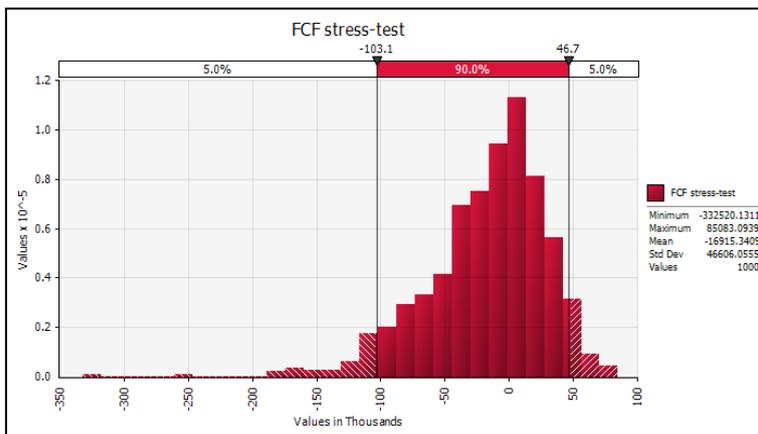

Figure 1. Example of FCF variation during a stress-test for an IT company

The significant volatility of the results led to the creation of a hypothesis on the possibility of implementing an integrated risk metric for a unified description of the risk profile of an innovative company. That leed to the new risk metric was introduced:

$$W_{risk} = \sqrt{(v_t - v_0)^2 + (p_t - p_0)^2}, \text{ where} \tag{2}$$

- W_{risk} is the length of the risk vector, which is described in an orthogonal coordinate system, where abscises are represented by the coefficients of variation of the model cash flow at time t:

$$v_t = \left| \frac{\sqrt{\frac{1}{n-1}\sum_{i=1}^{n}(r_i-\bar{r})^2}}{\bar{r}} \right|, \text{ where } \bar{r} = \frac{1}{n}\sum_{i=1}^{n} r_i, \tag{3}$$

and the ordinates show the ratio of costs related to the acquisition, creation, upgrade, reconstruction, and preparation for the use of non-current assets to the modified operating profit, which determines the risk potential of the IT company at time t:

- $p_t = \frac{CAPEX_t}{EBIT_t}$, where EBIT - profit before interest and taxes. $\tag{4}$

240

The resulting two-dimensional risk space "variation - risk potential" makes it possible to clearly describe the position of each of the analyzed IT companies both relative to the center of the coordinate system and among themselves. In this regard, the ranking of companies on risk reduction (figure 2) was formed.

| Rank	Company	Wrisk
1	Pangeya	8.85
2	InfoTex	5.30
3	ABBYY	1.35
4	SDN-Video	1.17
5	CRT	1.05
6	R-Telecom	0.84
7	LVM	0.66
8	JDC	0.57
9	BARS	0.53
10	Satellite	0.48
11	SimbirSoft	0.44
12	Kaluga Astral	0.43
13	ISS-Soft	0.38
14	SKB Kontur	0.35
15	IT	0.26
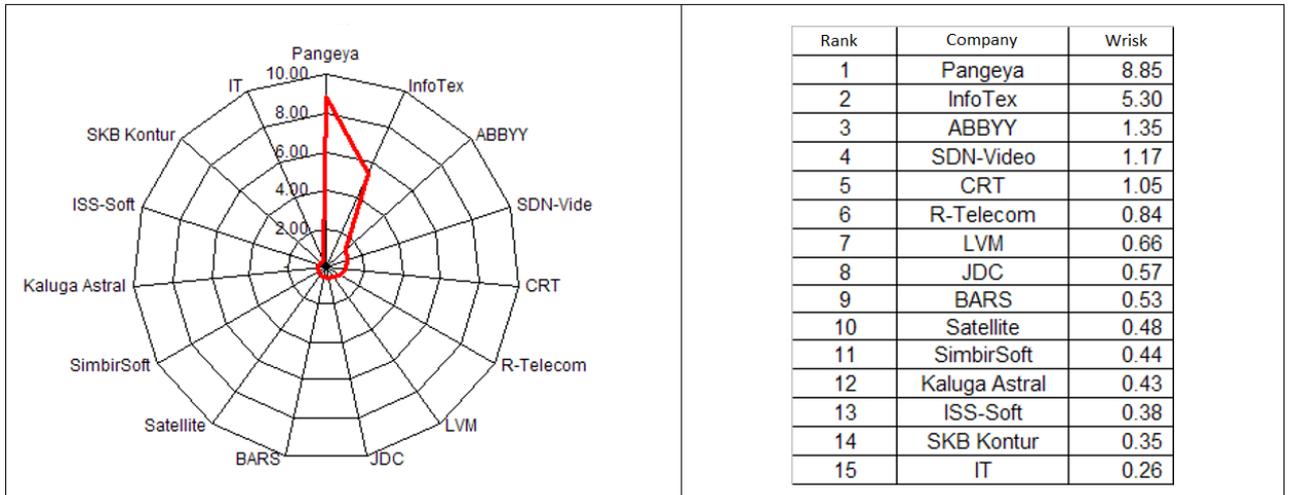
Figure 2. Comparative analysis of Russian innovative companies

Due to traditional stress testing does not answer the question of the existence of uncertainty clusters in which non-linear interactions of risk factors appear, it is especially beneficial to analyze the probability and consequences of their catastrophic combinations. At the same time, it can be hypothesized that the use of neural networks will make it possible to identify risk clusters, on the elimination of which managerial efforts can be focused in the future. Concerning such a task, the use of Kohonen maps was proposed. The structure of the neural network was determined based on the analysis of FCF sensitivity to changes in risk factors (figure 3), after which the clustering procedure was performed.
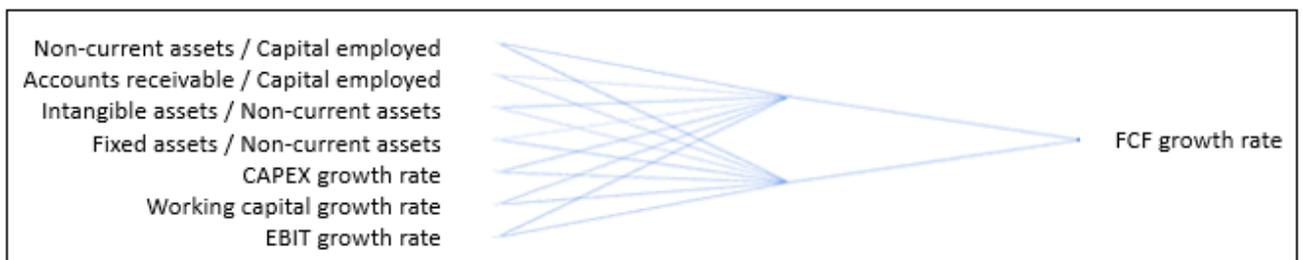

Figure 3. Neural net architecture

4. Results/Findings, Discussion

Analysis of the calculated self-organizing Kohonen map (figure 4) provides several insights about risk dynamics in Russian innovative companies in IT sector of the economy:

- significant non-linear relations between risk factors are discovered for tails in FCF distributions;
- clustering discovered uneven cluster population;
- the growth rate of FCF is mainly driven by changes in profit components;
- significant CAPEX was relevant only to a few IT companies due to risk avoidance behavior;
- non-current assets count small to medium share with respect to capital employed.

Thus, in comparison to foreign IT companies, Russian innovative organizations tend to be less willing to invest in CAPEX while prefer to focus on maintaining adequate working capital. Conventional stress testing procedure for FCF cannot fully describe cumulation of risks in various interrelated areas, but neural nets can. Effects of risk cumulation are of a non-linear nature. Further research may be focused on the investigation of marginal risk contribution to FCF variance during periods of excessive market turbulence with respect to the induced by COVID-19 increase in demand for innovative services of IT companies.
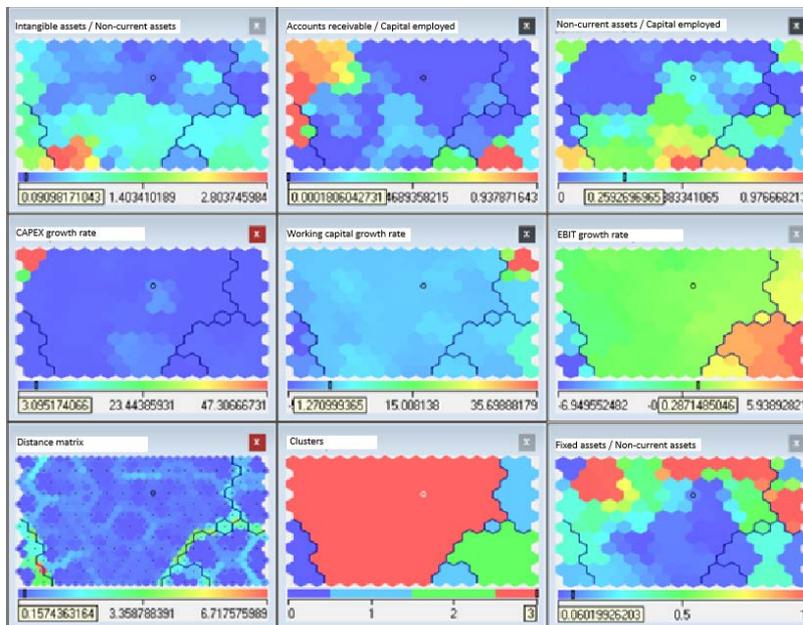
Figure 4 – Self-organizing Kohonen map

5. References

Kohonen, T. (2001). Self–organizing maps. Springer, Berlin.

Shapiro C., Varian H. (1999). Information Rules: Strategic Guide to the Network Economy. Harvard Business School Press, Boston.

Shvets, S.K. (2015). Integrated risk assessment metrics of a non-financial company. Izvestia of St. Petersburg State Economic University, Saint Petersburg.

Shvets, S.K. (2016). Introduction to Corporate Risk Management: study book. Saint Petersburg Polytechnic, Saint Petersburg.

Yoe, C. (2012). Principles of risk analysis: decision making under uncertainty. CRC Press Taylor & Francis Group llc., Boca Raton.

Improving Student Dropout Prediction By Integrating Feedback Textual Data

Minh Phan, Arno De Caigny, Kristof Coussement k.coussement@ieseg.fr – IESEG School of Management, 3 Rue de la Digue, F-59000, Lille, France; LEM-CNRS 9221, 3 Rue de la Digue, F-59000, Lille, France

Keywords: Learning analytics, Student dropout, Textual data, Segmentation, Machine learning

1. Introduction

Student dropout in higher education is among the most important problem that educators and researchers have been dealing with for a long time. Having many dropouts not only causes negative effects to the ranking and goals of the institution, but also wastes investments for the studied years. To the best of our knowledge, the use of textual student data has not been considered in student dropout prediction in high education context. In this research, we propose a new predictive algorithm that incorporates feedback textual data for automatically creating observations' segments and use them as inputs for student dropout prediction application. The performance of the new algorithm based on the segmentation approach is tested on a real-life student data set and benchmarked with other approaches. Finally, we unbox the incorporated textual data with visualizations that can support decision making.

2. Literature Review

According to the literature, firstly, the data used to predict student dropout are usually variables derived from structured data. The two most common sets of structured variables are students' background, and academic performance (Mason, Twomey, Wright, & Whitman, 2018; Nagy & Molontay, 2018). Our study extends the literature on student dropout prediction by investigating the added value of unstructured, textual student feedback data.

Secondly, different predictive modeling methods have been used in a student dropout prediction context, but all considered students as a whole group and did not investigate them in different segments (Ameri, Fard, Chinnam, & Reddy, 2016; Nagy & Molontay, 2018). In addition, previous studies also suggested that segmented approach could significantly improve the performance and interpretation of an predictive application (Coussement, Phan, De Caigny, Benoit, & Raes, 2020). In this study, we introduce a new algorithm that allows the automatic segmentation of student based on their textual data, before applying logistic regression (LR) to every segment specifically.

3. Methodology, Research Design

In this study, we introduce a new algorithm which automatically handle structured data and unstructured, textual data. The algorithm contains two phases, segmentation and prediction modelling. In the first phase, segmentation, the algorithm creates segments based on the embedded textual data (using Vector space or pre-trained doc2vec method). The vectorized textual data is then inputted to the k-Means algorithm to create K homogeneous segments. Finally, the input structured and vectorized textual data are split into K different segments to be ready for the next phase. In the second phase, prediction modeling, the algorithm builds predictive models for the segmented data from the previous phase. For each segment, the segmented structured data and vectorized textual data are combined and are used to train the LR model

(with Lasso shrinkage). At the end of this phase, the algorithm creates K different LR model(s) for each data segment.

To evaluate and compare the performance of the new algorithm, we set up a benchmark between the new method and nine other predictive approaches (Tab. 1). According to Tab. 1, there are 4 groups of approaches in term of modelling methods and data combination: (i) the first group includes approaches based only on structured data (model No. 1, 2, 3, 4); (ii) the second group includes approaches based only on unstructured, textual data (model No. 5, 6); (iii) the third group includes approaches based on both structured and unstructured textual data (model No. 7, 8); and (iv) the last group includes approaches based on both structured and unstructured textual data and segmentation method (model No. 9, 10), The benchmark is run on a 5x3 cross-validation setup and is evaluated using Area Under the Receiver Operating Characteristic Curve (AUROC or AUC) and Top-Decile Lift (TDL) metrics.

No.	Model name	Data combination	Method	AUC (SD)	TDL (SD)
1	Mod_FD_S	Full data, structured data	LR	0.757 (0.045)	3.772 (0.855)
2	Mod_T_S	Only data with text, structured data	LR	0.785 (0.047)	4.011 (1.091)
3	Mod_NT_S	Only data without text, structured data	LR	0.712 (0.066)	3.126 (0.962)
4	Mod_FDS_S	Full data, structured and unstructured data	LR + Segmentation based on data type	0.754 (0.042)	3.610 (0.887)
5	Mod_T_U_VS	Only data with text, unstructured data	LR + Vector space	0.551 (0.056)	1.194 (0.499)
6	Mod_T_U_DV	Only data with text, unstructured data	LR + doc2vec	0.603 (0.039)	2.318 (0.600)
7	Mod_T_SU_VS	Only data with text, structured and unstructured data	LR + Vector space	0.789 (0.045)	4.074 (1.056)
8	Mod_T_SU_DV	Only data with text, structured and unstructured data	LR + doc2vec	0.797 (0.044)	4.248 (0.948)
9	Mod_T_SU_VS_KM	Only data with text, structured and unstructured data	New algorithm (Vector space + k-Means)	0.793 (0.032)	4.269 (0.610)
10	Mod_T_SU_DV_KM	Only data with text, structured and unstructured data	New algorithm (doc2vec + k-Means)	**0.819** (0.035)	**4.756** (0.833)

Table 1: Results of the student dropout predictive models on different data combinations and modelling approaches

4. Results

According to the results at Tab. 1, by comparing the results of model No. 1, 2, 3, 4 and model No. 7, 8, it is clear that incorporating unstructured, textual data into the student dropout prediction model actually improves the predictive performance. In addition, by comparing the results of model No. 7, 8 and model No. 9, 10, we can confirm that adding a segmentation layer on top of the embedded textual data significantly increases the predictive performance in both AUC and TDL. Last but not least, our new algorithm (i.e. model No. 10) outperforms all previous models, including model No. 8 (i.e. model using doc2vec method without segmentation layer) and model No. 9 (i.e. model using vector space and segmentation approach).

Finally, we go one further step to analyse the difference between the student segments created by the new algorithm (model No. 10). To do that, the top bigrams of each segment are extracted and labelled according to 4 categories i.e. Student, Teacher, Course, Facility. According to Fig. 1, it is clear that the new algorithm successfully creates distinct and meaningful segments of students. The students in the first segment tends to care more about their classmates (e.g. teamwork), the teacher and the school facility, while

the students in the second segment care more about the course (e.g. course quality, difficulty, etc.) than other factors. This also contributes to the reason why model No. 10 outperforms all previous models.
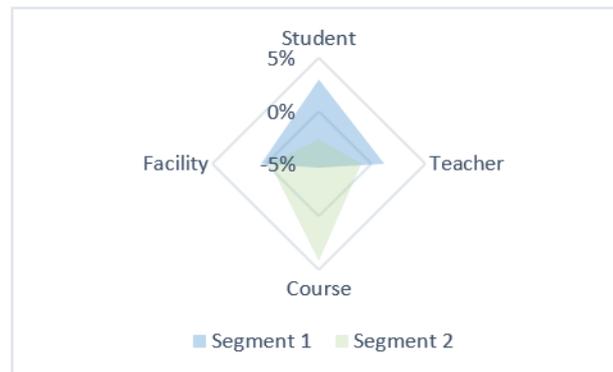

Figure 1: The discussion topics among the two students' segments

5. Conclusion

This study introduced a new algorithm that can handle both structured data and unstructured, textual data. The algorithm was applied to a student database of a triple crowns French higher education institution to predict the student dropouts. According to the final results, (i) the incorporation of unstructured, textual data improves the predictive performance of the student dropout model; (ii) the embedded textual data serves as a good basis to segment students, the models with segmentations outperform all previous models; and (iii) the segments based on textual data give informative insight about the different groups of students.

6. References

Ameri, S., Fard, M. J., Chinnam, R. B., & Reddy, C. K. (2016). Survival analysis based framework for early prediction of student dropouts. In *Proceedings of the 25th ACM International on Conference on Information and Knowledge Management* (pp. 903–912).

Coussement, K., Phan, M., De Caigny, A., Benoit, D. F., & Raes, A. (2020). Predicting student dropout in subscription-based online learning environments: The beneficial impact of the logit leaf model. *Decision Support Systems*. https://doi.org/10.1016/j.dss.2020.113325

Mason, C., Twomey, J., Wright, D., & Whitman, L. (2018). Predicting engineering student attrition risk using a probabilistic neural network and comparing results with a backpropagation neural network and logistic regression. *Research in Higher Education*, *59*(3), 382–400.

Nagy, M., & Molontay, R. (2018). Predicting dropout in higher education based on secondary school performance. In *2018 IEEE 22nd international conference on intelligent engineering systems (INES)* (pp. 389–394).

Application of the Larger-the -better optimization model to the portfolio optimization

Vasilisa Makarova – National Research University Higher School of Economics, Russia

1. Introduction

For the past 60 years, mean–variance analysis has served as the standard procedure of choosing the optimal investment portfolio. The main assumptions of this model are the investor's risk aversion and the normal distribution of the return on the asset or portfolio. The portfolio considered effective if it gives maximum return for a given risk level, or minimum risk for a given expected return level.

Scientists are constantly looking for alternatives to this theory to provide solutions to investors whose risk perception changes as the investor's wealth increases. Thus, Adler and Kritzman (2006) proposed full-scale optimization for the sample of returns that is significantly non-normal, and Holgersson et al. (2012) and Soliman et al. (2012) proposed theoretical model to assess the relationship between excess return and risk of financial assets.

In this article, we suggest that the risk aversion approach for investors should be a Larger-the -better optimization model that is quite successful in optimizing processes in engineering, quality management and economics. The method is to separate the factors that cause the variation in the response to controlled and uncontrolled, and to assess the robustness of the portfolio against uncontrolled factors.

It is worth noting that the method of splitting variation is successfully applied for time series analysis (primarily financial) where the conditional (past series) variance of the series depends on past series values, past values of these variances and other factors. These models are intended for «explanation» of the clustering of volatility in financial markets, where periods of high volatility last for some time, followed by periods of low volatility, with average volatility (long-term, unconditional) can be considered relatively stable. In the short term, there are usually no stable variations, so a different splitting principle should be applied.

In their paper, Adler and Kritzman (2006) emphasize that mean–variance analysis assumes that returns are normally distributed or that investors preferences are well approximated by mean and variance. Larger-the -better optimization relies on advanced search algorithms to identify the optimal portfolio given any set of response distributions.

2. Theoretical Background and Literature Review

In his paper, Markowitz (1952) state that, that reducing variation is an important area in portfolio optimisation. To demonstrate this, Markowitz suggested that investors be assumed to be risk-averse.

Mean-variance theory assumes optimization is putting together a portfolio in such a way that return is maximized for a given risk level, or risk is minimized for a given expected return level. These portfolios are termed efficient portfolios. All others are inefficient (Sharpe, 1966).

In practice, this approach to portfolio formation is sufficient for maximising expected utility if portfolio returns are normally distributed or if investors have quadratic utility $E(U)=\mu+\lambda*\sigma^2$, where μ - portfolio expected return, λ -risk aversion, and $\sigma^\wedge2$ - portfolio variance.

In general, mean-variance theory analyses the probability of return above the value of expected returns determined on the basis of historical values. In doing so, it is assumed that returns are normally distributed, and investors can infer the entire distribution of returns from its mean and variance. Periodic bursts of profitability and higher moments do not affect the outcome.

However, only a few assets produce a perfectly normal distribution. In turn, many authors agree that total portfolio return may display return distributions that are approximately normal. The reason the normal distribution is used is that the weighted average return (the weight of the assets in the portfolio and its profitability) is more accurate when describing the actual return of the portfolio (which may be positive or negative) especially if the weights change significantly. If the distribution is abnormal, variables are transformed into logarithms. The use of log-normal return for total portfolio performance, although it can be computed faster over a longer period of time, will not capture separate stock weights, and this can greatly distort the return. In addition, the portfolio return may be positive or negative, and the log-normal distribution will not be able to fix negative aspects. Investors are indifferent to other types of the distribution.

Moreover, the theory implies quadratic utility. According to most researchers, that is not a realistic description of any investor's attitude toward risk for several reasons. In the first place, it is assumed that investors are as averse to upside deviations as they are to downside deviations (Adler and Kritzman, 2006). Moreover, at certain levels of wealth, investors prefer less wealth to more. And finally quadratic utility assumes investors have increasing absolute risk aversion. However, quadratic utility is an excellent approximation to most variations in power utility for a wide range of reasonable investment outcomes. In some cases, investors prefer more advanced curved or S-shaped utility curves.

However, due to the characteristics of the samples (a small sample, insufficient observation period, panel imbalance, coefficient of variance is greater than 0.4), Mean-Variance analysis is not always possible.

In turn, the Larger-the -better optimization evaluates the expected portfolio return and its deviation simultaneously, providing valuable data for analytical purposes.

In this case, we are moving away from the concept of measuring the relationship between a beneficial effect and its loss, accepted in financial theory, and moving on to a numerical measurement of a function. In this case, the response distribution is not essential - the signal-to-noise ratio works with any distributions (Thangjai and Niwitpong, 2019). Investors chose a portfolio with the highest signal-to-noise ratio. The expected return in this case is a current desired output (Rao et al, 2013).

3. Research Design, Methodology and Data Analysis

The method is that the causes of portfolio variation are divided into two parts: controlled factors (signal) and uncontrolled (noise). The controllable factors are fixed and the portfolio is selected in such a way that the variation of the noise is minimal and the signal-to-noise ratio is as high as possible.

The obtained utility function assumes a preference for upside deviations. If the portfolio deviates from the preferred return, the loss increases rapidly. The obtained utility is power and assumes investors have decreasing absolute risk aversion and a constant relative risk aversion. The obtained function represents a more plausible statement of investor preferences than quadratic utility.

Mathematical techniques now allow us to perform Larger-the -better optimization instead of mean–variance analysis. With this approach, we calculate the utility of the portfolio for the study period in our sample, taking into account the number of asset combinations required to determine the weights that yield the highest expected utility, given any description of utility.

The main assumptions of the model: 1) The largest SNR is the best; 2) Portfolio management remained unchanged during the period under review; 3) Periods are noise levels (During each period, the portfolio

is exposed to various unmanageable factors that may affect the probability of maximizing income.); 4)The number of noise levels in the model is not limited. Practical examples presented by software support include examples where the number of noise levels varies from 2 to 6.

Suppose we want to find the best combination of the three funds whose returns are shown in table 1. We define the utility of these three portfolios as $-10 \log\left((\sum_{i=1}^{n} 1/y_i^2) * 1/n\right)$.

We then select the weight of the funds so that it maximizes the expected utility, which in this example is 10% of Fund A and 82% of Fund B and 8% of Fund C. The expected portfolio utility of 4.14 is the maximum value of the ratio in the possible set of studied combinations. This means that this combination is most robust to to uncontrolled portfolio risk factors.

4. Results/Findings, Discussion

We analysed the distribution of the received SNR on the training sample. Individual distribution identification revealed, that it can be normalized by implementing Johnson's transformation (table 1).

Table 1. Goodness of Fit Test

Distribution	AD	P
Normal	8,514	<0,005
3-Parameter Lognormal	8,518	*
2-Parameter Exponential	15,240	<0,010
3-Parameter Weibull	3,360	<0,005
Smallest Extreme Value	3,338	<0,010
Largest Extreme Value	11,063	<0,010
3-Parameter Gamma	343,872	*
Logistic	3,561	<0,005
3-Parameter Loglogistic	3,616	*
Johnson Transformation	0,161	0,943

With Johnson Transformation, we obtain the following functionality:0,0181087+0,514347*asinh((x - 1,06122) / 0,287968), where $\text{asinh}(x) = \ln(x + \sqrt{1 + x^2})$

By saving the normalized SNR, we get a new variable with the normal distribution and with the following parameters (table 3):

Assuming that the riskless rate of interest is above inflation rate on 1% and that by investing in a diversified portfolio we obtain an excess return over the riskless investment. Suppose that the investor in each period wants to earn a risk-free rate of return. In this case, the signal-noise ratio for the risk-free ratio is 0.78. In this case, the investor will receive a return no higher than a risk-free rate with a probability of 33.81% (Figure 1).
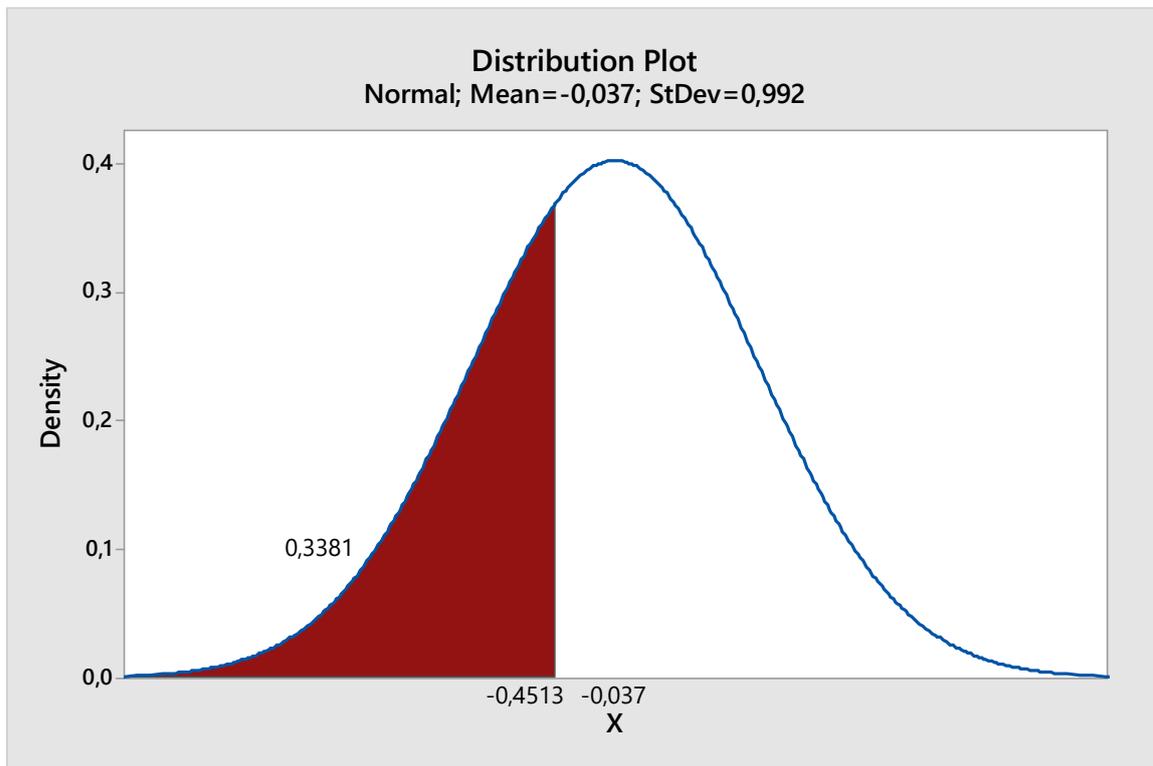
Figure 1. Distribution plot.

To conclude this, it can be state, that this technique does not directly analyse the data, but rather determines the variability of the data. Confidence is measured from the variance. Analysis proves the variance of controllable and noise factors.

The method may be applied not to active portfolio management, but to determine which portfolio asset combinations are more robust to uncontrolled risk factors.

Conversion to SNR usually viewed as a scale transformation for convenience of better data manipulation.

5. Conclusion, Contribution and Implication

We have demonstrated that this model has a wide application on investor utility function. This model addresses certain limitations of mean-variance analysis and is an advanced tool for evaluating process effectiveness. The case study presented in this article showed that the results of this model were clear, transparent and interpreted in the context of the expected usefulness of the portfolio.

6. References

Adler, T. and Kritzman M. 2007. Mean–variance versus full-scale optimisation: In and out of sample. Journal of Asset Management. 7, 302–311. doi:10.1057/palgrave.jam.2250042

Thangjai, W. and Niwitpong, S.-A., (2019). Confidence Intervals for the Signal-to-Noise Ratio and Difference of Signal-to-Noise Ratios of Log-Normal Distributions. Stats 2, no. 1: 164-173.

Holgersson, H.E.T.; Karlsson, P.S.; Mansoor, R. Estimating mean-standard deviation ratios of financial data. J. Appl. Stat. 2012, 39, 657–671

Sharpe, W. F. (1966). Mutual Fund Performance. Journal of Business, 1(2), 119-138

Roy, R. 1990. A Primer on the Taguchi Method. Society of Manufacturing Engineers, P.247

Samruddhi Rao, Pragati Samant, Athira Kadampatta, Reshma Shenoy 2013An Overview of Taguchi Method: Evolution, Concept and Interdisciplinary Applications International Journal of Scientific & Engineering Research, Volume 4, Issue 10, October-2013 621

Soliman, A.A.; Abd Ellah, A.H.; Abou-Elheggag, N.A.; Modhesh, A.A. Estimation of the coefficient of variation for non-normal model using progressive first-failure-censoring data. J. Appl. Stat. 2012, 39, 2741–2758.

Incorporating Donald Trump's tweets into LSTM for oil price prediction

Stephanie Beyer Diaz (*s.beyerdiaz@ieseg.fr*), Kristof Coussement, Arno De Caigny, Luiz Perez Armas, Stefan Creemers – IESEG School of Management, 3 Rue de la Digue, F-59000, Lille, France; LEM-CNRS 9221, 3 Rue de la Digue, F-59000, Lille, France

1. Introduction

This study uses deep learning to forecast the daily price of crude oil by using textual data and lagged oil price as features. The textual data is sourced from Donald Trump's tweets posted during part of presidential term, comprising between January 2017 and December 2019, or a total of 1,095 days. A total of 10,201 original tweets are used, preprocessed in different ways to adjust the input according to the natural language processing (NLP) techniques applied. The experiment is performed both on West Texas Intermediate (WTI) and on Brent crude oil prices, to confirm the generalizability of the results. The techniques applied correspond to Term Frequency–Inverse Document Frequency (TF-IDF), Word2Vec, and Global Vectors for Word Representation (GloVe). Up to five days of lag are used for both textual and price data, which are then used as input for a Long Short-Term Memory Neural Network, with the target variable being the crude oil price for the next day. To achieve the best results, LSTM model hyperparameters are tuned through gridsearch and cross-validation approaches. The results outperform the benchmark models used, showing the incorporation of Donald Trump's tweets does add predictive power. Possible future research, additional insights and study limitations are also discussed.

2. Theoretical Background and Literature Review

Oil price prediction research has vastly focused on data enrichment techniques to improve performance (Sezer et al., 2020), while studies examining the incorporation of textual content are few and focus mostly on sentiment analysis (Li et al., 2019). This study contributes to existing literature by further exploring the value of incorporating unstructured data and introducing state of the art NLP techniques. The textual data used corresponds to tweets Donald Trump posted during his presidency, under the assumption that there is value due to his former position of power.

3. Research Design, Methodology and Data Analysis

The unstructured textual data is used along with the lagged crude oil price data, using the following NLP techniques to extract features from the Donald Trump's tweets: Vector-space approach (TF-IDF), Neural Networks (Word2Vec, Doc2Vec, GloVe), transformer-based approach (pre-trained BERT). The data stemming from these NLP techniques is fed into a LSTM model. The performance is then benchmarked against Auto Regressive Integrated Moving Average (ARIMA), vector auto-regression (VAR), and support vector regression (SVR) models.

4. Results/Findings and Discussion

The results outperform the benchmark models used, showing that: 1. the incorporation of Donald Trump's tweets does add predictive power, and 2: state of the art NLP approaches can successfully be adapted to highly complex tasks, such as oil price prediction.

5. Conclusion, Contribution and Implication

The results confirm that including textual data from Donald Trump's tweets improves crude oil price predictive performance for both Brent and WTI.

6. References

Li, X., Shang, W., & Wang, S. (2019). Text-based crude oil price forecasting: A deep learning approach. *International Journal of Forecasting*. https://doi.org/10.1016/j.ijforecast.2018.07.006

Sezer, O. B., Gudelek, M. U., & Ozbayoglu, A. M. (2020). Financial time series forecasting with deep learning: A systematic literature review: 2005–2019. *Applied Soft Computing Journal*. https://doi.org/10.1016/j.asoc.2020.106181

Track: Public Procurement

Chairperson: Andrei Yakovlev

The Public Procurement track is designed to bring together procurement practitioners, researchers and PhD students to debate the current trends in public procurement sector. Public procurement today is a key economic sector, representing 15 to 20 per cent of GDP in most economies. It has major implications for growth, competitiveness and the welfare of citizens. Each country's public procurement practitioners have always faced challenges imposed upon by a variety of factors including market, legal environment, political environment, organizational environment, and socio-economic and other environmental factors. In this session, we explore the most common and new issues and challenges in public procurement, and possible ways to improve the effectiveness of this sector in different counties.

Problems and efficiency of public procurement system from the participants' perspective

Yuliya Rodionova – National Research University Higher School of Economics, Moscow, Russian Federation yrodionova@hse.ru

Andrei Yakovlev – National Research University Higher School of Economics, Moscow, Russian Federation

Olga Balaeva – National Research University Higher School of Economics, Moscow, Russian Federation

Andrey Tkachenko – National Research University Higher School of Economics, Moscow, Russian Federation; Bocconi University, Milan, Italy

1. Introduction

This paper examines the key problems and assesses the effectiveness of the Russian public procurement system. Public procurement accounts for a significant portion of government spending and GDP in developed and developing countries. In Russia, procurement costs, including procurement by state-owned enterprises, amounted to 31.6 trillion roubles in 2019, or 29% of GDP at current prices [Accounts Chamber, 2020]. The large scale of procurement requires control over their effective spending, clarity, and unambiguous legal requirements for all participants in the procurement process. The experience of 2020 has also shown the importance of flexibility in public procurement legislation, especially in emergencies such as the COVID-19 pandemic, when fast procurement is vital.

The main focus of regulation in this area in Russia is traditionally based on combating corruption and ensuring transparency in procurement. To achieve these goals, the procurement process is strictly regulated with control over compliance with the procurement procedure, rules for interaction with participants, deadlines, etc. But the result of the purchase, including the ability to meet the current demand, is still largely "behind the scenes" of the current legislation. Practitioners and researchers in the field of public procurement are increasingly talking about the need to shift the focus from strict regulation of the procurement process to improving procurement efficiency.

2. Theoretical Background and Literature Review

The predominant part of research in the field of public procurement is based on the results of the analysis of large amounts of open data or examines the cases of individual organizations or projects. Such studies are important, but they do not reveal the problems of the functioning of the public procurement system from the point of view of its direct participants. Only a few works are devoted to the analysis of the opinions of public customers and suppliers. Among foreign empirical studies, the most ambitious is still the PwC project devoted to the analysis of the efficiency of public procurement in the EU countries [PwC, 2011]. However, such large-scale "multi-country" public procurement surveys were no longer repeated, and at the level of individual countries, there are also very few of them (see, for example, [Flynn, 2017; Grega et al., 2019; Kacandolli-Gjonbalaj et al., 2018]).

As for Russia, the first large-scale study in Russian practice assessing the public procurement system by its direct participants was carried out in 2017 [Yakovlev et al., 2018]. A massive online survey of public customers and suppliers showed that the adoption of the new Law on the Contract System (44-FZ) did not improve the situation in the public procurement regulation system in Russia - most of the problems characteristic of the previous legislation (94-FZ) remained relevant in the new conditions, and their acuteness with the transition to new regulation practically did not decrease.

3. Research Design, Methodology and Data Analysis

The second massive online survey of public customers and suppliers was conducted in March-May 2020. The base of respondents was formed on the basis of contact information from procurement notices and contracts concluded in accordance with 44-FZ from January 2017 to September 2019. The final sample for sending out questionnaires consisted of 94.5 thousand e-mails of public customers (those who in three years posted at least 5 procurement notices, including at least one in 2019) and 207.8 thousand e-mail suppliers (who have concluded at least 3 public contracts in three years). Thus, the sample was formed from specialists from enterprises and organizations with sufficient experience in participating in public procurement. The survey was launched on March 17 and coincided with the crisis over the spread of the COVID-19 virus, which could have affected the number of respondents. However, as of May 29, a sufficient number of completed questionnaires were received for quantitative analysis - 434 from customers and 586 from suppliers. At the same time, in terms of its key parameters, the sample of the current survey is close to the sample of the 2017 survey, which included 1251 customers and 721 suppliers (see [Yakovlev et al., 2018]).

4. Results/Findings and Discussion

The results of a mass survey of customers and suppliers in 2020 refer to the conservation of problems accumulated in the public procurement system. 77% of customers and 66% of suppliers believe that effective procurement should be characterized by "supply of quality goods". However, about 60% of customers and suppliers consider the supply of substandard goods/works/services to be the most common problem for the Russian public procurement system. The presence of unresolved problems in Russian public procurement legislation is also evidenced by the fact that half of suppliers and 17% of customers noted informal communication between a customer and a supplier as a common problem. Comparison with the results of the 2017 survey shows that these problems not only have not lost their relevance, but, on the contrary, have become more acute. In order to ensure the final outcome of the procurement, honest participants should move into the 'gray zone' violating the formal rules. The consequence of this is a higher number of violations identified during the FAS inspections with the subsequent imposition of fines but without improvement of the situation.

In general, the survey results suggest that, despite the importance of fighting corruption and increasing competition, procurement regulation should primarily be aimed at ensuring their ultimate efficiency - in the form of high-quality and timely execution of contracts, taking into account the interests and requests of the main participants of the public procurement process. As our respondents say, "we need simple rules of doing business, tuned to efficiency", "ensuring a balance of interests of government agencies and business, since it is business that is the basis of society, and government structures serve and protect it (ideally)".

5. Conclusion, Contribution and Implication

Despite all the complaints about the existing procurement regulation system, the majority of Russian customers and suppliers perceive government procurement as a significant, relatively stable financial resource and are interested in open access to this market. However, today in the field of public procurement, neither customers nor suppliers have organizations that would represent their interests in a dialogue with regulators and would be able to voice and promote their proposals to change the public procurement system. In turn, there are no existing mechanisms capable to regularly identify the positions and assessments of direct participants in the procurement process. Meanwhile, such a consideration of participants' preferences and the formation of effective incentives for the execution of contracts still remain an important problem in the development of the public procurement system.

Thus, the task of improving the legislation on public procurement is still relevant, but it is necessary to take into account the interests of direct participants in the procurement system and changes in regulation should not generate additional costs for them. It would be reasonable to use the regulatory impact assessment (RIA)

procedures, which have been used for private business since 2010. The dissemination of RIA to public sector organizations would improve the quality of regulation, ensuring the necessary balance between the interests of regulatory agencies, suppliers, and customers, whose functions include the production of public goods and the provision of social services to citizens.

6. References

Accounts Chamber of the Russian Federation (ACRF). 2020. Report on the results of the expert-analytical activities "Monitoring the development of public and corporate procurement in the Russian Federation for 2019". Moscow: ACRF. (In Russ.)

Flynn A. (2017). Re-thinking SME disadvantage in public procurement. Journal of Small Business and Enterprise Development. Vol. 24. No. 4. Pp. 991-1008.

Grega, M., Orviska, M., Nemec, J., Lawson, C. (2019). Factors determining the efficiency of Slovak public procurement. NISPAcee Journal of Public Administration and Policy. Vol. 12. No. 1. Pp. 43-68.

Kacandolli-Gjonbalaj, D., Shiroka-Pula, J., Berisha-Shaqiri, A., Osmani, M. (2018). The Efficiency of Public Procurement in the Republic of Kosovo: An Econometric Approach. Ekonomika (Economics). Vol. 97. No. 2. Pp. 70-90.

PwC (2011). Public procurement in Europe: cost and effectiveness. PricewaterhouseCoopers. A study on procurement regulation prepared for the European Commission.

Yakovlev, A.A., Tkachenko, A.V., Balaeva, O.N., Rodionova, Yu.D. (2018). Russian System of Public Procurement: the Law is Changing, the Issues remain. ECO. No. 9. Pp. 17–38. (In Russ.). DOI: 10.30680/ECO01317652-2018-9-17-38.

Effectiveness of public procurement in the Czech and Slovak public health care sectors

Juraj Nemec – Masaryk University, Faculty of Economics and Administration, Brno, Czech Republic; Matej Bel University, Faculty of Economics, Banska Bystrica, Slovakia Juraj.Nemec@econ.muni.cz

Matus Kubak – Technical University, Faculty of Economics, Kosice, Slovakia matus.kubak@tuke.sk

Milan Krapek – University of Technology, Faculty of Business and Managements, Brno, Czech Republic milan.krapek@ambis.cz

Maria Horehajova – Matej Bel University, Faculty of Economics, Banska Bystrica, Slovakia maria.horehajova@umb.sk

1. Introduction

Sustainability of health finance is a critical issue for all countries. The final level of achievements of critical public health goals is connected not only with the efforts of the people involved, but also with the availability of finance to cover the costs of the actions needed. One of the "internal sources" providing more resources to cover public health care costs is effective public procurement in the health care sector. The aim of our article is to examine the degree of competitiveness of public procurement in the Czech and Slovak health care system and its impact on the final price of a contract and to analyse to what extend Health Technology Assessment is used to determine procurement needs.

2. Theoretical Background and Literature Review

There exist a large number of papers dealing with acquirement of goods, services and works, many of them with a focus on health care sector procurement. According to such existing scientific literature, a low rate of competition represents one important factor that has a direct negative impact on the efficiency of health public procurement. Another factor is effective ex-ante analysis of procurement needs, based in health care on high quality Health Technology Assessment (HTA).

3. Research Design, Methodology and Data Analysis

As regards to methodology, we concentrate first on the problem of competitiveness which determines economy / efficiency of public procurement. The main focus is the allocation efficiency – effectiveness: we investigate to what extent an ex-ante analysis of the need of procured medical equipment (particularly HTA) is carried out. From the point of view of measuring the rate of competitiveness we use dominantly quantitative research methods and our sample is a complete sample of all procurements in the Czech and Slovak health services for 2014- 2019 (all registered PPs for the given period – almost 4,300 cases – are covered and their information processed by us). Data on individual PPs were obtained from the national registers of the Public Procurement Office and processed by the authors of this article. In terms of allocation efficiency, we will mainly use secondary qualitative analysis - analysis of PP documentation, available on the website of the Public Procurement Office and the information and materials of the Institute for Health Policy of the Ministry of Health of the Slovak Republic. To enrich the list of sources, we also interviewed a small sample of health sector specialists in both countries, experts directly involved with public procurement in the sector.

4. Results/Findings and Discussion

Concerning the competitiveness, the research fully attested the findings of those studies carried out so far – the higher the number of tenderers, the lower the final price, even in the Czech and Slovak health sectors. However, the average number of tenderers is only around two and in the Czech Republic for more than half of the tenders only one bid was submitted. From the point of HTA, our data suggest that the Czech health care sector partially uses HTA to determine procurement needs, however the situation in Slovakia is much less satisfactory. Our data confirm that on one side health establishments in both countries complain that they do not have enough resources to cover costs of universally provided high quality care for patients in need. On the other hand, they waste significant amounts of resources because of inefficient and ineffective public procurement.

5. Conclusion, Contribution and Implication

From the point of competitiveness, our research suggests that a limited number of bids is not the result of low supply capacity of the market. On the contrary, it is dominantly the results of existing systemic corruption and also a reflection of the low quality of the functioning of public procurement systems, overwhelmed by bureaucracy, but without any clear focus on efficiency. The policy recommendations are straightforward in such situation. First priority is the need to change the method how public procurement functions in the country – to refocus from an emphasis on the compliance with bureaucratic rules to an emphasis on results, which can be evaluated for example by systematic benchmarking. The second priority is connected with general trends related to fighting corruption – financial education to limit the high level of tolerance to corruption and effective punishment to increase the risks connected to fraudulent behaviour seem to be critical elements.

From the point of view of allocation efficiency, the Czech example shows how to start – some level of centralisation and central regulations is necessary. However, it is also necessary to achieve maximum transparency of such oversight.

6. References

Available upon request

Institutional constraints in the Russian health care system: assessing the effectiveness of public procurement

Olga Valieva – Institute of Economics and Organization of Industrial Production SB RAS, Laboratory for Modeling and Analysis of Economic Processes; Novosibirsk National Research State University, Faculty of Economics; Novosibirsk State Technical University, Faculty of Business, Novosibirsk, Russia o_valieva@mail.ru

1. Introduction

Healthcare in Russia today is characterized by a number of problems that can seriously affect the state of the country's human capital and its quality. On the one hand, these processes are connected with a reduction of the state funding for the healthcare system in the country and a decrease in the availability and quality of medical services. On the other, these are institutional barriers and restrictions in the form of public procurement legislation, which form quasi-market relations and restrict competition. The article shows how the negative consequences of institutional provision in the healthcare system affect its effectiveness.

2. Theoretical Background and Literature Review

The UN Human Development Report 2019 notes that modern inequality is transforming into new forms, and if earlier the accessibility of medicine as such played an important role in basic concepts, now inequality in the availability of high-quality high-tech medical services is growing (Human Development Report, 2019). The availability of high-quality medical care to the general population is a direct task of the state and state institutions that set the priorities of state policy and form the legislative basis for its implementation.

To date, Rosstat data for 2019 show that despite the efforts being made, both the overall incidence rate and the incidence rate in certain categories requiring the provision of high-tech medical care are growing in the country. Analysis for the period 2010-2018 showed that the increase in oncological diseases over 10 years amounted to 22.4%, diseases of the endocrine system increased by 39.4%, circulatory systems by 9.6%, respiratory diseases by 8%, while and the structure itself (Healthcare in Russia, 2019). Now the share of these diseases in the overall picture of the incidence of Russians has grown significantly.

The public health sector in Russia today is strictly regulated by a number of institutional norms, the main of which are the federal laws "On the contract system" (No. 44-FZ) and "On the procurement of goods, works, services by certain types of legal entities" (No. 223-FZ) ... The laws regulate the purchase of any consumables, drugs, equipment, tools and other goods and services only through competitive procedures. At the same time, the priority of choosing a particular drug is only a low price, no emphasis is placed on quality.

3. Research Design, Methodology and Data Analysis

We interviewed several experts working in the public health system, they point out that the law on the contract system is a "disaster for medical organizations." In the study by Yakovlev and colleagues from HSE, customers from government agencies most often point to legal collisions as the main problem when conducting auctions (Yakovlev A.A., Tkachenko A.V., Balaeva O.N., Rodionova Yu.D., 2018).

4. Results/Findings, Discussion

Inadequate legislation in the field of public procurement raises another serious problem - inadequate provision of high-quality vital drugs in the public health system. There are many reasons for this problem. The first is low financial security due to the reduction in health care costs in the country as a whole. The second is institutional, connected with the system of distribution of funds through the MHIF and unworked procedures for including private companies in the system of redistribution of public funds. The third is the low availability of certain vital imported pharmaceuticals, due to direct bans, sluggishness, and in some cases even outright negligence on the part of a number of ministries and departments that do not license foreign drugs in the domestic pharmaceutical market and close access to certain drugs for Russian markets. The fourth is the same 44-FZ and a number of decrees that directly prohibit the purchase of imported high-quality drugs at a higher price if there are at least two domestic drugs on the market. The fascination of state authorities with protectionism and import substitution in the pharmaceutical sector, in which priority is given to domestic, in some cases, low-quality drugs, leads to a number of negative consequences that reduce the quality of human potential and lay a "bomb" for the health care system in the future.

5. Conclusion, Contribution and Implication

In our opinion, the "On the Contractual System" legislation in healthcare is a typical example of an institutional trap: it's a stable ineffective norm, which is fixed in the existing rules of the game and remains unchanged even when negative effects and high social costs appear. The main reasons are the existing mechanisms of coordination (generally accepted norms of behavior, deviation from which is disadvantageous for the main participants), training (the prevalence of sustainable practice of implementing the adopted norm), conjugation (integration into other norms and laws), as well as cultural inertia and lobbying (Polterovich, 2007). Legal rules continue to be embedded in an ineffective law, support entrenched stereotypes and reinforce established ties. This leads to ineffective equilibrium states of the system, which are practically impossible to improve without serious social and economic reforms. Thus, the current institutional environment in Russian healthcare leads to reinforcement of risks that prices of domestic pharmaceuticals will increase and their quality will decrease, intermediaries will receive superprofits out of it, and to a deterioration of the medical services quality. In general, it will lead to the degradation of the whole sector and a decrease in its economic and social efficiency.

6. References

Human Development Report 2019. Beyond Income Levels and Today's Averages: Inequalities in Human Development in the 21st Century. (2019). // URL: http://hdr.undp.org/sites/default/files/hdr_2019_overview_-_russian.pdf (In Russ.)

Healthcare in Russia, 2019: Stat. Sat. (2019). Rosstat (In Russ.).

Polterovich, V.M. (2007). Elementy teorii reform. Moscow. Ekonomika Publ. (In Russ.).

Yakovlev A.A., Tkachenko A.V., Balaeva O.N., Rodionova Yu.D. (2018). Russian System of Public Procurement: the Law is Changing, the Issues remain. All-Russian ECO journal. No. 9. Pp. 17-38. (In Russ.). http://dx.doi.org/10.30680/ECO0131-7652-2018-9-17-38

Political power and entry barriers at public procurement markets

Pavel Pronin – National Research University Higher School of Economics, Moscow, Russian Federation
pspronin@edu.hse.ru

Andrey Tkachenko – National Research University Higher School of Economics, Moscow, Russian Federation; Bocconi University, Milan, Italy

Andrei Yakovlev – National Research University Higher School of Economics, Moscow, Russian Federation

1. Introduction

The activity of regional (sub-national) actors is an essential source of initiative and dynamism. Different resources are available for regional governments with public procurement (PP) contracts becoming a policy tool with growing importance. However, the allocation of PP can be the source not only for economic development but also for rent-seeking (Szakonyi 2018). In this paper, using unique data for Russia, we analyse the impact of previous experience of regional governors on the allocation of PP contracts between local and external suppliers. Contrary to the previous studies on regional protectionism, we make the main focus on the public procurement and especially on the allocation of contracts to the firms located in two cities – Moscow (country's capital) and Saint Petersburg (second largest city and city of origin for both Russian presidents since 2000 – Vladimir Putin and Dmitry Medvedev – as well as for many pivotal members of federal political elite). We focus on Moscow and St. Petersburg firms as the concentration of political power in the federal center during the early 2000s has made the enterprises, that are connected to the federal government, "the most effective lobbyists". These firms gained higher bargaining positions and received much more preferential treatments comparing to the firms without federal connections. As some regional governors allocate substantially more contracts to Moscow and St Petersburg (MSP) firms than others, our research question is – "How personal characteristics of regional governors can explain the variation of public procurement allocation in Russian regions?".

2. Theoretical Background and Literature Review

Scholars have found that allocation of public procurement is affected by numerous factors, that can be summarised in four categories: firm characteristics, regional characteristics, market structure, and governors' characteristics. Scholars explored a wide range of these personal characteristics, that can affect regional economics: ties to the federal center (Libman et al. 2012), local ties and time in office (Coviello & Gagliarducci 2017, Tkachenko & Esaulov 2020), political cycles (Mironov & Zhuravskaya 2016) and expectation of being re-elected (Sidorkin & Vorobyev 2018).

In this paper we advance four hypotheses, that explain variation of central firms' penetration in regional markets. Firstly, governors with connections to the federal center are prone to allocate more contracts to firms from Moscow or St. Petersburg. Secondly, governors-insiders are inclined to allocate fewer contracts to firms from Moscow and St. Petersburg. Thirdly, in addition to work ties, the variation of contract allocation is also explained by other personal ties, including those created during university years. In our paper, we find statistical evidence in favour of the second and third hypotheses.

3. Research Design, Methodology and Data Analysis

Our primary dependent variable is *Head Share of Central Firms*, which is calculated as the value of all contracts received by Moscow and St. Petersburg firms, divided by the overall contract value. Head share accounts only for the contracts that are received by firms that are located directly in Moscow or St. Petersburg. This data was web-scrapped from the Unified Information System in Public Procurement of the Russian Federation (zakupki.gov.ru) and, subsequently, aggregated on the governor-year level.

We use four variables to test our hypotheses: *Federal Work*, *Local Work*, *Central Education*, and *Local Education* Dummies. We use them to account for the governors' connections that are formed during university years and professional carrier. *Federal Work* is codded one if the governor had work experience in the national legislature (The Federal Assembly), The Government of Russia, or President's Office. *Central Education* is also a dummy variable that indicates whether the governor graduated from Moscow or St. Petersburg Universities. Variables *Local Work*, *and Local Education* are coded similarly and indicate whether the governor had any government related job in the region previously and whether he or she received a diploma from local universities.

Firstly, we use linear regressions with year and region fixed effects and a battery of control variables to explore the correlation between our four main explanatory variables and the share of central firms in regional public procurement markets. We use four groups of control variables: (1) governor characteristics, (2) main indicators of regional economic development, (3) structure of the gross regional product (GRP), and (4) structure of the public procurement market of the region. We additionally estimate lagged dependent variable models to account for autocorrelation. We also ran extreme bounds analysis to fully explore the robustness of our estimates to model specification.

Secondly, we used difference-in-difference modelling to argue for causal impact of governors' personal characteristics on regional public procurement. We also test for balance of control and treatment groups and match treatment and control regions using Genetic and Nearest Neighbour Matching to ensure greater comparability. Finally, we demonstrate that our assumptions on parallel pre-trends hold using Event Study analysis.

4. Results/Findings and Discussion

Previous studies have found that governors tend to behave predatory when they have outside options or have no previous connections to the region. In this study, contrary to our expectations, working experience at federal authorities did not provide a significant impact on the allocation of PP contracts. Thus, we did not confirm the political connection / political loyalty hypothesis in this case.

However, governors who graduated from universities located in Moscow and St Petersburg are more inclined to allocate PP contracts to suppliers from these two country's major cities. The study experience at 'central' universities increases the share of central firms at 5-7 percentage points. We suppose it happens because these governors did not manage to establish reliable connections with local firms during their stay in the region. We avoid naming this behaviour predatory as it does not necessarily mean that governors use their connections for corrupt reasons. Regional governors treat PP not only as a tool for rent-seeking and wealth distribution. Considering a high number of criminal investigations against high-level officials due to violations during the execution of PP contracts, the reliability of suppliers and their capacity to execute these contracts is an essential aspect of the political survival of Russian governors. Therefore, searching for reliable suppliers to execute required PP contracts in their regions, these governors can apply to their 'old guys networks' established in their university years. Such networks at universities located in Moscow and St Petersburg can be broader and more robust. Supposedly, it happens because of more competitive entry exams and higher quality of education in these universities that all their graduates to build successful carriers with higher probability.

We found that regional governors with local working experience are less inclined to allocate PP contracts to suppliers located in Moscow and St. Petersburg. In contrast, the effects of local education are insignificant. Insider status of governor reduces the share of central firms at approximately 3-10 percentage points, depending on the model specification. This finding is consistent with previous works on regional separatism. We conclude that governors with local connections tend to behave protectively. For insider governors, it can be rational to apply to local suppliers because they know these firms and have more opportunities to monitor their performance. Nevertheless, for outsider governors without established connections in the region, it can be a risky strategy to apply to local firms. At the same time, working experience at the federal government cannot be enough to establish relevant personal connections. Therefore, appeal to 'old-friends network' can be a solution for such outsider governors. However, very often people develop such trusted personal relations in their youth, especially during their studies at university. It seems that in the case of Russian governors, university ties play a decisive role.

5. Conclusion, Contribution and Implication

In this paper, we made four contributions to the literature. Firstly, we updated the studies of regional protectionism from federal interventions in Russia by analysing the period from 2012 to 2018. Secondly, we explored the effects of personal connections on the levels of regional protectionism, showing that political connections on governor level influence public procurement contract allocation in Russia. Thirdly, we confirmed the protectionist behaviour of governors-insiders, and we find new pieces of evidence that governors with federal connections intend to outsource regional procurement contracts to "federal" firms. Finally, we highlight an importance of university ties on the preferential treatment of firms.

6. References

Coviello, D. & Gagliarducci, S. (2017), Tenure in office and public procurement, American Economic Journal: Economic Policy, 9(3), 59–105.

Libman, A., Kozlov, V. & Schultz, A. (2012), Roving bandits in action: Outside option and governmental predation in autocracies, Kyklos 65(4), 526–562

Mironov, M. & Zhuravskaya, E. (2016), Corruption in procurement and the political cycle in tunneling: Evidence from financial transactions data, American Economic Journal: Economic Policy 8(2), 287–321.

Szakonyi, D. (2018), Business people in elected office: Identifying private benefits from firm-level returns, American Political Science Review, 112(2), 322–338.

Tkachenko, A. & Esaulov, D. (2020), Autocratic governors in public procurement, European Journal of Political Economy 61, 101825.

Yakovlev, A. & Demidova, O. (2012), 'Access of firms to public procurement in Russia in the 2000s: before and after radical reform of regulation', International Journal of Economic Policy in Emerging Economies, 5(2), 140–157

Innovative models in the European centralized public procurement

Tünde Tátrai – Corvinus University of Budapest, Department of Logistics and Supply Chain Management Hungary, Budapest, Hungary tunde.tatrai@uni-corvinus.hu

Gyöngyi Vörösmarty – Corvinus University of Budapest, Department of Logistics and Supply Chain Management Hungary, Budapest, Hungary gyongyi.vorosmarty@uni-corvinus.hu

Keywords: public procurement, centralization, innovative models

1. Introduction

Centralized public procurement is in dispute in many European countries. In addition to the mandatory or optional nature, the purpose and financing of centralization is changing, and there is openness to the introduction of innovative techniques.

2. Theoretical Background and Literature Review

Dynamic Procurement Systems have appeared in many places in addition to framework agreement procedures, while in many cases the use of centralization for other purposes can be perceived. In addition to ensuring transparency, there is a need to ensure security of supply, or even a minimum technical standard. The research highlights the importance of centralized public procurement, but it also requires the provision of data and the definition of appropriate KPIs in addition to IT support.

3. Results/Findings and Discussion

It is not the existence of electronic catalogs that is an innovation today, but rather whether the catalog adequately supports purchasers and suppliers. The service nature, the role of the think tank, comes to the fore, despite the fact that many traditional models prevail in the European public procurement market.

4. References

Available upon request

Track: Analytics in Arts and Culture Management

Chairperson: Julia Trabskaya

The track Analytics in Arts and Culture Management is designed to bring together researchers and PhD students to debate the current trends in the arts and culture sectors. Recently, researchers have shown an increased interest in the arts and culture sectors.

Despite a considerable amount of literature published on the arts and culture sectors, it is still not a well-studied phenomenon. Much uncertainty still exists about the mechanisms of development and transformation of the art and culture ecosystem, stakeholders' interconnection, the role of art and culture in place management and regional development, etc. It is essential not only to study these topics but also to relieve the critical need for data with modern analysis methods such as Text Mining, Social Network Analysis, QCA, etc. Filling these gaps, employing modern approaches and analytical instruments, understanding the nature and mechanisms of the Arts and Culture sectors as a whole and as separate entities become especially topical in the current context, when museums, theatres, creative spaces, and art projects face multiple challenges.

These include new patterns of customers' behavior, digitalization, increasing direct and indirect competition, and the necessity to contribute to the development of territories. Additionally, organizations of the Arts and Culture sector are being pressured to quickly transform their concepts, business models, and representation mechanisms due to the coronavirus crisis. In this context, the track aims to attract research-oriented scholars for knowledge sharing on the state of modern academic discussion in the area of the arts and culture management.

Arts and Culture Marketing, a value co-creation within Systems perspective

Norberto Muñiz Martínez – University of Leon, Spain, Faculty of Economics and Business, nmunm@unileon.es

Keywords: cultural industries, creative cultural service ecosystems, performing arts: music and dance, place branding

1. Introduction

Place Marketing & Branding is an emerging area of marketing and management that analyzes territorial governance and marketing places as cities, regions and countries of the world seek to improve their positionings in national or international spheres, to acquire awareness and gain visibility. Cities, regions and countries of the world compete in different facets, such as attracting citizens, tourists, investments, organizing events that provide them with positive reputation, thus generating positive awareness, achieving quality of life, etc. From an academic perspective, marketing / territorial branding integrates contributions from various disciplines: urbanism and architecture, economic and human geography, urban sociology, politics and public management, marketing; so it can be said that it is a multi-disciplinary field of knowledge.

Place branding tends often to be confused with a mere place promotion based on short time advertising campaigns. These marketing campaigns are usually managed by public place organizations such as city councils, regional or national governments-whose politicians or public servants usually commission promotional actions to agencies or consultancy boards that tend to replicate similar models. However, the concept of place branding is conceptually grounded on the identity and image of the territory (Boisen et al, 2018). Place branding is more consistent when the multiple social actors involved in a territory – such as political institutions and public administrations, private organizations, social entities, cultural and sports, citizens, visitors - share a more or less harmonious vision of space and place.

This research analyzes the complex interconnections between sub-systems that used to be studied from sector isolated perspectives; thus there is lack of research addressing broader categories of engagement (Alexander et al, 2018). On one side this study explores cultural industries and artistic activities related to cities and other broader places –regions or countries-; then how cultural and ecosystems arise in cities in certain historic and institutional contexts, and how a network of organizations involved within these cities and countries are implementing marketing positionings within artistic and cultural vectors, and branding as cultural references on national or international spheres. Increasingly, cultural and artistic activities attract active tourists that are looking for cultural experiences of authenticity in the cities and sites where these cultural systems emerged. As focal key actors, the roles of the Mariinsky (Saint Petersburg), the Bolshoi (Moscow) and The Perm Opera and Ballet will be studied as leading cultural entities within their cities and Russia. The case study approach focused on these reference cultural and artistic actors, addresses lack of research of actors who assemblage diverse interacting and engagement sub-systems into holistic macro or meta ecosystems (Alexander et al, 2018).

2. Theoretical Background and Literature Review

The marketing and management paradigm of Service-dominant Logic (Vargo and Lusch, 2004, 2016) opens new theoretical-conceptual and practical perspectives, with implications not only for the economy and business management and marketing, but also with cross-sectional foundations with other social sciences. While traditional marketing has been essentially focused on the business and in general on the providing organizations -service providers-, from which actions and strategies are based towards clients, through one-to-one exchange of sales of goods or services, Service Logic provides a more global, holistic

vision, with multiple exchanges Many-to-Many Marketing (Gummesson, 2006), among diverse and multiple socio-economic actors, who interact by forming networks whose service interdependencies in their respective contexts are called service eco-systems (Akaka, Vargo and Lusch , 2013). Service Logic extends the marketing perspective beyond the economic sphere, towards a conceptualization of interactions between different actors (people, organizations, institutions, social entities, cities, nations); from these interactions emanates or a co-creation of value.

Within the emerging Service dominant Logic paradigm, cities, and also other larger territories, are conceptualized as complex systems of interactions (Spohrer, 2013). Therefore, territorial governance and marketing should try to address the complexity that arises from multiple actors involved in a territory, often with diverse and sometimes conflicting interests (reference). Therefore, more than short-term territorial marketing actions, political and management models should rethink places towards holistic integrative governance approaches (Kavaratzis et al, 2014), based on the geographic, cultural, and socio-economic identities of territories.

3. Methodolgy

As Service-dominant Logic states that value is co-created by multi-actor interactions, thus this research will be based upon methodological tools approaches that explore insights of the inherent complexity of cultural ecosystems among various actors. Complex service systems raise new challenges for research; hence this paper analyze a multilevel level of value co-creation –from micro direct interactions to macro societal service ecosystems- (Lusch and Vargo, 2014; Andreini et al, 2018), and recur to multi-method tools of complementary data collection (Brodie et al, 2013) to analyze this complexity, linking theoretical conceptual framework with empirical evidence based research through middle-range theory (Brodie et al, 2011). Thus, primary data collection methods based on qualitative in depth interviews to key actors in the ballet ecosystem involved in the city of Saint Petersburg, Moscow, and Perm, will be combined with content analysis (websites, articles and video films and documentaries by credible media producing and broadcasting corporations and film makers), and on-site observation in key places –theatres, schools, auditoriums, and relevant sites-.

Accordingly, this research is based on a multilevel –micro multi-case study, and an analysis of a macro ecosystem around ballet as artistic and cultural industry for these cities. The design combines various data collection to explore the creative process of value co-creation, interactions of focal actors around which wider service ecosystems have been created, with other multiple actors –service providers and service users-; thus forming a value constellation (Normann, 2001) around Ballet music and dance. A combination primary and secondary data collection such as interviews with service providers is addressed –ballet companies, academies, public administrations related to cultural policies-, and service users –ballet students, ballet spectators, and other customers and users- will be mixed with Netnography (Kozinets, 2010; Bowler, 2010; Brodie et al, 2013; Kozinets et al, 2018) as a method to analyze the conduct of ethnography over the internet, designed to study C2C (ballet enthusiasts or fans) in on-line communities (Bowler, 2010) and consumer engagement (Dessart et al. 2015). The methodology will be complemented with content analysis of media outputs (Bryman and Bell, 2015) such as TV films provided credible documentary producing and broadcasting corporations-, specifically focused on this artistic and cultural activity. Key statements of focal actors in interviews given on TV or videos documents will be extracted, which can also provide valuable secondary data collection about the value co-creation processes through qualitative methods (Belk, 2007).

Table 1. Multi-data collection methods to address the complexity of multi-actor ballet value co-creation

Multi-actor data collection (primary and secondary) (in-depth interviews, on-site observation, digital platforms to examined, video documents, and credible TV film documentaries)						
Service providers				Service users		
Providers & partners (costume, music, dance schools)	Focal actors (the Bolshoi and a dance school)	Interviews and on-site observation	Organizations interviewed related ballet creation	Customers interviewed (ballet spectators, tourists)	Other service users (on-line ballet enthusiasts)	Netnography: C₂C brand communities, value co-creation service platforms
		Supplementary data collection based on video or audio (TV films or programs, radio) or written documents (magazines, newspapers)				

This research will be conducted with Prof JuliaTrabskaia, HSE Saint Petersburg, and Kirill Rozhkov HSE Moscow and Saint Petersbur. Netnographic analysis is already in progress at HSE Moscow by Kirill's students, and by Norberto at University of Leon (Spain). Also onsite observation to be conducted. The methodology will be complemented with content analysis -websites, articles and video films- (Bryman and Bell, 2015).

4. Results/Findings, Discussion

1.textual analysis of the value co-creating interactions among the multiple actors identified.

2.graphic chart to mapping the cultural value co-creation in Moscow around ballet as cultural industry. Norberto will draw this graphic mapping.

5. Conclusion, Contribution and Implication

This research will deepen our understanding on the roles of leading ballet and music cultural organizations in co-creating a combined cultural and economic service ecosystem within their cities; shaping complex interactions with other multiple actors –service providers and service users-; thus forming a value constellation around Ballet and Music. The Mariinsky, The Bolshoi and the Perm Opera and Ballet are also representing ambassadorial entities representing Russia in global spheres.

6. References

Akaka, M. A., Vargo, S. L., & Lusch, R. F. (2013). The complexity of context: A service ecosystems approach for international marketing. Journal of International Marketing, 21(4), 1-20.

Alexander, M. J., Jaakkola, E., & Hollebeek, L. D. (2018). Zooming out: actor engagement beyond the dyadic. Journal of Service Management, 29(3), 333-351.

Aoyama, Y. (2009). Artists, tourists, and the state: Cultural tourism and the flamenco industry in Andalusia, Spain. International Journal of Urban and Regional Research, 33(1), 80-104.

Boisen, M., Terlouw, K., Groote, P., & Couwenberg, O. (2018). Reframing place promotion, place marketing, and place branding-moving beyond conceptual confusion. Cities, 80, 4-11.

Evans G.L. (2009), From cultural quarters to creative clusters: creative spaces in the new city economy. In: Legner M (ed) The sustainability and development of cultural quarters: international perspectives. Institute of Urban History, Stockholm, pp 32–59

Vargo, S. L., & Lusch, R. F. (2016). Institutions and axioms: an extension and update of service-dominant logic. Journal of the Academy of marketing Science, 44(1), 5-23.

Between repugnance and desire: disturbing subjects in the photography auction market

Ciara Paolino – Department of Economics and Business Management Sciences, Università Cattolica del Sacro Cuore (UCSC), Milan, Italy chiara.paolino@unicatt.it

Federica De Molli – Department of Economics and Business Management Sciences, Università Cattolica del Sacro Cuore (UCSC), Milan, Italy

Francesca Pinardi – *ATLAS Photography Gallery*, London, United Kingdom

1. Introduction

One would think that art collectors want to surround themselves with objects that are pleasant and beautiful. However, auction reports show that the market sale of works of art with disturbing subjects (such as images of sick, mutilated or dead bodies) is not only active, but also fruitful (see ArtTactic 2019). In the photography art market, for example, at recent auctions, the major part of the lots awarded with the highest prices are the ones with deviant subjects (see ArtTactic 2019).

We address our research goal with a mixed method approach. First, we run a quantitative study on an original multilevel and longitudinal dataset of the photographs of 1 766 lots from 24 artists auctioned at the major European auctions, from 2013 to 2018. We analyzed the market performance (i.e. sold or brought in, and the price) of the works of art of the selected artists in the auctions.

With this analysis, we found that, considering artworks of the same artist, the probability to get a favorable outcome at the auction is positively affected by the disturbing subject, illustrating that their deviance is positively evaluated by collectors. We, therefore, discussed these findings with photography collectors and experts in the field (10 interviews in total), in order to understand the reason underpinning the phenomenon observed. Through this qualitative study, we understood that the positive evaluation of disturbing art works can be traced back to their "extraordinariness", to the desired "change" they can bring, in terms of unacceptable break from mainstream cultural production, and to their "sophistication" (Irwin 2003).

2. Theoretical Background and Literature Review

According to social psychology, deviant are those individuals possessing qualities or attitudes that differ from the prototype (Hutchison, Jetten and Gutierrez 2011). For their unordinary nature, deviators are often stigmatized by the society (Goffman 1963). Images and pictures are not allowed, and tables should be limited and be necessary for understanding, and referred to in the body of the manuscript. Insofar as possible, tables should be self-explanatory without referring to the body of the manuscript.

Deviance, however, might be also interpreted and valued positively in a given field of reference. According to this seminal studies (e.g. Harman 1985), positive deviance used to be referred to the category of "extraordinariness", referring, for instance, to those subjects or actions that exceeded what it was considered the norm in a field of reference. In light of these studies, our study is grounded in the literature on stigma and positive deviance in the art market (see Herington and van de Fliert 2018; Shoenberger, Heckert, and Heckert 2012; Ludwig 2012), which has been growing tremendously in the recent years. While some empirical research on the topic exists (e.g. Bryant 2012; Lundahl 2018), there are still scant investigations that illustrate the reasons why actors in a art field build a positive evaluation of "out of the norm" subjects. In addition, considering the literature on collector choices, several studies have analyzed collector's tastes and art preferences showing, for example, how the artist's name (Hernando and Campo 2017), or the size

of the artefact (Higgs and Forster 2014) might affect collector's perception and, eventually, the price of the work of art. However, extant studies are mainly focused on objective characteristics of the artworks, while it has not yet been analyzed how subjects socially considered as disturbing influence the price of works of art.

Within the field of contemporary art photography, we focus on artworks representing disturbing subjects, namely artworks depicting deformity and illness, death or explicit sexuality. These subjects, indeed, being deeply related with the body, are visible and therefore subject to judgments and repulsion (Goffman 1963) if founded not aligned with the common standards of beauty, youth, health (Featherstone 2000), or acceptable behaviors (Link and Phelan 2001).

3. Research Design, Methodology and Data Analysis

In order to test the relationship between the disturbance of the artworks and their performance on the market, we developed an original longitudinal multilevel dataset collecting the market performance of 1766 lots of photographs of 24 artists auctioned at the major European auction houses operating in the photography market, from 2013 until the first semester of 2018. Data for the qualitative analysis were gathered data from 10 qualitative semi-structured interviews with collectors (4) and photography specialists (5) working in three of the major European auction houses active in the photography market, and an art critic specialized in photography (1). Interviews were carried out by two of the authors in person (8), when possible, otherwise via Skype (2).

4. Results/Findings and Discussion

In order to investigate our research goal, we carried out an empirical study through a mixed method approach. Firstly, we run an econometric analysis to test whether the presence of a physical disturbing subject influenced its performance at the auctions. Secondly, based on the results from this quantitative investigation, that underlined how considering artworks of the same artist, the probability to get a favorable outcome at the auction is positively affected by the disturbing subject, we carried out semi-structured interviews to understand why disturbing subjects were positively evaluated by collectors.

Our qualitative analysis supported the idea that the acceptable deviance of these artworks is rooted first in the character of "extraordinariness" of these artworks, where, according to our findings, "extraordinariness" can be defined as an "out of the norm" access to the external reality and to the inner deep aspects of the collectors' intimacy. Deviant subjects are positively out of the norm because of this extraordinary ability to mirror the outside and the insider sphere of an individuals and to push for a reflection. Second, deviant subjects are positively evaluated because they are considered as alternative to mainstream photography production. Disturbing subjects, indeed, seem to respond to the need to investigate more marginalized topics, in the desire to see a broader range of societal problems and issues discussed in the contemporary artistic production. Third, disturbing photography is evaluated positively because, although extremely direct in the representation of the subjects, it also speaks the language of the sophisticated artistic process, of the complex research the artist has to go through to realize this kind of artworks. According to our findings, this kind of photographs are both the door to a harsh reality, and representations of a sophisticated, accurate and elitist research process.

5. Conclusion, Contribution and Implication

This study contributes to extant literature on stigma and positive deviance in the art market (see Herington and van de Fliert 2018; Shoenberger, Heckert, and Heckert 2012; Ludwig 2012), by illustrating how the extraordinariness of deviance, together with its capacity to signal a desirable departure from what is the mainstream production and its ability to host a message of research and sophistication, are important factors in building the acceptability of disturbing subjects in the photography market. With this study, we corroborated the idea that the process of stigmatization depends on the meaning and interpretations the actors in a field build about that deviance.

6. References

ArtTactic. 2019. "Photography Auction Market Report."

Bryant, Clifton D. 2012. Routledge Handbook of Deviant Behavior. Taylor & Francis.

Coffey, Amanda, and Paul Atkinson. 1996. Making Sense of Qualitative Data: Complementary Research Strategies. Sage.

Creswell, Jhon, W. 2014. Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Sage.

Featherstone, M. 2000. Body Modification. Sage.

Goffman, Erving. 1963. Stigma. London: Penguin.

Harman, Lesley D. 1985. "Acceptable Deviance as Social Control: The Cases of Fashion and Slang." Deviant Behavior 6 (1): 1–15.

Heckert, Druann Maria. 1989. "The Relativity of Positive Deviance: The Case of the French Impressionists." Deviant Behavior 10 (2): 131–44.

———. 1998. "Positive Deviance: A Classificatory Model." In Deviant Behavior: A Text Reader in the Sociology of Deviance, 20–32.

Herington, Matthew J., and Elske van de Fliert. 2018. "Positive Deviance in Theory and Practice: A Conceptual Review." Deviant Behavior 39 (5): 664–78.

Hernando, Elisa, and Sara Campo. 2017. "Does the Artist's Name Influence the Perceived Value of an Art Work?" International Journal of Arts Management 19 (2): 46–58.

Higgs, Helen, and John Forster. 2014. "The Auction Market for Artworks and Their Physical Dimensions: Australia—1986 to 2009." Journal of Cultural Economics 38 (1): 85–104.

Hutchison, Paul, Jolanda Jetten, and Roberto Gutierrez. 2011. "Deviant but Desirable: Group Variability and Evaluation of Atypical Group Members." Journal of Experimental Social Psychology 47 (6): 1155–61.

Irwin, Katherine. 2003. "Saints and Sinners: Elite Tattoo Collectors and Tattooists as Positive and Negative Deviants." Sociological Spectrum 23 (1): 27–57.

Link, Bruce G., and Jo C. Phelan. 2001. "Conceptualizing Stigma." Annual Review of Sociology 27 (1): 363–85.

Ludwig, Erin. 2012. "Stigma in the Arts: How Perceptual Barriers Influence Individuals' with Disabilities Participation in Arts Organizations." The Journal of Arts Management, Law, and Society 43 (2): 141–51.

Lundahl, Outi. 2018. "Dynamics of Positive Deviance in Destigmatisation: Celebrities and the Media in the Rise of Veganism." Consumption Markets and Culture 0 (0): 1–31. https://doi.org/10.1080/10253866.2018.1512492.

Marra, Claudio. 2012. Fotografia e Pittura Nel Novecento (e Oltre). Mondadori.

McAndrew, Clare. 2010. Fine Art and High Finance: Expert Advice on the Economics of Ownership. John Wiley & Sons.

Rosenblum, Naomi. 2008. A World History of Photography. New York: Abbeville Press.

Shoenberger, Nicole, Alex Heckert, and Druann Heckert. 2012. "Techniques of Neutralization Theory and Positive Deviance." Deviant Behavior 33 (10): 774–91.

———. 2015. "Labeling, Social Learning, and Positive Deviance: A Look at High Achieving Students." Deviant Behavior 36 (6): 474–91.

Sontag, Susan. 1977. On Photography. New York: Penguin.

Yang, Lawrence Hsin, Arthur Kleinman, Bruce G. Link, Jo C. Phelan, Sing Lee, and Byron Good. 2007. "Culture and Stigma: Adding Moral Experience to Stigma Theory." Social Science & Medicine 64 (7): 1524–35.

Impact of Major City Event on Revisit Intention of Museum Visitors using SEM and Conditional Inference Tree Modelling: Case of Long Night of Museums at Saint Petersburg

Aleksei Gorgadze, Anastasia Sinitsina, Julia Trabskaya – HSE University, St. Petersburg Tartu University, Estonia

Keywords: Long Night of Museums, Major City Event, Museum, Revisit Intention, Satisfaction, Perceived Value, Conditional Inference Tree, SEM.

1. Introduction

Past decades major city-level events organised in collaboration with museums have become popular phenomenon. "Long Night of Museums" is a bright example of such kind of an event. Museums take part in the event, prepare special programmes, apply creative tools to increase attractiveness of museum and in its turn improve attractiveness of major city event. In this sense, museums can be seen as trigger to enforce visitors to revisit major city event.

However, it is still not clear which exact benefits can museums take from major city event and which role does major city event play in the museum's attractiveness for visitors.

Questions arise on how perception and satisfaction from a major city event influence on behavioral intentions regarding certain museum. Additionally, much uncertainty still exists about detailed mechanism of visitors' behaviour, intention and decision-making.

This research seeks to address the following questions: how the perception of and satisfaction from a major city event influences on behavioral intentions of museum visitors, what is visitors' behaviour in detail.

To understand the first question we used cognitive, affective, and conative model, including perceived value, satisfaction and behavioral intentions. Previous literature have shown that up to this day studies do not cover all possible variables. We have adjusted the model to comply with the analyzed literature and developed new combinations of dimensions, namely attractiveness, fitness, uniqueness, atmosphere.

For the purposes of the analyzing mutual influences of cognitive, affective, and conative components we used confirmatory factor analysis (CFA), structural equation modelling (SEM).

To gain more in-depth knowledge of mechanisms and variability of visitors' intention and behaviour, we used a structural equation modelling, which highlights the most influential dimensions.

The current study add to a growing body of literature on museum visitors' intention forming process. There are several important areas where this study makes original contributions: (1) the study has gone some way towards enhancing our understanding of interconnections of perceived value, satisfaction and behavioral intentions; (2) developed new combinations of dimensions, namely attractiveness, fitness, uniqueness, atmosphere; (3) this is the first study to utilize a conditional inference tree for studying interconnections of perceived value, satisfaction and revisit intention/ visitors' behaviour.

The findings of this study have an important implications for future practice. The practical input of the study is developing an instrument which will allow museums to predict visitors' behaviour and intention.

2. Theoretical Background and Literature Review

Researchers have long been trying to measure cognitive (represented by perceived value) and affective (represented by satisfaction) components to assess factors that shape behavioral intentions. In our study, we present the following variables based on literature analysis.

Figure 1. Theoretical framework of the PV-IR interaction.
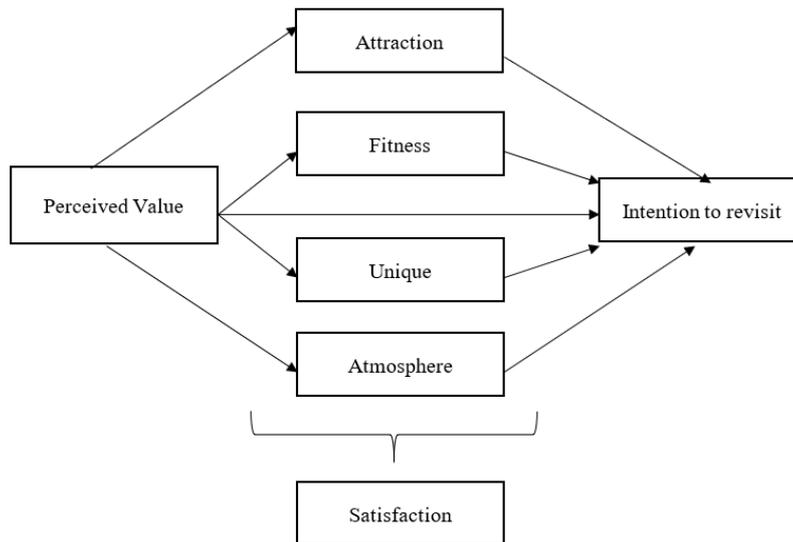
Perceived value. There are two approaches to analyzing perceived value: one-dimensional and multi-dimensional. To measure perceived value more accurately researchers argue that the multidimensional approach is more relevant for a deeper understanding of processes and mechanisms behind visitor behavior, especially in the area of museums and events, where the one-dimensional approach is too simplified (Baker and Crompton 2000; Shen, 2016). We modelling visitor perceived value via experience and place reputation.

Experience. According the experience economy concept customers tend to pay rather for an experience, then for product or service (Pine, Gilmor, 1999). Researchers underline the value of the experience for museums visitors (Roppola, 2012; Dirsehan, 2012) and events visitors (Rodriguez-Campo, Alen-Gonzalez, Fraiz-Brea,Louredo-Lorenzo, 2019). Events create a certain experience that encompasses museums participating in these events; also museums can create a very new experience during events. Codignola, Mariani (2017, p.) argue that '…to realize complete and satisfactory experiences for visitors, museums realize a growing number of public-involving actions and supply a range of digital and non-digital tools'. The authors quite appropriately mentioned digital tools; in other words, today experience can be formed by two channels: the experience of a real-life visit and of a digital visit, meaning that a visitor did not attend the event physically but has gained the experience through information and a virtual visit to the museum. Thus, we measure two types of experience – real and quasi experience, brought about by information and digital instruments. It is reasonable to expect that experience is an important dimension of perceived value that influence on visitors' satisfaction and has an indirect influence on their intention to revisit.

Reputation. Perceived value includes a dimension - reputation (Petrick and Backman 2002; Kim, 2010). There are two ways to create reputation: the experience of previous visits and acquiring information; for instance, destinations, events, and museums can build their reputation through media exposure (Li, Song and Collins, 2014). Some researchers in the field of museums empirically tested that reputation has a significant influence on revisit intention (Zhang, Wu, Buhalis, 2018; Umar, Suharyono, Andriani, 2017;

Stylos, Bellou, Andronikidis,Vassiliadis, 2016). In the case of events, it was also noted that reputation is a part of perceived value and has a positive effect on satisfaction and intention to visit or revisit (Kim, 2010). Also, if an event (including museums) builds a positive reputation, it can influence the reputation of a particular museum. The reputation of the event and museum can be linked.

Modelling visitor satisfaction, researchers have arrived at the idea that satisfaction is generated under the influence of material as well as affective and emotional attributes (Bigné et al., 2005; Prayag et al., 2013). In the museum-event context, satisfaction can be measured via attractiveness, uniqueness, atmosphere, fitness.

Attractiveness. Attractiveness is a significant stimulator intensifying interest in history of events and museums and encouraging visitors to study museums and their collections. As a result, attractiveness of museums and events increases their cultural recognition and has an important role for visitors and increases revisit intention of visitors (Tsaur, Wang, Liu, Huang, 2017; Zhang, Chang, Tsai, 2018; Baker and Crompton, 2000).

Uniqueness. Today visitors are interested in unique service. There is a kind of pursuit of uniqueness. Uniqueness is a significant dimension of satisfaction, an important affective attribute and it influences revisit intention. Sharpley (1994). Tsaur, Wang, Liu, Huang (2017) argue that novelty-seeking shape event attachment. Authors claim that searching for novelty including unique experiences is an important motivation; 'The unique experience, associated benefits and the positive emotive feelings… During festivals, the visit itself is a way to have novel experiences. Novel things or items attract the attention of visitors and win their recognition' (Tsaur, Wang, Liu, Huang, 2017, p.20). Researchers emphasize the importance of uniqueness. Uniqueness helps remove the banality, step out of everyday life; uniqueness is called affective image that stimulates revisit intention (Liu, Wang, Huang, Chen, 2017). Thus uniqueness of events and uniqueness of museum activity during events can influence behavior of museum visitors.

Atmosphere is vital dimension of saticfaction (Tsaur, Wang, Liu, Huang, 2017)**.** The construct 'satisfaction' as affective component implies a significant role of emotions (Liljander, V. and Strandvik, T., 1997). Undoubtedly, there is an emotional quality to appeal, uniqueness, but at the same time, visitors are left with emotions that are hard to assess. A good indicator here is the atmosphere of a museum and event. Visitors often mention the atmosphere. The atmosphere is expressed through spirits, tastes, and lifestyles of visitors Bonn (2007).

Fitness. According Liu, Wang, Huang, Chen, (2017) dimention Fitness based on the concept compatibility by Kaplan (1995). Liu, Wang, Huang, Chen, (2017) applied dimension fitness in the context of destinations; and defined as visitors' sense of how well visiting experience correlates to self image of a visitors, allowing visitors to be themselves, in other words, some sort of self-congruity (perceive that experiences at a destination has fitness with their own self image, allowing them to freely being themselves in the destination for enjoying involuntary attention) 258. Indeed, when a museum and event suit visitors' taste, fit their spirit, relate to their lifestyle, it increases satisfaction and has a tremendous impact on revisit intention.

However, according to the authors of the present article, in order to demonstrate fitness, it is not enough to simply analyze its cognitive aspects. Important components of fitness (according to the concept of comfortability) also include material attributes and physical fitness that have an immense significance for visitor satisfaction (Bigné et al., 2005; Prayag et al., 2013). When it comes to museums, Jeong and Lee (2006) stated that physical environment initiates emotional affect and is important for visitor satisfaction. The physical environment is also cited as a crucial factor in the study by Zhang, Chang, Tsai (2018); it

helps predict visitor behavior and is associated with service quality. Thus physical fitness is formed by outer and inner facilities and can be perceived and evaluated by visitors. "Museum visitors satisfied by physical fitness are more likely to recommend and disseminate favorable comments to others" (Zhang, Chang, Tsai, 2018, p.25).

Thus, visitor satisfaction is connected with both cognitive and physical attributes fitness, impact on museum visitors' behavioral intentions.

Behavioral intentions. Traditionally, it has been argued that **behavioral intentions** measured by three dimensions: revisit intention, positive word of mouth (Zeithaml, Berry, and Parasuraman 1996), willingness to recommend (Anderson et al., 1994).

Authors argue that visitors' satisfaction with an event can be predicted by the perceived value of the event; intention to revisit a museum or a cultural organization can be predicted by the perceived value of the event, and intention to revisit a museum or a cultural organization can be predicted by satisfaction with the event.

3. Research Design, Methodology and Data Analysis

Sampling and data collection

The research data source is the Long Night of Museums 2019 in St. Petersburg. It is the most popular annual cultural event in Russia. More than 100 people visit this Festival in 2019. Moreover, there is an increase of the Long Night of Museums participant's digital activity (Gorgadze 2019).

One of the distinguishing features of the festival is the presence of many venues. There were 120 cultural organizations, which participate in the event. We have selected 4 museums, on the territory of which a visitor survey was organized: Anna Akhmatova Museum in the Fountain House, Museum of Hygiene, Petersburg Museum of Buses, Russian Railway Museum.
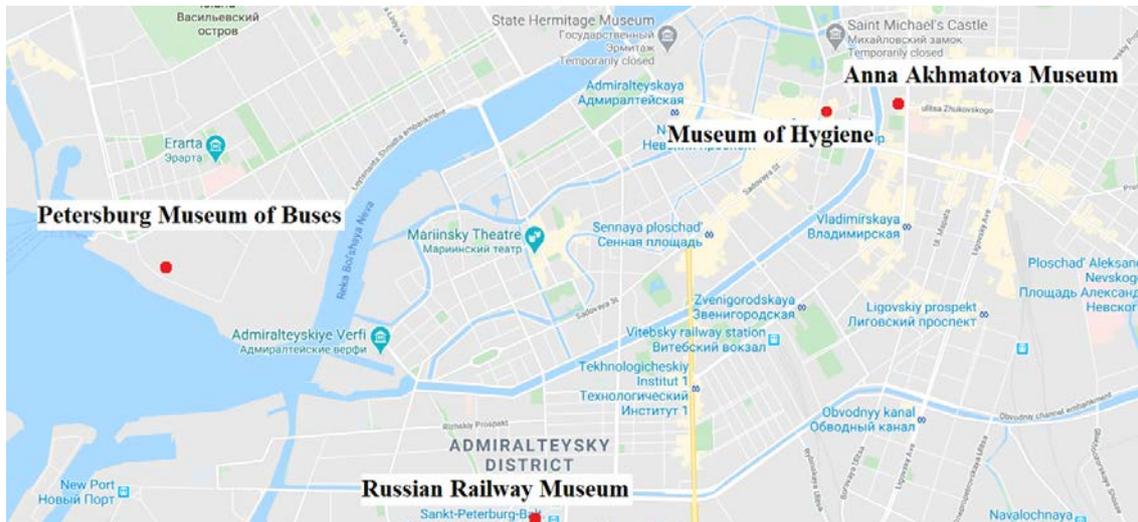
Figure 1. Museums, on the territory of which a visitor survey was organized.

This study is based on a quantitative data collection method. We organized several groups of interviewers who interviewed the visitors simultaneously in all the selected territories. To achieve valid results, a respondent selection mechanism with an element of randomness was used (with step 5). 298 valid questionnaires were collected from festival visitors.

Measurement

The purpose of the survey is to reveal of visitors' perception and satisfaction impact of event on their behavioral intention. The desired variable is the visitors' intentions to revisit, which is based on one proposition: «I would like to visit this place again after the Long Night of Museums Festival».

Perceived value represents three categories of visitors based on the experience and reputation:

1. have not been to this place before;

2. was previously but does not appreciate the reputation of the place;

3. was previously and appreciates the reputation of the place.

Satisfaction consists of 4 blocks (attractiveness, uniqueness, atmosphere, fitness), each of which consists of several propositions. The respondents were read the judgment and were asked to evaluate the degree of agreement on a scale of 1 to 4, where 1 - completely disagree, and 4 - completely agree.

Methods

To answer for the first research question we estimate theoretical model (Figure 2) utilizing structural equation modeling (SEM). Attraction, Uniqueness, Fitness and Atmosphere dimensions we form using factor analysis. Both factor analysis and structural equation modeling were processed using Stata programm. Wherein we confirm from theory questions to form factors. Hence, we utilize confirmatory factor analysis (CFA) and insert formed factors in structural model as set of independent variables.

Further to address the second research question we widen our empirical analysis with conditional inference tree (CTree) (Hothorn, Hornik, Van de Wiel, Zeileis, 2006) using R package «partykit» (Hothorn, Zeileis, 2015). This method evaluate a regression relation using binary recursive splitting in a conditional inference environment. Obviously, it is impossible to cover all the factors considered earlier in the scientific literature, and we wondered which factors are most influential in predicting a return visit. Using CTree, we decided to optimize the model, leaving only the most significant variables. The independent variable is the intentions to revisit, and the dependent variables are the same as in the structural model (Attraction, Uniqueness, Fitness and Atmosphere dimensions). It is worth noting that for this model, we calculated the average values of the variables.

4. **Results/Findings, Discussion**

Empirical Model

At the first stage we apply CFA and form the factors for Attractiveness, Atmosphere, Uniqueness and Fitness based on the following survey questions.

Table 1. CFA for for attraction, fitness, uniqueness and atmosphere

Construct	Question	Question mean	Question Standard Deviation SD	R square for factor loading
Attractiveness	Here my mood improves.	3.44	0.81	0.44
	This place has many interesting objects that I would like to observe.	3.48	0.85	0.13
	I enjoy every moment here.	3.13	0.95	0.55
	I would like to spend more time here.	2.81	1.04	0.28
Atmoshere	Spaciousness of the museum helped me enjoy the Long Night of Museums here.	3.37	0.87	0.37
	Here I appreciated the opportunity to interact with other visitors.	2.73	1.16	0.14
	Creativity of the event here helped me enjoy staying in this place.	3.41	0.83	0.51
	Light effects used in the event helped me enjoy staying here.	2.67	1.26	0.44

	Sound effects used in the event helped me enjoy staying here.	3.06	1.12	0.51
	Surroundings of the museum (park, garden, street outside the museum) helped me enjoy this place.	3.59	0.73	0.39
	I appreciated the opportunity to not only watch but also participate in the event.	3.03	1.06	0.33
Uniqueness	This place has a unique style.	3.62	0.65	0.56
	This place is not different from other cultural organizations.	3.26	0.97	0.35
	I do not know any other place in Saint Petersburg where I can have that much fun.	1.53	0.83	0.17

Fitness	My lifestyle matches the atmosphere of this place	2.79	1.06	0.21
	I find this place appealing.	3.34	0.91	0.59
	I do not find this place congenial.	3.26	1.07	0.09
	This place needs additional maintenance.	2.88	1.09	0.10
	I found it hard to get to this place.	3.3	1.1	excluded
	Overcrowding was interfering with my experience in this place.	3.3	1.01	0.08
	This place needs more personnel to keep order.	3.63	0.79	0.021
	The personnel are very polite and ready to answer any questions.	3.68	0.66	excluded

Note. Initial questions were asked in Russian language and later for research purposes were translated in English

Standardized factor loadings with the corresponding p-values for Attractiveness factor formation reveals to be statistically significant. Question 13_7 an 13_2 have the highest R square meaning while for q13_6 and

13_15 prediction is the lowest. Overall Attraction as factor predicts at least 72% of overall dispersion of the initial variables.

Cronbach's alfa for 4 factors is 0.75 meaning that all factors are measuring similar thing. And from theoretical perspective this result is not surprising as Attractiveness, Atmosphere, Fitness and Uniqueness are different dimensions of the broader concept of satisfaction. As our goal is to identify the relationship between different sub-components of satisfaction and avoid aggregation, we continue our analysis using 4 factors that we formed before as independent variables. The other independent variable that we control for is perceived value that is formed based on the question and included in structural model as categorical variable with 3 levels- 1- I have never been here before; 2- I have been here, but I don't like it too much; 3- I have been here before and liked it.

As dependent variable, we use behavioral intention presented by the question – I would like to visit this place one more time after the Long Night of Museums.

As the second step in our analysis we apply SEM. The path coefficients with associated significance values are presented in Table (Or Diagramm?) below. In model we estimate direct and mediate effects of variables following our theoretical model and obtained the following path coefficients.
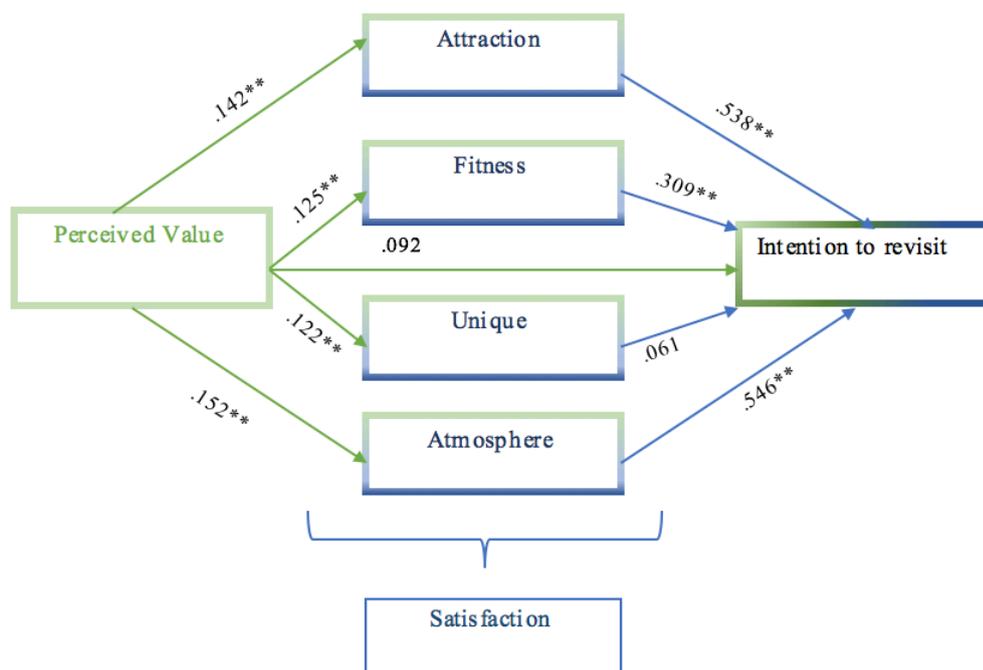

Diagram 1. Structural Model
Note: Coefficients of models are above and below the arrows
*significant at 10%; ** significant at 5%; significant at 1%*
Source: own calculations based on Survey results

Model goodness of fit is acceptable: RMSEA 0.057 that is less than cut-off point 0.10; CFA (0.961) and TLI (0.930) are both close to 1; SRMS (standardized root mean squared residual) is 0.046 and CD (coefficient of determination) is 0.193

Overall effect of perceived value- in our case we have not overall effect as we don't find any significant direct impact. However, we have large mediation effect of perceived value on factors and through them perceived value effect on behavioral intentions to revisit the place.

0.076+ 0.038+ 0.082=0.196

Conditional Inference Tree

As the final step in our estimation we apply conditional inference tree to reveal what factors are the most influential for behavioural intentions to revisit. For tree construction we apply the same set of independent variables and test for its impact on dependent variable- intention to revisit.
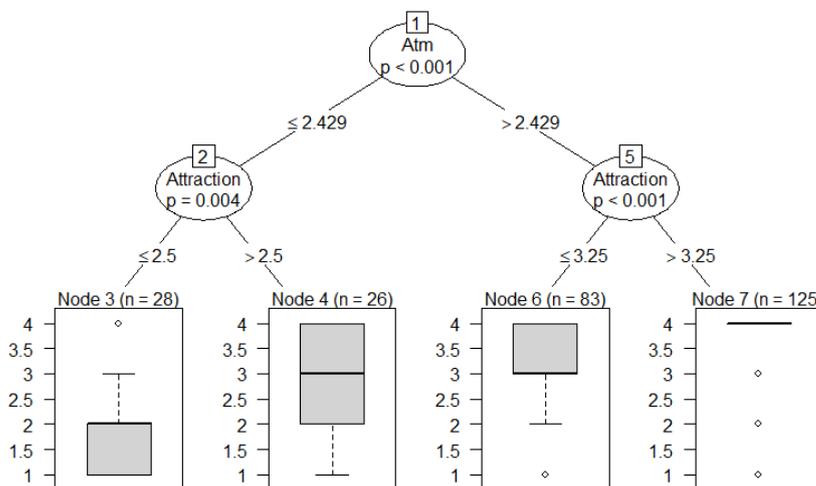

Figure 2. Conditional Inference Tree.

The Conditional Inference Tree (Figure 2) shows that the atmosphere of the place is the most significant variable. In the first step, the algorithm distinguishes observations with a low atmosphere value (≤ 2.429) and a high atmosphere value (> 2.429). With a low rating of the atmosphere and a low level of attractiveness (≤ 2.5), the desire to visit visitors again will be minimal (mean = 1.893, n = 28, err = 24.7). With a high value of attractiveness (> 2.5), there is a large variation in the desire to visit again, but respondents are more willing to visit the place again (mean = 3.0, n = 26, err = 26.0). Places with an atmospheric level (> 2.429) are also divided by level of attractiveness. Places of medium attractiveness ($<= 3.25$) demonstrate a high degree of repeat visit close to node 4 (mean = 3.301, n = 83, err = 53.5), and the most attractive places (> 3.25) provide the highest degree of repeat visit among visitors (mean = 3.760, n = 125, err = 42.8).

Thus, of all the factors, the atmosphere and the place attractiveness play the most important role. A high degree of atmosphere and attractiveness provide the greatest effect when you want to visit again.

5. Conclusion, Contribution and Implication

The main purpose of this study is to examine and clarify relationship between dimensions of satisfaction that have an impact on revisit intention of museum visitors in the context of major city event. Firstly, we

found direct effect of satisfaction from major city event on revisit intention of museums visitors. This findings of the current study are consistent with (reference). In contrast to earlier findings (Kim, 2010), however, current research found that perceived value of major city event does not reveal to have any significant direct effect on intentions to revisit museum. However, we found significantly large immediate effect on intention to revisit through other dimensions.

Secondly, the questions from the questionnaire allow to compile factors into a factor model (SFA).

Thirdly, in our research we left out satisfaction as an aggregated construct, but analyzed each dimension of satisfaction separately – Uniqueness, Fitness, Attractiveness, Atmosphere. As a result of conducting SEM, we established that Attractiveness and Atmosphere revealed to be the most impactful dimensions on intentions to revisit. These are new results, since for the first time Attractiveness and Atmosphere were identified as the most important factors.

Fourthly, CTrees confirmed the SEM results. Thus, of all the factors, the atmosphere and the attractiveness play the most important role. A high degree of atmosphere and attractiveness provide the greatest effect when you want to visit again.

Fifthly, the research succeeded in defining not only significant dimensions but the most important combinations of dimensions as well.

Practical implications In general, the results prove their importance for museum management, confirming beneficial effects of participation in city events and role of the participation on encouraging revisits. The results have immense practical significance for museum employees. Thus, museum managers have to understand that atmosphere and the attractiveness bear substantial meaning for visitors and appear to be the most important factor in acting on revisit intention.

6. References

Baker, D. A., & Crompton, J. L. (2000). Quality, satisfaction and behavioural intentions. Annals of Tourism Research, 27(3), 785- 804. Bermam, B. (2005). How to delight your customers. California Management Review, 48(1), 129-151.

Heinonen, K. (2004): Reconceptualizing customer perceived value - the value of time and place, Managing Service Quality, 14 (2/3), 205-215

Roppola (2012) Designing for the museum visitor experience Publisher: Routledge

Lai, I. K. W. (2014). The role of service quality, perceived value, and relationship quality in enhancing customer loyalty in the travel agency sector. Journal of Travel & Tourism Marketing, 31, 417–442. doi:10.1080/10548408.2014.883346

Liu, C.-H. S., & Lee, T. (2016). Service quality and price perception of service: Influence on word-of-mouth and revisit intention. Journal of Air Transport Management, 52, 42–54. doi:10.1016/j.jairtraman.2015.12.007

Hutchinson, J., Lai, L., & Wang, Y. (2009). Understanding the relationships of quality, value, equity, satisfaction, and behavioral intentions among golf travelers. Tourism Management, 30(2), 298–308. doi:10.1016/j.tourman.2008.07.

Federica Codignola, Paolo Mariani Management Studies, Mar.-Apr. 2017, Vol. 5, No. 2, 75-90 doi: 10.17265/2328-2185/2017.02.001 Location Attractiveness as a Major Factor in Museum Visitors' Choice and Satisfaction

Laing, J., Wheeler, F., Reeves, K. and Frost, W. (2014), "Assessing the experiential value of heritage assets: a case study of a Chinese heritage precinct, Bendigo, Australia," Tourism Management, Vol. 40, pp. 180-192.

Jeong, J.H. and Lee, K.H. (2006), "The physical environment in museums and its effects on visitors' satisfaction," Building and Environment, Vol. 41 No. 7, pp. 963-969.

Liljander, V. and Strandvik, T. (1997), "Emotions in service satisfaction," International Journal of Service Industry Management, Vol. 8 No. 2, pp. 148-169.

Li Li, Jie Zhang, Sifeng Nian & Honglei Zhang (2017) Tourists' perceptions of crowding, attractiveness, and satisfaction: a second-order structural model, Asia Pacific Journal of Tourism Research, 22:12, 1250-1260, DOI: 10.1080/10941665.2017.1391305

The Influence of Social Interactions through Online Media Platforms on Destinations Brand Awareness

Alicia Adriani – National Research University Higher School of Economics, St. Petersburg, Russian Federation

Aleksei Gorgadze – National Research University Higher School of Economics, St. Petersburg, Russian Federation

1. Introduction

The internet and social media play a huge role in building a brand and advertisement marketing. Travel writers, bloggers, and companies are exploring social media content marketing as engagement rate based on online social interaction in Web 2.0 is becoming more crucial to establish a personal brand. The study focuses on the connection between the social influence theory, destination branding, and how the implementation of those practices affects the wide-spread practice of social media marketing. The study concluded digital marketing strategies for destinations based on the study on three different regions (Bali, Turkish Aegean coast, and Abruzzo-Molise). A part of the study focused on the general consumer and market perception of both media and user-generated content on several types of content based on visual and linguistic factors.

2. Theoretical Background and Literature Review

Social engagement in online platforms impacts destinations' brand awareness and plays a role in developing and fixing the regional issues.

3. Research Design, Methodology and Data Analysis

The study focuses on the connection between the social influence theory, destination branding, and the wide-spread practice of social media marketing. The study concluded brand strategies for destinations based on the case study on three regions (Bali, Turkish Aegean coast, and Abruzzo-Molise) and the result of the analysis.

4. Results/Findings, Discussion

This factors that make a content attract an audience in this study focused on linguistic factors and color theory. General surveys for frequent travelers and foreign locals (expats) all over the world were conducted. Interviews with digital marketing experts and travel influencers were conducted to determine which type of engagement gain positive feedback on destinations' brand. The results were then applied into three destinations. Local surveys and interviews with foreign locals in the destinations, tourism boards, and local business owners were gathered.

5. Conclusion, Contribution and Implication

COO affect the level of color harmony. The main hue and subtone preferred by the touristic segmentation are the colored pictures—particularly in blue, cool sub-tones, complex color harmony. English-speaking users are more inclined to complex words to describe an experience.

Engagement level in online platforms is crucial to brand growth. Positive content of human interest gains more interactivity. Negative content increases the level of interactivity in the online platforms exponentially.
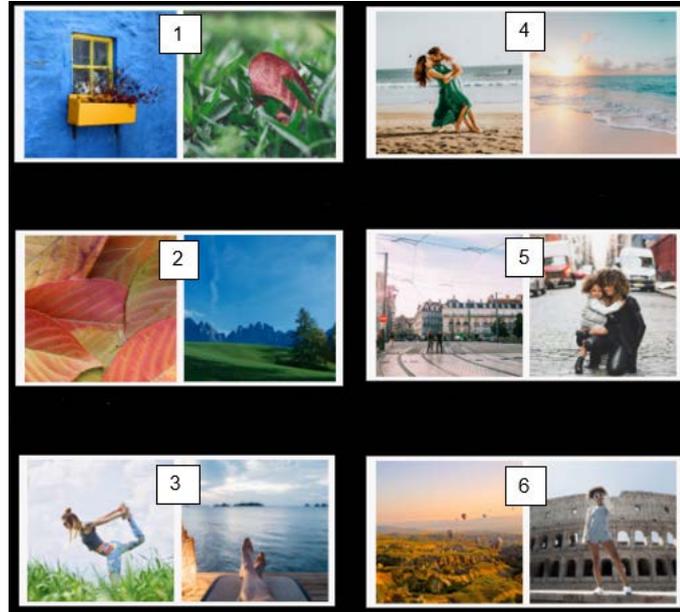
Picture 1. Visual perception (comparison) (1) Contrasting hue (Blue-Yellow;Red-Green), (2) Corresponding hue (Red-Yellow;Blue-Green). (3) Active;Passive. (4) Natural landscape (With people;without people). (5) City landscape (With people;without people) (6) City/Natural landscape + Warm;cool (With people;without people)
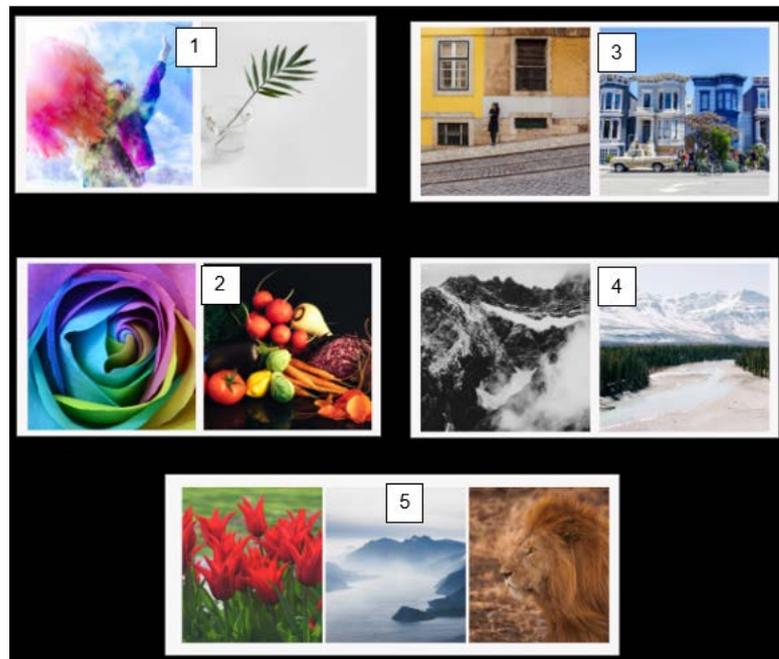
Picture 2. Visual perception (comparison) (1) Simple;complex, (2) Artificial;natural. (3) Warm(yellow);cool(blue). (4) Monochromatic;colored. (5) Red;Blue;Green
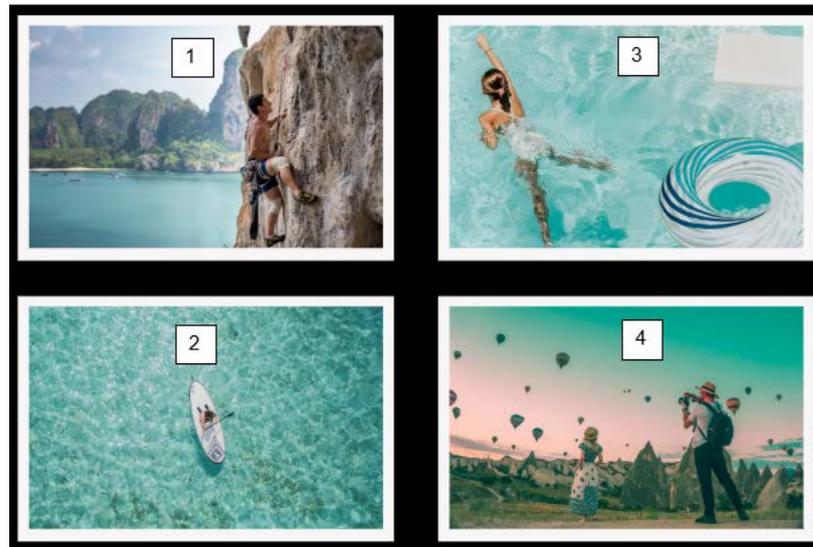
Picture 3. Correlation – Visual-Adjectives

6. References

Blaer, M., Frost, W. and Laing, J., 2020. The future of travel writing: Interactivity, personal branding and power. Tourism Management, 77, p.104009.

García-Perdomo, V., Salaverría, R., Kilgo, D. K., & Harlow, S. (2018). To share or not to share: The influence of news values and topics on popular social media content in the United States, Brazil, and Argentina. Journalism studies, 19(8), 1180-1201.

Harrigan, P., Evers, U., Miles, M.P. and Daly, T., 2018. Customer engagement and the relationship between involvement, engagement, self-brand connection and brand usage intent. Journal of Business Research, 88, pp.388-396.

Hsiao, S.W., Yang, M.H. and Lee, C.H., 2017. An aesthetic measurement method for matching colours in product design. Color Research & Application, 42(5), pp.664-683.

Hsiao, S.W. and Yang, M.H., 2017. A methodology for predicting the color trend to get a three-colored combination. Color Research & Application, 42(1), pp.102-114.

Huete-Alcocer, N., 2017. A literature review of word of mouth and electronic word of mouth: Implications for consumer behavior. Frontiers in psychology, 8, p.1256.

Huete-Alcocer, N., Martinez-Ruiz, M.P., López-Ruiz, V.R. and Izquiedo-Yusta, A., 2019. Archeological tourist destination image formation: Influence of information sources on the cognitive, affective and unique image. Frontiers in psychology, 10, p.2382.

Kusumasondjaja, S., 2017. Commitment to Online Community and Continuance Intention: Issue Involvement, Interactivity, and Social Interaction. Jurnal Bisnis dan Manajemen, 18(2), pp.90-103.

Marozzo, V., Raimondo, M.A., Miceli, G.N. and Scopelliti, I., 2020. Effects of au naturel packaging colors on willingness to pay for healthy food. Psychology & Marketing, 37(7), pp.913-927.

Ou, L. C., Yuan, Y., Sato, T., Lee, W. Y., Szabó, F., Sueeprasan, S., & Huertas, R. (2018). Universal models of colour emotion and colour harmony. Color Research & Application, 43(5), 736-748.

Creative Career Pathways: Benefits and Obstacles

Elena Elkanova – National Research University Higher School of Economics, St. Petersburg, Russian Federation elen.elkanova@gmail.com

1. Introduction

During past 10 years the labour market has changed significantly with introduction of freelancing and various software tools for remote work and self-promotion. Specifically, the world faced emerging opportunities to monetize creativity not only for giant corporations, but for individual artists as well. If previously they considered their artworks solely as hobbies, nowadays they have a possibility to establish a small enterprise or register as a sole proprietor and conduct business. The changes mentioned above encouraged youth to switch careers to creative occupations.

Regardless the transformations in the field, there are still many hurdles like precarious working and living conditions, difficulties to secure the job, unstable income flows, employability for creative work in general, high competitiveness in creative industries and intellectual property protection.

The research has an exploratory nature. The paper explores artists' experiences of building creative career pathways and builds up portraits of creative workers among youth. Specifically, successful practices are described, and recommendations provided. The study seeks to answer such research questions as: 1. What ways of monetization creativity young artists exploit nowadays? 2. How do they change careers? And do they experience the process of career transition? 3. What are the benefits of switching to creative occupations? What are the challenges? 4. What are the key factors of achieving high performance in creative field?

2. Theoretical Background and Literature Review

The notion of creative industries emerged as political initiative of New Labour Party in UK to boost economic development. There are various classifications of creative industries. According to UNCTAD report creative industries provide potential for sustainable economic growth in both developed and developing countries (UNCTAD, 2019).

Scholars also show a great interest to the topic examining different aspects of creative economy, impacts of creative industries on quality of life and destination image, creative workforce challenges and advantages. Creative work does not necessarily occur in creative industries occupations (Ashton, 2015). Creativity term is widely used in scientific literature in a broader meaning. To be more specific, Richard Florida (2003) who he a well-known scholar in this field, claims that creativity is embedded in all human activities. All businesses, all ventures imply creative in nature thinking.

Some authors make a distinguish in creative employee and creatively occupied worker (Ashton, 2015). Whereas a lot of people are employed in creative industries, not all of them have creative nature of work, for instance security guards, accountants, and managers. On the other hand, there are employees who are not working in creative industries, but, nonetheless, creatively occupied (a professor of literature in university or an advertising copywriter in a big FMCG company). Besides, to be more accurate one should also take into account those whose second job is creative, and freelancers.

The aspect of career shifts among graduates (in both directions) is also a discussed topic in academic literature. Some are switching to non-creative work, while non-creative students on the contrary end up

with creative work. However, this paper primarily focuses on artists who are occupied with creative work, thus some types of employees in creative industries are excluded from the study.

3. Research Design, Methodology and Data Analysis

The study has an exploratory nature, and utilizes the case method to reach its primary aim. The study was carried out within a framework of the course "Creative and Cultural Industries" in 2019. The aim of the assignment was to draw a portrait of creative worker in Russia. The list of profession was formed in advance, so that students were selecting the field they were more interested in. The participants were selected to provide a diversity of opinions. Students worked in groups of two. They selected a person they found the most outstanding person in selected occupation or the most interesting. All the choices of occupations and representatives students have chosen were the matter of negotiation and approval by the authors. One of the criteria was earning money on creative work. Whether the respondent was self-employed or hired employee of particular institution, the person should earn money on their activities. The volume of profits in the study is not a crucial issue. Another criterion was a willingness to participate.

The list of questions was formed and discussed as well, so that all the interviews have the same direction and framework. The questions were semi-structured. They included several blocks: background information; source of income and expenses; working process; form of organization (individual entrepreneurs, self-employed, etc.); and funding. As the representatives of various occupation have different context, working conditions and process of work, guides were modified and adapted to suit better for the particular profession, though the canvas and core blocks remained untouched.

Research project was coordinated by the lecturers who set the ground rules, guides, interview strategies. The respondents were contacted via emails or social media by students. an official invitation to take participation in project was sent. All interviews were conducted in Russian and translated into English. all interviews were recorded either on audio recorder or on video. The results of the interviews were designed as submitted papers, besides the main results of the research project were discussed and presented during the class.

The study utilizes primary and secondary data. Secondary data sources include official websites, social media accounts, publication in media used to complement information collected by interviews. Photos of respondents and examples of work were collected via secondary sources.

4. Results/Findings and Discussion

The interviews were analyzed, and provided a clear understanding of people who are engaged in creative work: the age, education background, professions and forms of organizations (sole proprietor, self-employed/ freelancer, employees). The respondents shared their personal stories of success and failures of building up a career. The common distinct obstacle is being torn between their passion and the need to survive.

5. Conclusion, Contribution and Implication

The findings can be crucial for artists and potential creative entrepreneurs. Besides, those who want to change their career path can also benefit from the research recommendations. Moreover, in the end of the paper distinct guidelines for the regulators who set cultural policy and are in charge of funding.

The study has several limitations connected with selected methods and sources. As the answers are limited to respondents of selected occupations, they cannot be generalized to all the occupations. The future research may consider interviewing more representatives; conducting focus groups.

6. References

Ashton, D. (2015). Creative work careers: pathways and portfolios for the creative economy. Journal of Education and Work, 28:4, 388-406, https://doi.org/10.1080/13639080.2014.997685

Florida, R. (2003). The Rise of the Creative Class: And How It's Transforming Work, Leisure, Community and Everyday Life, New York, Basic Books.

UNCTAD (2019). How the creative economy can help power development. UNCTAD. https://unctad.org/en/pages/newsdetails.aspx?OriginalVersionID=2230

Transformation of Educational Museum Activities in the Conditions of Development of Online Technologies

Irina Sizova – National Research University Higher School of Economics, St. Petersburg, Russian Federation iasizova@hse.ru

Keywords: keyword1, keyword2, keyword3, keyword4, keyword5

1. Introduction

The concept of "education" in the museum context is interpreted as the development of a person, the formation of his psyche, personal qualities, mental properties, value attitude to the world. The specificity of museum education is determined by the fact that it is carried out on a subject basis and in a specially organized, aesthetically significant, and meaningful subject-spatial environment. It began to form in museums from the late 19th - early 20th centuries [Hooper-Greenhill, 1991]. However, various forms of educational activity became especially active in museum practice in the second half of the 20th century [George E. Hein, 1998]. Over the years, a system of interaction between museums of different fields with different educational organizations, such as schools, colleges, universities, has been globally formed. Museums began to actively create specialized resources aimed at helping teachers and students in the development of training courses - specialized thematic excursions, study passes, teaching aids for teachers on the use of museum expositions in the educational process, etc. All these events were characterized by face-to-face meetings.

At the same time, museum education belongs to the informal sphere [Dana Dudzinskaya-Przesmitski and Robin S. Grenier]. It is democratic, devoid of rigid schemes, and is applicable to literally all strata of society: children and adults, locals and tourists, healthy people, and the disabled. As a result, the transformation of educational activities in museums is quite easy. This is especially evident in the context of the explosive growth of online technologies and their penetration into all spheres of society. Therefore, today we are witnessing the transformation of the educational activities of museums, which has intensified due to the COVID-19. There are more and more museum online resources for children and adults.

The aim of the study is to identify the activity of various fields museums in the development and implementation of educational online products both in their own educational activities and in the process of formal and nonformal education, together with universities, schools, institutions that implement it. To achieve this goal, we aim to answer the following research questions:

1) what online museum resources can be considered educational and why?

2) with what organizations do museums collaborate to develop such resources?

2. Theoretical Background and Literature Review

In our study, we rely on two theories: the theory of distance education [Shailendra Palvia; Yoany Beldarrain] and museum education [Edward W. Taylor; Dana Dudzinska-Przesmitzki]. Both theories are very well studied. According to the theory of distance education, we highlight online resources of museums that can be used in the educational process. Based on the theory of museum education, we focus on its informal nature.

3. Research Design, Methodology and Data Analysis

The data used in this study come from a research of Laboratory of economics of culture in September 2019 - January 2020. We focus on these issues by continuously browsing the sites of museums, museum organizations and open platforms that have online educational resources. The article begins with a description of theories of museum education and its expansion in modern conditions to online education.

We employed open educational platforms such as Coursera, FutureLearn, EdX, etc. Museum sites with descriptions of online-resources, aggregators of mobile apps, and podcasts. In determining museum educational online-resources, we began to examine online-resources from 2013.

4. Results/Findings and Discussion

In this article, we examined two research questions: 1) what online resources of the museum can be considered educational? 2) with what organizations do museums enter into collaborations to develop such resources? As a result of the study, the educational online resources of museums should include the following attributes: 1) a standard set of educational elements - video lectures, texts, audio information, a list of additional literature, etc.; 2) tasks - for self-examination (tests, games, quizzes) and verification by a moderator - essays, presentations, etc .; 3) guidelines and recommendations for the use of the resource in the educational process within the framework of formal education (at school, university, college, etc.); 4) the inclusion of the resource in the educational process both independently and as part of an online course such as MOOCs or SPOCs within the framework of formal and non-formal types of education; 5) the possibility of obtaining a certificate.

So the following online resources of museums that can be used in the educational process were identified: 1. Massive open online courses – MOOC; 2. Specialized professional courses – SPOC; 3. Educational games; 4. Mobile apps; 5. Podcasts.

Speaking about the collaboration of museums, the development of the system of educational online resources of museums should be based both based on a wider involvement of employees of various museum departments and services in the process of developing these resources and by expanding the circle of organizations collaborating with museums in this activity. In our opinion, in addition to universities that are already actively developing joint online courses with museums, it is necessary to more widely attract schools and institutes for the advanced training of teachers interested in modernizing modern school education. The cooperation of museums with IT and media companies that develop online educational services for various organizations also seems promising.

The actively digitizing museum collections create huge amounts of information that can be used to develop a wide variety of educational online resources.

5. Conclusion, Contribution and Implication

The analysis of the development of museum educational online resources led to the conclusion that museums are actively entering the circle of organizations that create virtual resources for the education sector. The development of the system of educational online resources for museums should be based both on the broader involvement of employees of various museum departments in the process of developing these resources and by expanding the range of organizations cooperating with museums in this activity. The cooperation of museums with IT and media companies that are developing online training services for various organizations seems promising. The ongoing digitization of museum collections is creating huge amounts of information that can be used to develop a wide variety of online educational products.

The main direction of future research on expanding the educational activities of museums, according to the authors, should be the assessment of the potential of digitized museum exhibits from the main and scientific auxiliary funds for their use in various kinds of educational online products. By now, a significant part of the collections of most museums has been digitized but has not yet become a widely demanded element of the educational activities of museums.

6. References

Hooper-Greenhill, E. (1991) Museum and Gallery Education. Leicester: Leicester University Press; 213.

Hein George E. (1998). Learning in the Museum. 216 p.

Shailendra Palvia, Prageet Aeron, Parul Gupta, Diptiranjan Mahapatra, Ratri Parida, Rebecca Rosner & Sumita Sindhi (2018). Online Education: Worldwide Status, Challenges, Trends, and Implications, Journal of Global Information Technology Management, 21:4, 233-241, DOI: 10.1080/1097198X.2018.1542262

Yoany Beldarrain (2006). Distance Education Trends: Integrating new technologies to foster student interaction and collaboration, Distance Education, 27:2, 139-153, DOI: 10.1080/01587910600789498

Dana Dudzinska-Przesmitzki & Robin S. Grenier (2008) Nonformal and Informal Adult Learning in Museums, Journal of Museum Education, 33:1, 9-22, DOI: 10.1080/10598650.2008.11510583

Edward W. Taylor & Amanda C. Neill (2008) Museum Education, Journal of Museum Education, 33:1, 23-32, DOI: 10.1080/10598650.2008.11510584

Conceptual Development of the Place Marketing and Place Branding Scientific Discipline

Kirill Rozkov – National Research University Higher School of Economics, St. Petersburg, Russian Federation natio@bk.ru

Keywords: place, marketing, branding, concept, model

1. Introduction

Practical solutions in place marketing and place branding often turn out to be fragmentary. Their effectiveness are shown only in short-term period at the best, and the probability of new problems in the future arises. Teaching of the discipline faces the similar problem. Dominant orientation to case studies replaces systemic understanding of the field. Academic literature is often a hostage of personal ambitions of authors aimed at fixing the first place in creation of concepts and categories, rather than provide the understanding of their interrelations, systemic conceptualization and further implementation by students and practitioners.

The purpose of the research is practice-oriented conceptual development of the place marketing and place branding scientific discipline

2. Theoretical Background and Literature Review

The theoretical basis of the work is the concepts and methods of Russian formalism (first of all, Бахтин, 1997; Шкловский, 1925; Propp, 1958; Rozhkov and Skryabina, 2015) and their further development in the linguistic analysis of the text (e.g., Cotton, 1980).

3. Research Design, Methodology and Data Analysis

A wide recognized literary text, which describes the emerging scientific field (place marketing and branding) holistically and unbiased, was interpreted in the framework of well-known thesaurus (the mainstream marketing).

The method used in this study is a combination of (1) directed (based on the existing theory) qualitative content analysis (social research method) and (2) structural analysis and text discourse analysis (linguistic research methods) figuratively (i.e., from a scientific point of view, systematically and integrally) describing the studied area.

At the first stage, decomposition and decoding of fragments of literary texts into tabular form was carried out. At the second stage, the fragments were interpreted in the mainstream marketing vocabulary.

At the third stage, the text was decoded into the format of the mental (logical) scheme of terms.

4. Results/Findings and Discussion

The list of main practically relevant categories of place marketing and place branding illustrated by text fragments. The general conceptual model (relations of the main practically relevant categories) of the place marketing and branding

5. Conclusion, Contribution and Implication

The obtained model fills in the conceptual gap in current place marketing and branding research.

The model gives an opportunity to create the thesaurus of place marketing and branding that is (1) distinct (unambiguously interpreted), (2) consistent (covering the optimal range of phenomena), (3) understandable for both researchers and practitioners.

This study develops a new method for creation of a practice-oriented conceptual base for emerging scientific field.

Methodologically, the study develops the tradition of the so-called school of Russian formalism in linguistics, using its techniques for the conceptual development of special (professional) thesauri.

The wide recognition of such a literary text both as a whole and in individual fragments, the awareness of situations and actors described in it, guarantees a close connection of the created artistic image (and with it – the professional thesaurus created with its help) with practice. Besides, such a recognition can provide vocabulary and conceptual links shared by academicians.

The developed conceptual model of place marketing and branding can play the role of a framework for the standardized analytical techniques and organizational procedures for place marketing and branding practices..

6. References

Бахтин М. М. и др. 1997. Собрание сочинений. – Русские словари. – С. 011-011.

Шкловский В. 1925. О теории прозы. – " Круг"

American Marketing Association, AMA (2018), "Dictionary of marketing terms", available at: www.

marketingpower.com/_layouts/Dictionary.aspx (accessed 7 December 2019).

Cotton, E. (1980), 'Linguistic design in a poem by Cummings', Style, XIV/3.

Propp, V. (1958), Morphology of the Folktale (ed. S.Pirkova-Jakobson, trans. L.Scott), Bloomington:

Indiana University Research Centre.

Rozhkov K. L., Skryabina N. How to capture the idea of a place? The case of five Moscow districts // Journal of Place Management and Development. 2015. Vol. 8. No. 3. P. 206-232.

View from outside. Perspectives and challenges of the heritage object management seen by humanities expert. The experience of Scholss Fall manor (Keila-Joa, Estonia)

Aleksey Kraikovski – National Research University Higher School of Economics, St. Petersburg, Russian Federation; University of Padova, Padova, Italy

1. Introduction

Since 2010 I have been involved into the reconstruction, museumification and management of the historic Russian manor site Schloss Fall. This heritage site is situated in Estonia, in the settlement Keila-Joa, some 30 km. to the West from the city of Tallinn, which is the Estonian capital. Therefore, being situated in the North-Eastern corner of the European Union it has a lot of features in the architecture, history and perceptions that highlight the specific transborder character of the area. The manor of Schloss Fall as such attracted some attention from the researchers both in Russia and in Estonia. It was studied through a variety of perspectives from the architectural history to the tourism management. In the paper I will present the brief outline of the history of the manor and in the concluding remarks I will do my best to formulate the conceptual questions important for the further research of the site (and more generally, perhaps – to the further research of the Russian noble manors as such) through the perspective of the general studies of the phenomena of the noble residences in the transborder areas.

2. Theoretical Background and Literature Review

The name of Schloss Fall is a German name, which is translated as 'the castle near the water fall'. The waterfall is six meters high, one of the highest waterfalls in Estonia, situated some 2 km. upstream from the river Keila mouth. Alexander Benckendorff, the 45 years old General, purchased the land on July 14, 1827 for 65000 silver roubles. We know that the general almost immediately had to leave the newly baught possessions and return to St. Petersburg to perform his official duties and the manor was reconstructed under the supervision of his wife Elizaveta.

The general vision of the manorial complex was rather romantic and unusual for the Russian Empire of late 1820s. The architect Stackenschneider tried to create the image of the medieval fortress with this bridge across the canal and with the towers on the corners of powerful walls of a stable and a cowshed representing two forts on both sides of the road to the main building. Further to the park the visitor could see also some gothic constructions like gothic church, memorial places like the memorial to parents of Alexander Bendkendorf. In a word, the owner tried to make this place a sort of family manor with long history and big memory.

3. Research Design, Methodology and Data Analysis

The first visitor who made this place prominent was Nikolas I. They were friends with Benckendorff, and in 1833, very soon after the construction of the manor, the Emperor came with his spouse and had dinner with Benckendorffs family, which was described in newspapers. Of course, one can imagine the consequence, the place was very actively visited later. People used to come; the owners of the manor had plenty of guests. Noticeably, we speak not only about the Russian nobility. In one of the letters Benkendorff asked his wife to build an inn for the inhabitants of Reval, so that the owners could serve some food for them. Therefore, it was the first owner himself who was the first to try to make a touristic site in Schloss Fall.

After the revolution of 1917 and collapse of the Russian Empire, when Estonia became independent the manor was confiscated. The Estonian government let the former owner of Schloss Fall Prince Grigorii Volkonsky to keep a small house for living and a plot of land. In 1940s when Estonia was incorporated into the Soviet Union. Very soon after the German invasion in June 1941, Estonia was occupied by the Nazi

and the castle became a property of German Nazi intelligence Service (Abwehr). They used the manorial complex as a school for spies. When Estonia became a soviet republic again in 1944, the castle was considered as a military property or military object. It was immediately transferred to the Soviet Army.

In 1990s, when the Soviet Union collapsed, the Russian army left Estonia. Estonian intellectuals proposed the projects of restoration of the manor with the hotel, café and a museum of the noble life, something like Estonian Peterhof. However, the new independent Government could not find money and by 2010, the palace looked like a ruin. In May 2010, the Estonian newspapers informed that finally two businessmen, the Estonian Andrey Dvoryaninov from Tallinn and the Russian Alexander Gur from St. Petersburg, signed the contract and the State real estate company and purchased the partr of the Keila-Joa manor including the castle, in total about ten buildings with a part of the park which is situated on the right side of the Keila river. They paid in Estonian crowns approximate equivalent of 500 thousand dollars for all this property.

4. Results/Findings, Discussion

The owners met several big challenges, namely the bad condition of the buildings, the lack of pieces for the potential exposition and the lack of clear strategy towards the business success. The house was renovated after the project prepared by the Estonian architect Allan Struss, while the museum was organized around the media content. However, the success of the project is still not very evident. The visits to Keila Joa are now offered by all the major players of the Estoninan touristic market but the owners still face significant challenges. My question is, however, what are the general perspectives for the research of the history of the manor as a unity, including the Soviet and Post-Soviet period?

Considering the story of the manor matierialized in the buildings and paintings and represented in the books and articles, we have several questions to discuss in order to understand the strategy of restoration and touristic use of the noble manors situated in the transborder regions and related to several spheres of public memory.

The problem of price is the first one. If we deal with the famous manor which is designed by well renowned artist, which is full of history, which is definitely a masterpiece of art, then how could we estimate the price of that? Is it priceless or not? The new owners paid for this complex five hundred thousand US Dollars which is definitely cheap for the object of that kind. But does it mean that it was cheap manor? How could we consider heritage as a real thing that is (or is not) worth money? The answer will define economic and managerial strategy, of course.

The problem of a memory tension is important as well. Considering Schloss Fall, we deal with an object that is on one hand definitely part of Russian heritage. It was built according to the design of St. Petersburg architects and Russian workers from St. Petersburg constructed it. It belonged to the Russian noble families. It was visited by the prominent Russian figures. And that is one side of the story. But on the other side of the story it is situated now in the European Union, in Estonia. It became an important part of the local identity and historical memory. And that is a very important part of discussion around this place now. The nowadays Estonian cultural policy to some extent is based on the idea of separateness from Russia and on the clear manifestation of Europeanness. Representing the history of a manor as a part of the Russian nobility and imperial life, the new owners, however, have to respect the European-centered perspective exisiting in the Estonian society. A problem of balance is very significant for the projects.

5. Conclusion, Contribution and Implication

Finally, the history of a manor has to be considered in several important contexts. It is an important page of the international European nobility history. The owners had numerous connections among the European

elite, they travelled a lot and the materials related to the history of Schloss Fall can be found in the archives from Estonia to the US. Therefore, the general history of luxury residences in the Old (and perhaps even New) World in the 19th c. will explain a lot about the process of building, representation and perception of the Estonian castle through all its history. On the other hand, the manor represents very Post-Soviet story and analyzing it we pose the questions of nobility representations in the nowadays possoviet society both in Russia and in the new independent countries. How do we percept and represent now the owners of the manor and their descendants, who, maybe, still live somewhere nearby? What do their names mean for us and do they play any role in the construction of our memories and identities? Answering those questions, I hope eventually to make the study of Schloss Fall rather a story of our present and future, that of our past.

6. References

Available upon request

Limitations and Opportunities of Big Data Application for Tourist Flow: Volume and Structure Analysis

Mikhail Degtyarev – National Research University Higher School of Economics, Moscow, Russian Federation madegtyarev@edu.hse.ru

Keywords: Big Data, tourist flow, tourism, GIS

1. Introduction

Tourist flow is the key indicator for measuring destination attractiveness and the effectiveness of place marketing approach undertaken by local authorities. It shows the volume of visitors arriving and may even define various segments among them.

The significance of the mentioned data is highly appreciated by stakeholders, such as regional and federal governmental tourist organizations, local businesses and potential investors. Although various entities are interested in verified data, its quality is often quite low.

Modern digital technologies allow to decrease the discrepancy between statistics and reality, however, the attempts to implement big data-based tourist flow analytics products in Russia are rare.

The general problem raised in the proposal is the lack of relevance and veracity in existing tourist flow measurement and segmentation approaches and the slow implementation of new big data-based methods

Nowadays, there are various digital technologies of data analysis could be used in this field. The attempts to implement new methods of collection and application have already been tested in some scientific and business pilot projects. However, only few territories of Russia have implemented modern tourist flow analytics approaches.

The main aim of the research is to discover the main limitations for big data application for tourist flow analytics in regions of Russia.

2. Theoretical Background and Literature Review

The literature review mostly consists of articles reviewing the existing problems of tourist statistics in Russia or studying the potential of big data for tourist analytics. The research of T. Saleeva and A. Samoilenko [1], describing the problems in sphere of tourist analytics that one of the leading tourist regions of Russia- Krasnodar Krai faces. For instance, it shows that currently used tourist flow analytics approaches may only take up to 50% of incoming guests into account what really effects the quality of place management in terms of tourism. At the same time, number of scientists demonstrate the great potential of big data for tourist flow analytics. Honghui Dong, Qin S. Man J, Wang X, Li C [2] successfully applied digital approaches to improve tourist flow scenic area operation management in one of the tourist destinations of China and described the process in details. However, there is a research gap between the two directions (disadvantages of current approaches study and opportunities of potential approaches) and the lack of articles with the detailed overview of big data-based tourist flow analytics products in terms of real market showing their potential taking into account such characteristics as pricing, management complexity and other real-use attractiveness factors, especially in Russian circumstances.

3. Research Design, Methodology and Data Analysis

The goal of my research was achieved with mainly qualitative methods. In the first part the detailed analysis of currently used and developing tourist flow volume and characteristics analysis technologies is held. The benchmark of various big data-based methods for tourist flow analytics and market analysis allowed to discover all the digital tourist analytics products suppliers operating in Russia and within a study of open data sources to form a list with the information about the implementation stage for big data-based tourist flow analytics products for all of 85 regions of Russia. The list showed that 72 out of 85 regions of Russia do not take any attempts to modernize the system of tourist flow analytics. At the same time only two regions have successfully implemented big data-based tourist flow analytics products.

The list containing information with different stages for big data-based tourist flow analytics products implementation helped to form a pool of experts for further interviewing including politics, tourist industry managers and managers of telecommunication companies representing different regions of Russia with different stages of big data-based tourist flow analytics products implementation. 15 experts were interviewed to get the information about existing difficulties and problems on the way to big data tourist flow analytics implementation.

4. Results/Findings and Discussion

The research showed that there are three main barriers for big data-based tourist flow analytics products implementation: financial, technological and managerial. The financial is for low motivation of regional tourist authorities in terms of high costs of big data products and lack of financial autonomy of Russian territories. The technological factor is for the absence of platforms for combination of various data sources (telecom, banking, nethology and others) use for tourist analytics. The managerial factor means the uncertainty for the roles in the big data product implementation process among regional authorities.

5. Conclusion, Contribution and Implication

It appears from what has been discussed that within the detailed open-source data study and expert interviewing the key opportunities and limitations for big data-based tourist flow analytics products implementation in regions of Russia have been discovered. Although, the project includes a list of recommendations in order to minimize identified problems, the full-scale study of options to eliminate existing barriers in terms of tourist statistics management modernization is considered as the direction for further studies.

These achieved results and summaries might be in the area of significance to place marketing researchers and regional authorities.

6. References

Saleeva T.V., Samoylenko A.A. (2018) Perfection of statistical accounting in tourism as a necessary condition for objective planning of social and economic development of the region (on the example of the Krasnodar territory) // Resorts. Service. Tourism.. - №2 (39). - 30-36. ISSN: 2309-7884

Siyang Qin, Jie Man, Xuzhao Wang, Can Li, Honghui Dong, Xinquan (2019) Ge Applying Big Data Analytics to Monitor Tourist Flow for the Scenic Area Operation Management // Discrete Dynamics in Nature and Society. - №2. -. 1-11. DOI: 10.1155/2019/8239047

Developing Culinary Nation Branding strategy: A case of Vietnamese cuisine in Russia

Pham My Linh – National Research University Higher School of Economics, St. Petersburg, Russian Federation phammylinh.ftu@gmail.com

Keywords: Nation Branding, Cuisine, Gastrodiplomacy, Tourism, Vietnam

1. Introduction

In a globalized society, cross-cultural interaction is gradually widespread along with the development of information technology and transportation. People fearlessly relish exploring, experiencing and immersing themselves in new cultures. Accompanying this tendency, nations pay more attention to being recognized in the world through the country's image with cultural values.

In this research, the author aims to develop a concept of cultural element 'Cuisine' in Nation Brand or *'Culinary Nation Branding'*, and its impact on economics, tourism, and cultural influences on a global scale. The research conducted based on the specific case of Vietnamese cuisine in Russia. The research task is to analyze Vietnamese Cuisine Brand in the Russian market and 'Gastrodiplomacy' campaigns of countries. The research questions are: *'How to determine if Cuisine can become a Nation Brand of a country?', 'What are elements of Culinary Nation Branding and implementation method?'*

2. Theoretical Background and Literature Review

The theoretical background of the research is covered by main areas: Marketing Strategy in Business; Nation Brand and Cuisine in Diplomacy. These are the foundations for building a theory of Culinary Nation Brand.

The concepts in Marketing Strategy include Brand and Branding. Branding means to create differentiation, and a successful branding strategy creates a strong brand and can be evaluated by the Customer-based brand equity model (CBBE) (Keller, 2003) and Brand Insistence Model of VanAuken.

The concept of 'Nation Brand' was evolved through studies of Anholt, *'Nation brand is the image and reputation of countries'* Anholt (2005) with Anholt Nation Brand Model; Dennie (2008) with Nation-Brand Equity (NBEQ). 'Nation Branding' is the application of marketing communications techniques and branding techniques to promote the nation's image among the international audience (Fan, 2006). Gastrodiplomacy was defined by Rockower (2012) for the first time as the concept of using food in Diplomacy with relevance to Public Diplomacy and was exploited in tourism sector by Suntikul (2017).

3. Research Design, Methodology and Data Analysis

The paper uses both qualitative and quantitative methods. Data collection methods include conducting survey, interviewing, collecting primary and secondary data from open resource. The framework of research is in the following stages:

Stage	Hypothesis	Research methods
1	*Cuisine is a nation brand of Vietnam*	Aim: to prove that cuisine is a nation brand of Vietnam. **Model**: Anholt Nation Brand Model

		Sample: Top-of-mind Awareness of foreign public collected from the survey
2	*The potential of developing Vietnamese cuisine brand in Russia*	Evaluate Vietnamese Cuisine Brand Equity in Russia. **Model**: Customer-Based Brand Equity (CBBE) **Sample:** *From survey questions corresponding to the 4 levels: Cuisine Brand Identity; Cuisine Brand Experience; Cuisine Brand Familiarity; Cuisine Brand Resonance*
3	*Factors* affecting *Culinary Nation Branding*	Divided into 2 steps: 1. Overview: to determine which factors affecting culinary nation branding 2. Details: Analyze the factors in details to demonstrate the current pros and cons of Vietnamese cuisine brand in the Russian market **Method:** SPSS Statistic, Brand Marketing BCG-matrixx, Content Analysis. **Sample:** Data on respondents' opinions about Vietnamese cuisine from the survey and Data on Vietnamese restaurants in Russia
4	*Culinary Nation Brand impacts on tourism*	Evaluate the impact of Culinary Nation Brand on Tourism **Method:** SPSS Statistic **Sample:** Data collected from survey questions about cuisine and tourism
5	*Gastrodiplomacy campaign is suitable for Vietnam*	Analyze summarize the content of gastrodiplomacy campaigns have been implemented by countries to find the strategies for Vietnam **Method:** Content Analysis **Sample:** Content of gastrodiplomacy campaigns

4. Results/Findings

The data result is 292 observations from conducting survey in the first quarter of 2020. The majority of respondents are Russian and citizens of CIS countries (86%) and foreigners from other countries. The respondents are mainly young people aged 18 to 24 (76.4%). By gender, 61.6% of respondents are female, 39.4% are male. Other data collected include: 636 restaurants and cafes in Russia serve Vietnamese cuisine, the operation situation of a Vietnamese restaurant in Russia; Data on international tourists and Russian tourists to Vietnam from 2009 – 2019; Gastrodiplomacy campaigns of countries: Thailand, Korea, Taiwan, Japan, Peru, Malaysia. etc.

Stage 1:

By applying Anholt's Nation Brand Model, Nation Brand of Vietnam related to clusters 'Culture & Heritage', 'Tourism' and 'Exports' aspects, in which all three dimensions have relevance to 'Cuisine'. Thus, 'Cuisine' is appropriate to become a nation brand of Vietnam.

Stage 2:

Vietnamese cuisine has an opportunity to achieve great success in brand positioning in the Russian market due to the favour and loyalty with Vietnamese cuisine of Russian and foreigners.

Stage 3:

These are factors impacting on Vietnamese cuisine brand in Russia: *Taste of dish* – Identify Vietnamese dishes can become a symbol of Vietnamese cuisine. *Accessibility* – Evaluate Vietnamese restaurants and festivals in Russia. *People contact* - The recommendation and introduction by individuals. *Tourism impact* - Traveling to Vietnam. *Cultural interest* - The interest in Vietnamese culture. Meanwhile, the media advertising Vietnamese cuisine in Russia is ineffective and has a negligible impact on Vietnamese cuisine branding.

Stage 4:

National cuisine served and promoted abroad has an impact on destination branding in tourism. A successful Culinary Nation Brand abroad enables the State to develop tourism.

Stage 5:

Gastrodiplomacy's campaign has been successfully implemented by countries around the world: Thailand – 'Thai Kitchen to the World', 'Global Thai Program', Korea – 'Global Hansik Campaign', 'Korean Cuisine to the World', Malaysia – 'Malaysia Kitchen for the World', Peru – 'Peru Mucho Gusto', etc. The methods are performed in campaigns:

- Expanding restaurants and Cafes abroad (quantity and quality)
- Organizing Festivals and Events
- Using advertising and media relations
- Seeking recognition of world organizations: *UNESCO's Intangible Cultural Heritage,*
- Opening Cooking Class and Educational Program
- Collaborating with business organizations in promoting food
- Ambassador program
- Choosing representative national dishes

5. Discussion and Conclusion

In previous studies of tourism and place branding, 'Cuisine' is mentioned as food tourism or food destination within the territory of the country or city. As such, there is a lack of research on the relation between destination branding and culinary promotions take place outside the national territory, known as 'Gastrodiplomacy'. On the international scale, 'destination/place branding' is regarded as 'nation branding', and national cuisine is one of the national identity. With the idea of bringing cuisine into the nation brand, the author developed definitions:

'Culinary Nation Brand' is the nation brand that contains the culinary element, describes a country with rich cuisine, a culinary destination.

'Culinary Nation Branding' is the process of using food to communicate with the foreign public in order to gain country's reputation and global recognition; A combination of three concepts Cuisine, Nation Brand, and Public Diplomacy, an intersection between Gastrodiplomacy and Culinary Nation Brand. **Figure 1.**
A *'Culinary Nation Branding Model'* is built, consisting of six elements: *Government, Value, Accessibility, People, Culture, Tourism.* **Figure 2.**

- *Government:* Government's involvement in policymaking. Gastrodiplomacy is suggested in this research.
- *Value:* Determine the core value of national cuisine – national dishes and their appropriateness for promoting abroad.
- *Accessibility:* The accessibility of information about cuisine; and the accessibility of locations for culinary experiencing.
- *People:* Each individual is an ambassador for national cuisine and nation's image.
- *Culture:* Increasing culinary and cultural interest among foreign publics.
- *Tourism:* Developing food tourism, food tours, building culinary destinations. Tourism promotion combined with culinary promotion.
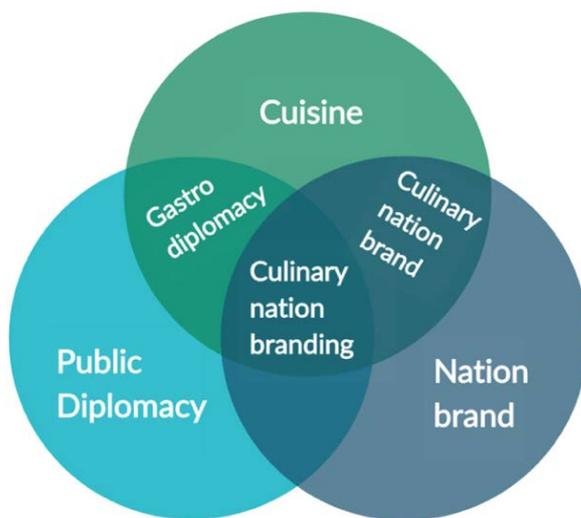

Figure 3 Concept of Culinary Nation Branding Source: Developed by author

Figure 4 Culinary Nation Branding Model Source: Developed by author

A Culinary Nation Branding strategy abroad requires three main participants: *Embassy, businesses and individuals. Embassy* plays a leading role in supporting business in F&B sectors; *Businesses* including restaurants, food manufacturers & exporters, hotels, travel agencies take the promotional role in their business activities; *Individuals*, students and oversea community living abroad, carry the ambassador role in spreading national cuisine in small scale.

The main contributions of the research:

Theoretical implication - The research conceptualizes 'Culinary Nation Brand' and its Model with essential elements. Managing, marketing and branding strategies in business is applied in diplomatic realm, specifically is nation branding.

Practical implication: The research provides knowledge of Vietnamese national cuisine in Russia to both public sectors and private sector; enables them to set up an appropriate strategy for their goals, as well as to understand their responsibility in using brand assets, protecting and enhancing the common brand of the nation.

304

6. References

Atsuko Ichijo, Ronald Ranta (2016). Food, National Identity and Nationalism: From Every day to Global Politics. Palgrave Macmillan. https://doi.org/10.1057/9781137483133

Keith Dinnie (2008). Nation Branding: Concepts, Issues, Practice. Amsterdam: Elsevier. https://doi.org/10.4324/9780080554570

Paul Rockower (2012). Recipes for gastrodiplomacy. Place Branding and Public Diplomacy, Vol. 8, Issue 3, pp. 235–246. https://doi.org/10.1057/pb.2012.17

Simon Anholt (2005). Brand New Justice: How branding places and products can help the developing world. Oxford ; Burlington, MA : Elsevier Butterworth-Heinemann

Wantanee Suntikul (2017). Gastrodiplomacy in tourism. Current Issues in Tourism, 22:9, pp. 1076-1094. https://doi.org/10.1080/13683500.2017.1363723

Ying Fan (2006). Branding the nation: What is being branded?. Journal of Vacation Marketing, vol. 12, 1: pp. 5-14. https://doi.org/10.1177/1356766706056633

Muslim Friendly Tourism Promotion In Kazan: Official Destination Website And Reality

Polina Kamenskaya – National Research University Higher School of Economics, St. Petersburg, Russian Federation

Yana Shokola – National Research University Higher School of Economics, St. Petersburg, Russian Federation P.KAM2102@GMAIL.COM

1. Introduction

Kazan is the capital of the Muslim republic of Tatarstan in Russia. The main confessions of the republic are Islam and Orthodoxy. In 2018 the head of the Republic of Tatarstan approved an action plan for the development of Halal Tourism Sector.

The development of the tourism sector in the Republic of Tatarstan is included to the plan for the socio-economic development of the Republic of Tatarstan until 2030. Tatarstan actively cooperates with Muslim countries to develop tourism. From 2017 to 2019, the State Tourism Committee of Tatarstan worked closely with such countries as: Azerbaijan, Indonesia, Iran, Kazakhstan, Kyrgyzstan, Kuwait, Malaysia, UAE, Saudi Arabia, Tunisia, Turkey, Uzbekistan.

Since 2009, Kazan has been the host city of the International Economic Summit "Russia-Islamic World: KAZANSUMMIT", in 2019 it was attended by over 3500 people - representatives of 72 countries.

The authorities emphasize the need to increase the presence of the tourism opportunities of the Republic of Tatarstan on the Internet to form and promote the tourist image of the Republic of Tatarstan as an attractive destination for tourists.

Therefore, this research is essential to add to the scant studies on online Muslim Friendly tourism promotion in Kazan by examining official website of Kazan belonging to DMO of Tatarstan Republic.

2. Theoretical Background and Literature Review

Muslim tourism is a growing global trend, one of the largest niche markets in global tourism. According to the Pew Research Center (2011), by 2030 the total number of Muslims in the world will reach 2.2 billion people and will account for 26.4% of all inhabitants of the planet. There is no consistency in the use of terms for this type of tourism. Researchers use the following terms to refer to "Muslim tourism": «shariah tourism», «mosque tourism», «halal-friendly tourism & hospitality», «halal tourism» и «islamic tourism».

The word "halal" is of Arabic origin, it means "permissible" and is often used when referring to food. The terms "Islamic tourism" and "halal tourism" are used differently in different scientific papers and media. Khan and Callanan found that researchers more often use "Islamic tourism" to describe tourism associated with Muslim travelers. The term "halal" is more popular among the travel industry professionals and in the media. "Islamic tourism" includes all types of tourism carried out by Muslims, and assumes the presence of attributes that meet halal standards.

In this paper, "Muslim Friendly Tourism" is a type of tourism that allows Muslims to travel according to halal standards and assumes the presence of Islamic attributes. The term "halal friendly" will be used by us to denote the compliance of the provided service with the norms of Islam.

According to the Mastercard-CrescentRating, Global Muslim Travel Index 2019, the service needs of Muslim travelers based on faith can be divided into 3 categories: "need to have", "good to have", and "nice to have".

There are no studies examining the presence of Islamic attributes in Russian destinations. Existing studies are mostly exploring the potential of halal tourism in Russia and Tatarstan Republic, as well as general information on Muslim Friendly Destination Offers. This study can be a starting point for closing this gap.

In total, 45 publications and 38 internet sources were studied. This study aims to add to the scant studies on halal tourism destination promotion in Kazan by examining the existing Muslim Friendly offers in Kazan and how they are shown on the official destination website. This research also proposes research questions on how do world leading Muslim Friendly tourism destinations promote themselves through the DMOs' official websites. And how can the local authorities use it to promote Muslim Friendly Tourism of the destination.

3. Research Design, Methodology and Data Analysis

The first step of our research was to create a list of Islamic attributes of a destination, it's hotels and official website. The list was created based on research papers studying the needs of Muslim tourists. In the final list, we have highlighted 23 basic and advanced attributes.

Then, all of the Muslim attributes were divided into 3 groups: destination attributes, hotel attributes, and destination website attributes. Then we studied which of the selected Muslim attributes are present in Kazan. To do this, we turned to the official Internet platforms of the destination, Internet news sources, the 2GIS system, and also used the observation method.

In the third stage, Muslim Friendly attributes of hotels offered to Muslim tourists were studied. We have added 19 hotels with 4 * and 5 * on booking.com to 5 hotels that had halal friendly certificates in 2016 and 2018. Representatives of these hotels have confirmed or denied that the hotel has 14 Muslim Friendly attributes and services highlighted earlier.

The survey took place in April 2020 in the format of emails and phone calls. 6 hotels were excluded from the study due to failure to receive a response from them. The final list for further research included 19 hotels in Kazan.

At the fourth stage, we examined the official travel websites of Kazan and the leaders of the Muslim Friendly destinations for the presence of Islamic attributes highlighted in the first stage.

For our research, we used our list of 12 Islamic attributes for websites. We also studied foreign experience. Malaysia and Singapore - the leaders of the rating of Muslim Friendly countries - were chosen. Also South Korea were added, it has shown significant growth within this rating last few years, which means that the destination is actively working to create conditions for Muslim tourists.

Using a Google search, we found the official travel websites of the destinations. We studied general information and then moved on to researching websites for the presence of 12 Muslim attributes from the list compiled earlier.

At the fifth stage, we compared the Islamic attributes present in Kazan with their representation on the official website and, having studied foreign experience, developed recommendations for online promotion of Muslim Friendly tourism in Kazan on the official tourist website of the destination.

4. Results/Findings, Discussion

Islamic attributes of the destination

In Kazan, both basic and advanced Muslim attributes are widely represented, and the city can be described as a Muslim Friendly destination.

Islamic attributes of hotels

All highlighted hotels have basic Muslim attributes. We found out that there are 2 hotels in Kazan, which have 100% of the basic Islamic attributes we have identified. More than 50% of basic attributes can be found in 8 hotels in Kazan. 4 hotels can offer guests about 25% of basic Islamic attributes. Advanced Islamic attributes are best represented at the Gulfstream Hotel - 75%. The rest of the hotels represent less than 45% of the Islamic attributes we have identified.

Islamic attributes of websites

The basic Muslim attributes are fully represented on the websites of Tatarstan, Kuala Lumpur and Singapore - 100%. Kuala Lumpur and Singapore lead in terms of the number of available advanced attributes with 55%, followed by Seoul with 27%. The Tatarstan website presents only 18% of our highlighted advanced attributes. By the sum of basic and advanced Muslim attributes, the leaders are the websites of Kuala Lumpur and Singapore - 62%. The websites of Tatarstan and Seoul also cover the same number of attributes - 31%. At the same time, Seoul is not a Muslim destination, while Kazan is the capital of the Muslim republic.

Recommendations for online promotion of Muslim Friendly tourism in Kazan

We concluded that the Muslim attributes present in the destination are not sufficiently covered on the destination website. We have developed recommendations for online promotion of Muslim Friendly tourism in Kazan on the official tourism website of the destination. Most of them do not require additional costs, because aimed at improving the work with online resources.

5. Conclusion, Contribution and Implication

This work is devoted to the development of recommendations for the online promotion of Muslim Friendly tourism in Kazan. In the course of this work, a list of Muslim attributes was formed, on the basis of which the actual proposals of the destination and their use on the official website of the Republic of Tatarstan were investigated.

An important part of the research was a study of existing Muslim Friendly destination offers, within which a base of organizations was formed that offer products tailored to the special needs of Muslim travelers.

Based on the data received about the destination, we studied the content of the official website of the Republic of Tatarstan and the presence of the Muslim Friendly attributes present in Kazan on the website.

Taking into account the results of the study, we have proposed a number of managerial recommendations on improving the representation of Islamic attributes on the destination website. These measures can potentially be used by the Center for Tourism Development of the Republic of Tatarstan to attract Muslim tourists.

6. References

Available upon request

Marketing Collaborations as an Instrument of the Museum Cluster Sustainability

Anastasia Polomarchuk – National Research University Higher School of Economics, St. Petersburg, Russian Federation apolomarchuk@hse.ru

Keywords: museums, museum cluster, cultural tourism, museum management, marketing collaboration

1. Introduction

In the modern conditions of cultural tourism development, the museums become the majority of actors in the improvement of the city development due to the engagement of the financial recourses in the local economy from the tourists (Tien, 2010). This effect is achieved by organizing the museum's interactions with each other based on a classical cluster approach by M. Porter (Porter, 1998): firstly, the unity of the territory, which is accumulated tourists' flows; secondly, the museums unification that is based on the formed internal connections; thirdly, active collaborative activities between museums' partners. Unfortunately, the issues of marketing collaborations (formats of the join activity) between museums into the cluster have not been adequately reflected in the scientific literature until the present.

This research is aimed to searching marketing collaborations that make it possible to increase the museums' sustainability on the market. The substantiation of the collaborations' impact was provided by the evaluation of the inner connections intensity (ICI) of a museum cluster that was tested in this article. As the components of the ICI indicator will search the intensity of the inner logistic and marketing connections. Logistic ICI means the cross-logistical flow of visitors, in other words, the tourists' visits of two or more museums, included in the cluster. Marketing ICI means the prevalence of museums-collaborators' names in posts of the social network.

2. Theoretical Background and Literature Review

The theoretical research base is focused on the issues of the museums' partnerships and on the features of the museum clusters.

One the one hand, the academic literature reveals the features of the interaction formats between museums and different market actors such as the state organizations or privet business. Moreover, the strategic effects of the association or alliance format of the museum's cooperation with each other for the long perspective are researched considerably enough (Li, Ghirardi, 2019). In spite of the description of the strategic value of museum consolidations, researchers don't devote attention to study the impact of daily collaborations between museums proximity located.

The main results of the analysis of the theory of the museum clusters it was identified various forms of museum consolidation based on the formalized and non-formalized structural organizational and legal, logistic, marketing, and other connections (Nikolić, 2012). Nevertheless, the modern classification system of clusters doesn't take into account the intensity evaluations of the formed inner connections between museums.

Based on the existing research lacunas, the research hypotheses were formulated: the impact of the marketing collaborations into the museum cluster depends on the levels of the ICI (H1); the usage of the collaboration formats between museums into the cluster is influenced on the ICI (H2).

3. Research Design, Methodology and Data Analysis

The research design was created according to the following tasks: firstly, to calculate the logistic and marketing ICI indicators and based on the results to classify clusters depends on the ICI level; secondly,

to identify the daily and event collaborations of the museums and check the dependence of the intensity of the usage varies marketing collaborations from the museum clusters' ICI level.

Based on the tasks, the methodology was included in 3 stages.

In the first stage, a sample of museum clusters was formed. The parameters of the choice were: museum cluster's location in cultural city destination; unity of the territory; museums' identification with the cluster. As a result, the final sample was included 36 museum clusters.

In the second stage, the measures were provided. The logistic inner connection intensity measured by the calculation of the tourists' cross-visits. For this task, a database was formed with the tourists' reviews from the travel platform TripAdvisor. The calculation of the tourists' cross-visits was provided based on the searching of coincidences of the tourists' usernames in the review corpuses of each museum from the cluster. For uploading data and metric calculation, R codes were used.

The marketing inner connection intensity measured by the prevalence of museums-collaborators' names in Facebook posts. The database was formed by posts, published in Facebook groups of selected museums. They were uploaded by Popsters. The prevalence was calculated by a similar method as a logistic ICI indicator's measure.

For evaluation of the dependence of logistic and marketing ICI indicators, the correlation analysis was provided by the Pearson's chi-squared test and the Spearman's rank correlation test. Selected analysis methods are in demand by researchers in related fields (Booth, Ogundipe, Røyseng 2019).

On the third stage, the formats of daily and event museums' collaborations were identified by the content analysis in the R environment. A two-way analysis of variance (ANOVA) was used for checking the dependence of the intensity of usage of various marketing collaborations from the inner connection intensity into the museum clusters.

4. Results/Findings and Discussion

The hypothesis (H1) was proofed by the correlation analysis. First of all, the results confirm the medium-value relationship between the marketing and logistic ICI indicators: the Pearson correlation coefficient - 0.51 with p-value – 0.002; the Spearman's rank correlation coefficient – 0.46 with p-value – 0.006. Moreover, based on the results and guided by the offered classification by M.Nikolić three groups of clusters were formed: developed, emerging, and incipient clusters.

In order to verify the second research hypothesis (H2) the content analysis and the two-way analysis of variance (ANOVA) were used.

The content analysis revealed 34 interaction formats between museums. The identified collaborative activities were separated on the regular information and organizational support; different formats of online activities; events, regular exhibitions and excursion activities; educational activities; advertising; and other special formats.

The analysis results revealed several common characteristics of the marketing collaboration models of different types of clusters.

1. The demanded formats of interactions for all clusters, irrespective of the types, were identified regular information and organizational support, events, exhibition and educational activities.

2. The collaborative activity of all types of cluster museums is characterized by the prevalence of the following activities: exhibitions, publications of information content about collaborators, and small-scale educational events (lectures, seminars, etc.).

3. The developed and incipient clusters provide fairly intensive informational support to collaborators in informing visitors about organizational matters of visiting museums, but unfortunately the emerging clusters neglect it.

4. The emerging clusters are puzzled by the collaborative management of festivals and try to include the museum in the common trip or offer an entire ticket or ticket of another museum.

5. The incipient clusters are actively involved in different promotional actions.

6. There is a clear proportionality in the prevalence of using collaborative formats depended on the ICI levels only observed in the case of developed clusters. It means that the set of applied collaborative practices of developed clusters is much wider than other types of clusters.

In spite of the several identified characteristics of the marketing collaboration models of different types of clusters, the results of the two-way analysis of variance (ANOVA) didn't prove the research hypothesis. The result shows that the usage of the different collaboration formats didn't influence on the ICI levels ($P = 0,0862$). It indicates the versatility of the tools used that are equally suitable for different types of clusters.

5. Conclusion, Contribution and Implication

The research contributes to existing approaches toward the interpretation of the museum's collaboration formats that are maintained the sustainable position on the market and offered a modern assessment method of the inner connections intensity (ICI).

The article contributes to existing approaches towards the assessing of the clusters effectiveness. (Kind, Meier zu Köcker, 2012). The developed methodology has become a successful pilot project for the future dissemination of the evaluation of the inner connections that are formed not only within the museum cluster but also in the wider space of the cultural cluster. It should be the base for the creation of the sustainable models of the collaborative activities.

Due to the fact that this system for assessing the ICI indicator is based solely on network data, it can be assumed that this approach can also be applied to the study of building virtual clusters. The planned research will be focused on expanding the concept of a cultural cluster by identifying the features of its virtual component. Moreover, the research is planned based on the bilateral transformation of the real to virtual cluster' visitors, which is an urgent task for cultural organizations in the post-corona-time.

6. References

Booth, P., A. Ogundipe, & Røyseng., S. (2019). Museum leaders' perspectives on social media.Museum Management and Curatorship, 1-19.https://doi.org/10.1080/09647775.2019.1638819

Kind, S., & Meier zu Köcker, G. (2012). Developing successful creative & cultural clusters. Measuring their outcomes and impacts with new framework tools. Study for the European Creative Industries Alliance. Senate Department for Economic, Technology and Research Initiative Projekt Zukunft, Berlin, Germany. https://doi.org/10.13140 / РГ.2.2.31228.23681

Li, C., & Ghirardi., S. (2019). The role of collaboration in innovation at cultural and creative

organisations. The case of the museum. Museum Management and Curatorship, 34(3), 273-289. https://doi.org/10.1080/09647775.2018.1520142

Nikolić, M. (2012). City of museums: Museum Cluster as a manifesto of the paradigm shift. Paper presented at the 6th Conference of the International Forum on Urbanism (IFoU): TOURBANISM, Barcelona.

Porter, M. E. (1998). Clusters and the new economics of competition. Harvard Business Review, 76(6), 77-90.

Tien, C. C. (2010). The formation and impact of museum clusters: two case studies in Taiwan. Museum Management and Curatorship, 25(1), 69-85. https://doi.org/10.1080/09647770903529434

Strategies for the Art Tourism Development on the Example of the City of Saint Petersburg

Polina Shtanko – National Research University Higher School of Economics, St. Petersburg, Russian Federation

Keywords: art tourism, city tourism, urban art, urban art tourism, street art hunter, street art hunting, street art tourism, graffiti tourism, mural tourism.

1. Introduction

The relevance of the chosen topic of work is related to the increasing role of graffiti, street art, public art, in the development of the urban environment, as well as domestic and international tourism. It is worth noting, that urban art directly interacts with the environment and spontaneously integrates into the usual urban routes, which makes it possible to explore the city at the micro level.

Today a new direction in tourism is developing — graffiti or street art tourism. It is worth noting, that graffiti, street art, public art, mural and other forms of art created in an urban environment are included in the concept of urban art. In this regard, it is appropriate to use the term of urban art tourism.

Thus, urban art tourism is a journey through cities, visiting thematic events in order to get acquainted with local urban art or hunt for it — street art hunting. However, there is no research, which study street art hunting as an activity, which contributes to developing of urban art tourism, namely in Saint-Petersburg.

The purpose of the study is to identify the motives for searching for urban art by people interested in this type of art, and based on the results of the analysis of the data obtained, to develop strategies for the development of urban art tourism in St. Petersburg.

The main research question of this work is how street art hunters perceive urban art and how their participation in the process of urban art search contributes to the development of urban art tourism in St. Petersburg.

The theoretical contribution of the paper was to develop a theoretical model of the concept of urban art-tourism and analysis of trends of urban art-tourism as a niche form of tourism in St. Petersburg.

The practical result of the research was the development of basic strategies for the development of urban art tourism in St. Petersburg.

2. Theoretical Background and Literature Review

Studied articles have been mainly focused on the study of the tourist offer in the field of urban art in a particular city or urban area. So, it is important to note the work "Art-Tourism Space In Lodz: The Example Of The Urban Forms Gallery". In this paper, the classification of types of tourist space was given: the place of penetration, the place of research, the place of assimilation, the place of colonization, the place of urbanization. Three types of tourist space were considered in the context of art tourism, which have been explored using the example of the long-term Urban Form Gallery project, in which large-scale murals are created in the city of Lodz (Mokras-Grabowska, 2014, P. 23-30).

In addition, street art contributes to the development of local communities and contributes to the sustainable development of the urban economy. Today there is a tendency for the city authorities to promote urban art, in particular street art, by holding street art festivals, as well as organizing street art walks and excursions. City authorities include the creation and development of street art in urban planning strategies (Insch, Walters, 2017, P. 512-514).

Nowadays there is a tendency of institutionalization of street art and development of alternative forms of Metropolitan tourism. Moreover, street art actors do offer a variety of entertainment activities designed for a wide audience: educational seminars for children, excursions, introductory games, and a variety of activities that strengthen the link between street art and tourism (Blanchard, Talamoni, 2018).

Thus, for the tourist, participation in street art activities is valuable, since it is ephemeral, and the limited time increases its value, since the tourist feels the privilege of witnessing a single and unique event.

3. Methodology and Data Analysis

In this work, a sociological survey in the format of a Google form has been used as a research method due to the convenience of its distribution among potential respondents. This is the most commonly used method of research in the field of tourism (Veal, 2017).

The main example for the development of the questionnaire was a survey of participants of street art tours launched as part of the Urban Form Gallery project in the city of Lodz (Jażdżewska, I., 2017, P. 45-46). The questionnaire has been divided into a number of thematic blocks, such as:

- Socio-demographic data;

- Interest in urban art;

- Urban art tourism;

- Events related to urban art;

- Geography of urban art centers in Russia and in the world.

The survey has been conducted among 160 participants of the Telegram chat "Urban Walks Street Art". This chat is part of the project "Urban Walks Street Art", initiated by Street Art Research Institute in Saint Petersburg (Street Art Research Institute. URL: http://streetartinstitute.com/). The main aim of project is to study urban art in the context of the urban environment.

The developed questionnaire included 16 questions: 12 open and 4 closed. Most of the questions in the questionnaire were open-ended, which did not limit the volume and format of respondents' responses. The following actions was taken to analyze and interpret the data obtained:

- responses have been read and encoded by quotations;

- the selected quotations have been grouped according to the subject;

- the subject has been derived from the set of respondents' quotations and further analyzed.

Thus, the questionnaire allowed to get key information from respondents, the analysis of which helped to identify the characteristics of the perception of street art by people interested in this type of art. That have given opportunity to develop basic strategies for the development of urban art tourism in St. Petersburg.

4. Results/Findings and Discussion

Through the use of survey, it was found that not only young people aged 15-25 are interested in street art, but also people who are over 50 years old. In addition, respondents aged 41-45 follow street art for a long period of time, namely 10-25 years. Furthermore, 55% of the respondents said that they travel to get acquainted with graffiti, street art, public art. As for the frequency of travel, respondents travel 1-2 times per year to see urban art in a particular city. Respondents, who travel to see urban art, have a positive attitude to the fast changeability of works due to their frequent creation without approval. Moreover, the fact of changeability emphasizes the authenticity of this type of art.

The survey also allowed to identify the centers of urban art in Russia: St. Petersburg, Yekaterinburg, Nizhny Novgorod and Moscow.

It is important to note that currently there is no legal regulation of urban art in Saint Petersburg. However, respondents noted the institutionalization and legalization of urban art, especially graffiti and street art, is profanation.

Thus, street art is an alternative opportunity for the development of art tourism in St. Petersburg, and also contributes to the development of an alternative image of the city. As a strategy for the development of urban art tourism in St. Petersburg, it is proposed to develop a mobile application with a working name — Urban Walks Street Art Map.

Urban Walks Street Art Map is a mobile application, that will help local guides, residents, tourists get to know the city by creating non-trivial urban routes and getting a unique experience by generating the most optimal urban art routes. Moreover, each user can become a content creator by adding photographs of graffiti and street art works to the application's archive.

Thus, the Urban Walks Street Art Map mobile application will help to preserve the works of graffiti and street artists in digital format and will allow people to get acquainted with the underside of the city.

5. Conclusion, Contribution and Implication

To date, a small number of studies related to urban art tourism. Moreover, there is a problem of developing the concept of tourism related to urban art. This is primarily due to the large number of concepts that are included in the term "urban art": graffiti, street art, public art, and others.

Research has shown that some Russian cities have the resources to develop urban art tourism. First of all, this applies to those cities where urban art festivals and public art programs have been held for several years. Moreover, that the world's first Street Art Museum and Street Art Research Institute were opened in St. Petersburg, despite the image of the classic city.

In order to develop urban art tourism in Saint Petersburg, without institutionalizing, but preserving the spontaneous nature of graffiti and street art works in the urban environment, it was suggested to develop a mobile application Urban Walks Street Art Map as a recommendation. This application will allow any traveler and local resident to build a unique street art route with the highest concentration of works, depending on the user's location.

Thus, this application will become a city guide to street art in Saint Petersburg for travelers and will increase the level of interest and loyalty to this type of art among local residents.

6. References

Blanchard, S., & Talamoni, R. (2018). Street art et mise en tourisme de la métropole parisienne, des festivals aux street art tours. EchoGéo, (44).

Insch, A., & Walters, T. (2017). Conceptualising the role of street art in urban tourism. CAUTHE 2017: Time For Big Ideas? Re-thinking The Field For Tomorrow, 512.

Jażdżewska, I. (2017). Murals as a tourist attraction in a post-industrial city: a case study of Łódź (Poland). Turyzm, 27(2), 45-56.

Mokras-Grabowska, J. (2014). Art-tourism space in Łódź: The example of the Urban Forms Gallery. Turyzm, 24(2), 23-30.

Street Art Research Institute [website]. URL: http://streetartinstitute.com/ (date:16.08.2020).

Veal, A. J. (2017). Research methods for leisure and tourism. Pearson UK.

Management Of New Format Cultural Events: From On-Line To Off-Line

Nadezhda Poroshina – National Research University Higher School of Economics, St. Petersburg, Russian Federation nadupv@gmail.com

Aleksei Gorgadze – National Research University Higher School of Economics, St. Petersburg, Russian Federation

Keywords: events, online companies, online community, social networks, transition from online to offline

1. Introduction

Before the pandemic there were a lot of events created by online companies and social media. No studies have yet been conducted that describe the practices and trajectories of such transitions from online to offline. The purpose of this article was to determine the relationship in the factors that make companies create an event and trajectories of the offline transition of various events of a new format and derive general patterns and recommendations for their organization.

2. Theoretical Background and Literature Review

According to the Global Digital Report 2019 (wearesocial.com), one million new users appear on the Internet every day, 45% of the world's population are active in their social media accounts. Some companies use theirs online resources to create value (Barrett, Oborn, Orlikowski, 2016) and increase engagement. According to Instagram schemes in march 2020, the more publication has an audience involvement, that is, the more likes, comments and savings it gets, the more likely it will be put into trends and recommended to new users. Most social media now work on such schemes, and companies with social media accounts should take this into account in order to show more about themselves and create their own "consumer community" or social capital, so their "fan pages" could affect purchase intention. A similar idea is made by Hwang, Kim (2015) in their work, where it is stated that the use of social networks positively affects the intention to participate in any offline events. But for this it is important that a certain condition is fulfilled: a person must develop his personal social capital. Therefore, it is important for owners of social accounts to create conditions for networking and attract people to the community who will be valuable for it. Also, in an article by Harb, Fowler, Chang, Blum, Alakaleek (2019), the authors rely on the theory of planned behavior and assess the factors that influenced decisions about the intention to attend an event after browsing websites and social networks. The result of the study was that the perceived pleasure of a future event influenced a positive attitude towards the event page.

3. Research Design, Methodology and Data Analysis

With the development of technology, various organizations can currently exist on the Internet. But over time, for various reasons, they go offline and conduct their own events, meetings, seminars, etc. Such events are the concept of "new format events" when an online organization goes offline. And it is not always clear why exactly organizations are engaged in such activities and whether there are differences in the organization of ordinary events and events of new formats. No studies about events organized by online companies were found during literature review. In this regard, the tasks of the research were to create a definition for this format, compile a database of such events (40 events), analyze organization and management of three of them and develop recommendations for organizing events of this format.

Event of a new format is an Offline event in all formats that is organized by the online company (or blogger) or in partnership with some other companies, which can be one of the parts of any company`s strategy.

Forty events for the selection was made due to the fact that many local small events in online communities can be attributed to the events of the new format, and it may simply not be possible to collect all of them. Forty events that are held in one geographical area and organized by online companies from various fields of activity allow to reflect the main features of such events and find common patterns. Also, a restriction was introduced, according to which the selected events are mainly held in Moscow and St. Petersburg, since the main case of this work was focused on the VKFest, which takes place in St. Petersburg. The search for events was complicated by the fact that there are no online platforms where information on all online events can be collected. Therefore, initially data were collected on activities known to the author, and on the basis of which the creation of recommendations was planned. These are VKFest, events by "Paper", events created by the Instagram account and the media "Veter". Further, requests were made in the search engines Yandex and Google. These requests were:

- Social media event
- Geek events
- Online to offline transition events
- How to create events offline if the company exists online?
- Online Community-based event
- Online-to-offline models

Also, a search was made for the largest online companies in Russia and the world. Based on it, a search was conducted for events held by these companies. The main focus was on large organizations and their offline events. Data about event organization was taken from social media, official websites and media.

4. Results/Findings and Discussion

All of the collected events can be divided into 9 groups. The division into groups was carried out according to the theme of the event, as well as by the companies that created them. For this research three cases were chosen to analyze their organizational models and to reveal the similarities of new format event management. They are from different event type groups: social media events (VKFest), media events (Science Bar Hopping) and geek events (Unity Con). They were chosen so to see how the management was changing and was there a unique model of going offline.

Each of them revealed a certain factor that influenced the occurrence of the event. It was a person, a desire to create a certain way of knowledge and technology, and a desire to convey his vision of offline life and values. In each of these cases, there was a question of the quality of the product being created. In all cases, experienced teams were involved in organizing the event. Also, in each case, the interests of users of online resources were taken, sometimes there were consultations. The event emerged from a partnership of both users and creators, and various organizations seeking to unite and achieve their personal goals at the event. Based on this results the recommendations were made.

5. Conclusion, Contribution and Implication

The main goal of the work was to identify those factors that influence the creation of event of a new format, and to identify recommendations based on the analysis of three cases. As a result, case studies from a social network, online media and the geek community were reviewed. Each of them revealed a certain factor that influenced the occurrence of the event. These events were created that were interesting to the audience, they attracted new partners and sponsors, which made the event regular. That is why it can be concluded that the cultural event of the new format can be one of the company's marketing tools created in the framework of their image strategy.

This study does not affect all groups of events that can be created in new formats. Also, as a result of the pandemic, two events from these cases were transferred to the online format. How much more effective have these events become in online mode still needs to be studied. It is not known whether they will return in the future after removing restrictions in offline mode. It is also possible that the distribution of finances takes place in a different format: less funds are spent on promoting the event, since it is designed for an audience known to companies. All of these issues are topics for future research.

316

6. References

Barrett, M., Oborn, E. and Orlikowski, W. (2016). Creating Value in Online Communities: The Sociomaterial Configuring of Strategy, Platform, and Stakeholder Engagement. Information Systems Research, 27(4), 704-723. https://doi.org/10.1287/isre.2016.0648

Gruss, R., Kim, E. and Abrahams, A. (2019). Engaging Restaurant Customers on Facebook: The Power of Belongingness Appeals on Social Media. Journal of Hospitality & Tourism Research, 44(2), 201-228.

Harb, A., Fowler, D., Chang, H., Blum, S. and Alakaleek, W. (2019). Social media as a marketing tool for events. Journal of Hospitality and Tourism Technology, 10(1), 28-44. https://doi.org/10.1108/JHTT-03-2017-0027

Hwang, H. and Kim, K. (2015). Social media as a tool for social movements: the effect of social media use and social capital on intention to participate in social movements. International Journal of Consumer Studies, 39(5), 478-488. https://doi.org/10.1111/ijcs.12221

Identity-based Tourist Umbrella Place Brand. Case of the Hanseatic League cities

Anastasia Polomarchuk – National Research University Higher School of Economics, St. Petersburg, Russian Federation

Daria Bezhko – National Research University Higher School of Economics, St. Petersburg, Russian Federation dariabezhko@gmail.com

Keywords: identity-based brand, umbrella tourist place branding, cultural and historical heritage, gastronomy

1. Introduction

The concept of tourist place brand has become one of the central issues in studying placemaking. Despite the considerable amount of literature published on tourist place brand, it is still not a well-studied phenomenon, this area has many unexplored issues and gaps. To date, there has been little agreement on what the construct of identity-based tourist place brand is (Saraniemi, 2011). This issue is debated not only in the theory of studying tourist place brand but also in place making practice. In practice, not identity-based, e.c. "artificial" tourist place brands are less viable, more difficult to implement, and less attractive to consumers. In this regards, the question of how to create an identity-based brand is topical.

The aim of the paper is to provide a theoretical framework for understanding the nature of an identity-based umbrella tourist place brand, to develop a methodology for evaluating a potential of creating an identity-based umbrella tourist place brand, and empirically test the developed methodological approach.

2. Theoretical Background and Literature Review

The analysis of the literature on place branding and geography facilitated the creating of a theoretical framework where the identity-based umbrella tourist place brand is defined as a brand created with the stipulation that the residents are committed to the values manifested in the given tourist place brand. The present approach is highly important since residents are neglected in theory as well as in the practice of forming a tourist place brand (Insch, Stuart, 2015; Taecharungroj, Tachapattaworakul, Rattanapan, 2018).

The main output of creating an identity-based tourist place brand is its tourist appeal. This paper contests the claim that there is an interconnection between residents' support of values manifested in the place brand and place brand attractiveness for tourists.

Umbrella tourist place brand can be based on shared characteristics of places including shared cultural and historical heritage. One of foundation for building an umbrella tourist brand can be a common heritage based on political, religious, trade unions. It is worth mentioning that the topic of place brand formation based on belongingness to historical unities lacks research and is considered to be a promising starting point.

Cultural and historical heritage consolidate many components including gastronomy and can become a basis for creating an umbrella tourist brand of places united by a shared historical period in the past. Gastronomy can be an important indicator of preserving cultural heritage.

It was essential for this research to define what can be an indicator of residents' support of values manifested in a brand of territories. As a result of the conducted analysis of gastronomy literature it was defined that the gastronomical component is most distinctly expressed by restaurants.

Overall, the research is focused on umbrella tourist place brands based on cultural and historical heritage (unified by merchant unions in the past) expressed through the gastronomical component. Additionally, the research included an evaluation of support of values (cultural and historical heritage) manifested in an umbrella tourist place brand by restaurants.

3. Research Design, Methodology and Data Analysis

The main aim of the research was to explore possibilities on formation of an umbrella gastronomic place brand on the basis of Hanseatic culture and traditions. That is why following research hypotheses were formulated:

Hypothesis 1: Hanseatic culture is supported by a part of restaurants in studied destinations through various aspects of their activities.

Hypothesis 2: Local community of the Hanseatic cities, and in particular the local business and cultural institutions, form a Hanseatic identity through regular interaction with each other in the framework of the formation of a joint cultural program and the concept of restaurants.

For the purpose of proving these hypotheses, a cross-country study of twelve towns of the former Hanseatic League was conducted. Criteria for selecting the destinations were: 1) more than 100 years of membership in the Hanseatic League and consequently substantial impact of the Hanseatic culture on culture of a town; 2) mentioning of the Hanseatic theme in branding of each destination; 3) the participation of a town in European events dedicated to the Hanseatic League; 4) Presence of restaurants in a town that use in its positioning the Hanseatic culture (in a name, concept); 5) The annual number of tourists arriving in a town is more than 480 000; 6) Inclusion of artifacts of cultural heritage destinations in the UNESCO world heritage list.

In each of the destinations we screened restaurants with the name referred to Hanseatic culture. In total, 168 restaurants were selected. Then a content analysis of websites and menus of the restaurants was conducted taking into account characteristics grouped in four thematic domains: gastronomic component (cuisine and separate dishes); cultural component (cultural program); concept and design of the restaurants (interior, uniform) and website concept were considered.

For each destination, a table of restaurants and criteria was compiled. In each restaurant the presence ("1") or absence ("0") of each criterion was indicated. As a result, for each criterion in each city, the share (percentage) of restaurants with this or that criterion was calculated. To determine the hierarchy of the significance of the criteria in determining and forming the "Hanseatic" of restaurants, the sum of units for each criterion in each city was calculated and one-way univariate analysis of variance was applied. After that, a one-dimensional scatter diagram was generated to determine what the spread in the values of each criterion is within groups (groups by city). Then a simple average was calculated and thus the rating of factors was obtained and null-hypothesis was tested.

To determine the relation between business (restaurants) and cultural institutions of cities, cross-references of these restaurants in posts on Facebook pages of cultural institutions of cities (museums, festivals, academies, music and dance groups) were analyzed. For each city, by analyzing the cultural program of restaurants and analyzing the tourist and cultural portals, a list of cultural institutions was compiled. Then, with the help of Popsters, the posts of these institutions for the past 5 years were unloaded. After that, it was determined how many times each restaurant was mentioned.

4. Results/Findings, Discussion

Data description and pre-test analysis

The 12 selected cities were Tallinn (Estonia); Tartu (Estonia); Riga (Latvia); Kaliningrad (Russia); Gdansk (Poland); Wroclaw (Poland); Hamburg (Germany); Cologne (Germany); Bremen (Germany); Lübeck (Germany); Bruges (Belgium); Visby (Sweden). In total 168 restaurants were selected.

In addition, considering the amount of restaurants among all destinations that have elements of Hanseatic culture in their programme and concept, chosen cities were screened for hanseatic cultural institutions (those that educate community on the topic of hanseatic culture and history or use hanseatic culture in their creative activities). As a result, 23 most influential hanseatic cultural institutions were selected. For the purpose of cross-mentions analysis 14 117 posts of cultural institutions and 15 336 posts of restaurants were analysed.

Empirical results and hypothesis testing

With one-way univariate analysis of variance being complied, the following rating of factors (various aspects of hanseatic restaurants' activities) was obtained:

1) The Hanseatic character of individual dishes (B)

2) The presence of a separate independent Hanseatic cuisine (A)

3) Interior (D)

4) Hanseatic culture and history in the general concept of the restaurant (C)

5) Site (H)

6) Cultural program (G)

7) Uniform (E)

After that, the null hypothesis was tested that the studied criteria have no effect on the determination of the level of Hanseatic identity of restaurants. Fisher's test was applied and it was found that the p-value <0.05, which means the hypothesis is incorrect. Consequently, the criteria have a significant impact on determining the level of Hanseatic identity of restaurants, and A, B, D are leaders among the criteria.

So, using the developed system of criteria for determining the level of the Hanseatic identity of restaurants, it was proved that the Hanseatic culture is really supported by a part of restaurants in the studied places due to various aspects of their activities.

In order to prove Hypothesis № 2, it was calculated how many restaurants among all destinations have elements of Hanseatic culture. It was found that 20% of selected restaurants (32 restaurants) can be classified in this category.

Results of cross-mentions analysis show that 65% of restaurants are mentioned in 23 local cultural entities posts. This number of restaurants could be explained by the fact that some of not mentioned restaurants are located in museums or are museums themselves or have their independent cultural program which they organize without any assistance of any cultural institute. Overall, study shows that German and Polish cities have the strongest hanseatic identity implemented in gastronomic umbrella-brand. Using the developed system of criteria for determining the level of the Hanseatic identity of restaurants, it was proved that the Hanseatic culture is really supported by a part of restaurants in the studied places due to various aspects of their activities.

5. Conclusion, Contribution and Implication

The paper contributes to existing approaches toward umbrella tourist place brand by examining the interconnection of residents' support of value manifested in place brand and tourist appeal of the brand.

Practical implications. The findings of this study have a number of important implications for future practice. The study has practical meaning as it can be used within development of a program for umbrella branding of the towns studied. The proposed method of determining the potential of brand formation can be also applied in the development of other umbrella place brands.

It should be noted that whereas other considered studies (Therkelsen, A., Halkier, H., 2008) concentrate more on governmental support of such brands and how it could increase the quality of local touristic products, on tourists' needs, this study shows how these brands could be created and demonstrates that local community could be the main and vital creator and supporter of umbrella brand because of shared cultural and historic identity. However, in further studies the touristic demand and its role in developing such identity based brands will also be analysed.

Research limitations. An issue that was not addressed in this study was whether restaurants with local or international concepts support Hanseatic culture. Within the research we selected restaurants, which names refer to the Hanseatic culture. However, this culture can be also promoted by restaurants with different types of names (international or local). This is an important issue for future research.

This research provided an important opportunity to advance the understanding of identity-based umbrella tourist place brand construct and nature. The yielded results are valuable since the topic of identity-based brand lacks research. Additionally, for the first time umbrella tourist place brands based on cultural and historical heritage of the former merchant unions were a subject of a study.

The research is focused on umbrella tourist place brands based on cultural and historical heritage (unified by merchant unions in the past) expressed through the gastronomical component. The aim of the paper was to provide a theoretical framework for understanding the nature of an identity-based umbrella tourist place brand, to develop a methodology for evaluating a potential of creating an identity-based umbrella tourist place brand, and empirically test the developed methodological approach. The study has practical meaning as it can be used within development of a program for umbrella branding of the studied hanseatic towns as well as development of other umbrella place brands.

6. References

Anholt, S., 2009, "Why National Image Matters", World Tourism Organization and European Travel Commission, pp. 8-17

Boyne, S., Hall, D., 2004, "Place promotion through food and tourism: Rural branding and the role of websites", Henry Stewart Publications, Vol.1, № 1, pp. 80-92

Brisson, G., 2012, "Branding Prince Edward County as a Gastronomic Niche Tourism Destination: A Case Study", University of Ottawa: Department of Communication

Cuccia, T., Guccio, C. and others, 2016, "The effects of UNESCO World Heritage List inscription on tourism destination performance in Italian regions", Economic Modelling, Vol. 53, pp. 494-508

Miklós-Thal, J., 2012, "Linking reputations through umbrella branding", Quant Marketing, Vol. 10, pp. 335-374

Sims, R., 2009, "Food, place and authenticity: local food and the sustainable tourism experience", Journal of Sustainable Tourism, Vol. 17, № 3, pp. 321-336

Therkelsen, A., Halkier, H., 2008, "Contemplating place branding umbrellas. The case of coordinated national tourism and business promotion in Denmark", Scandinavian Journal of Hospitality and Tourism, Vol. 8, № 2, pp. 159-17

Developing the Strategy of Wine Festivals' Promotion

Malygina Olga – National Research University Higher School of Economics, St. Petersburg, Russian Federation oamalygina@edu.hse.ru

Belyakova Natalia – National Research University Higher School of Economics, St. Petersburg, Russian Federation

Keywords: wine festival; promotion strategy; place branding; event management

1. Introduction

In academic literature only a few studies analyze promotion strategies of wine festivals. At the same time, such concepts as event, place attachment and place branding are joining each other in a complex structure of modern promotion of wine festivals. Meanwhile, COVID-19 situation obviously has an impact on wine festivals and their promotion. The purpose of this study is to detect interconnections between wine festivals' criteria and its influence on wine festivals' promotion and to develop practical recommendations and strategy useful for wine festivals, both, in current COVID-19 reality and post COVID-19 period.

2. Theoretical Background and Literature Review

Place branding and place marketing theory is useful in terms of developing touristic destinations, as well as place attachment phenomenon that is a crucial concept helping to build an essential emotional link between a visitor and a place.

Along with place-making concepts, events has become important issues that help to attract tourists and bring various benefits to destinations. In literature there are several events classification, but none of them includes degree of event promotion to their criteria.

Wine festivals are a part of a big group of touristic events. The current study focuses on this special type of events due to core meaning of a wine festival and valuable benefits that could be brought, as, despite these critical factors, none of the research addressed wine festival promotion.

3. Research Design, Methodology and Data Analysis

In terms of research design, the database of 900 international wine festivals was collected by current researchers. Based on several studies, age groups classification was suggested for wine festivals.

Then, qualitative data from 29 wine festivals' websites was gathered. Content analysis method was implied to identify criteria affecting festival's promotion positively, negatively and neutrally according to gathered data.

Afterwards, the recommendations for wine festivals' organizations existing in COVID-19 reality were developed with the use of Alignment Squared model for three different periods: during the crisis, right after the crisis and in new normal.

4. Results/Findings, Discussion

Neutral, positive and negative criteria influencing the wine festival promotion were defined and practical recommendations for wine festivals benefitting from these criteria were given. The linkages between the general lifetime of wine festivals and its all-year-round marketing circle' have also been tracked.

5. Conclusion, Contribution and Implication

The findings of this study contribute to the literature on wine festivals and event promotion and ways of being effective in the pandemic time.

In recent studies no strategies for wine festivals promotion and no classification were suggested to define the level of wine festivals promotion. Obtained criteria may help to formulate the entire classification of wine festivals and bring valuable insights into organization of wine festivals around the world while practical recommendations may guide wine festivals' organizers during the COVID-19 and post COVID-19 period.

6. References

Available upon request

Track: Transformation of business models of companies in response to the challenges of the pandemy

Chairperson: Liudmila Ruzhanskaya

A radical change in the business models of companies in response to global economic challenges began even before the emergence of the threat of mass infection with the COVID-19 virus. The pandemic has exacerbated this challenge. The world is faced with an unprecedented challenge when, due to the pandemic, everyone is forced to adapt to the new reality as quickly as possible. The restrictions introduced by governments forced the digital transformation of both companies and consumers. Within that context this session aims to explore several issues of forming successful business models of companies in an environment of increased uncertainty, forecasting business development opportunities, taking into account the new business models based on online formats, as well as changing patterns of behavior of consumers of goods and services.

Peculiarities of the business appraisal approach in the project finance in the pandemic situation

Elizaveta Markovskaya – National Research University Higher School of Economics, St. Petersburg, Russia emarkovskaya@hse.ru

1. Introduction

Currently, in connection with the situation related to the coronavirus infection pandemic, new approaches are emerging in the field of business valuation and consulting, developed in practice by institutions involved in business appraisal, investment projects, and corporate finance issues [1,2,3,4,5].

According to a NAFI poll published on July 3, more than half of entrepreneurs (54%) indicated that their company was able to continue working in some form during the period of self-isolation. 46% of entrepreneurs transferred their employees to a remote format [5].

Many entrepreneurs noted the negative consequences of the pandemic: 76% reported a decrease in revenue, 66% - a decrease in demand for goods or services, 36% - a decrease in the number of suppliers, 24% - a decrease in the number of branches / points of sale. Every third entrepreneur (34%) sent employees on vacation at their own expense, and every fifth (18%) had to resort to dismissing employees. Most entrepreneurs do not expect to return to pre-crisis indicators in the short term: 36% expect to return to the previous level not earlier than in a year, 21% - in 2-3 years. A third of entrepreneurs are more optimistic: 35% expect to return to pre-crisis levels in a few months or earlier, and 8% note that the coronavirus has not affected their work. The majority of business representatives (70%) took measures to adapt to the crisis situation. The TOP-3 of such measures include budget cuts for current spending, switching to online and price / tariff adjustments. Most of those who transferred their business online (60%) believe that this has helped the company become more effective.Despite the difficulties, many entrepreneurs did not change their strategic plans for the future: 52% reported that quarantine did not affect their business plans, and 8% noted that thanks to self-isolation, they found new ideas and business formats. 40% of entrepreneurs reported that plans had to be changed after all

In connection with the development of the coronavirus pandemic, in the business appraisal and investment project evaluation process, when forecasting cash flows, the following should be considered:

- The importance of expert methods is increasing
- Uncertainty complicates forecasting
- The income approach to business valuation becomes difficult to apply
- It is necessary to take into account new business models based on the online formats that appear in some enterprises in a new situation

The paper, based on an investment project in the fitness industry, examines the transformation of the business appraisal approach in the project finance in the pandemic situation.

2. Theoretical Background and Literature Review

An analysis of the recommendations of Russian and international expert communities made it possible to highlight the following most important in relation to conducting a business assessment during a coronavirus pandemic:

1. Form financial models for a 2-year cycle, establish zero economic growth in 2 years and annual inflation at the level of 5-7%.
2. Scenario analysis is most likely necessary to assess and account for the likelihood that the crisis

will last for 3, 6, 12, 18 months or more/

3. It is necessary to take into account the possibilities of financing and the availability of credit funds, as well as the risks of breach of loan obligations/

4. It may not be appropriate for recent transaction prices, especially those taken before the pandemic widened, to receive significant weight in determining fair value/

5. Care should be taken to avoid "double counting" the valuation inputs in both the comparative calculation and the income approach. Using the discounted cash flow (DCF) method, if future cash flows have been adjusted downward, the increase in the discount rate may not be as large as the increase in the discount rate if the cash flows have not been adjusted for the effects of the crisis/

6. In general, during a pandemic, the performance indicators differ markedly from retrospective to the direction of deterioration. The degree to which performance indicators differ from retrospective indicators during a pandemic is primarily determined by:

- belonging to a specific industry / field of activity (for example, deterioration in performance is less affected by the production and distribution of food / medicine);
- parameters of restrictive measures introduced in a specific area (intensity, timing);
- terms of the concluded agreements [6].

7. It is possible to use data from China and other countries that faced COVID-19 before Russia. [6]. As an additional method that is suitable for evaluating investment projects in a situation of uncertainty, we propose to use the fuzzy logic method.

The main idea of the method of fuzzy sets (fuzzy logic) is that the elements of a person's thinking are not numbers, but elements of some sets. It is possible to characterize the belonging of an element to a set with a certain degree of reliability. The function at any given time can take on a different form. For calculations, it is more convenient to use a function of a certain type. A set is a collection of any objects (elements) that have common properties. In ordinary set theory, the belonging of any element X to a certain set A can be represented by two values: 1 - belongs or 0 - does not belong. And the very statement that the element x is included or not included in the set A can be expressed using the function μ (x), which has the following form:

$$\mu(x) = \begin{cases} 1 \text{ , if } x \in A \\ \end{cases} \tag{1}$$

The fuzzy logic method involves the complication of the traditional approach to calculating the NPV indicator in the process of investment projects assessment :

1) Traditional approach to the NPV evaluation :

$$NPV = \sum_{t=1}^{n} \frac{CF_t}{(1+i)^t} - I_0 = PV - I_0 \tag{2}$$

2) Fuzzy logic approach:

The formula for calculating the range of values of the npv indicator under the condition of planning 3 scenarios - optimistic, pessimistic and basic, can be presented as follows:

[NPV pessimistic, NPV basic, NPV optimistic] = [PV pessimistic – I pessimistic]; [PV basic – I basic];[PV optimistic – I optimistic] (3)

Scenarios are a set of values of NPV indicators that are predicted by the method of expert assessments (or in another way) taking into account certain conditions of the internal and external environment.

We also consider it necessary to adapt the risk management system during a pandemic, taking into account the specifics of the business.

Thus, in a pandemic situation, when preparing a project for project financing, special attention should be paid to the following areas in the investment analysis:

1. Market analysis. It should take into account the specifics of the purchasing power of the population in a difficult period, as well as the macroeconomic situation and changes associated with it.
2. Forecasting cash flows. Construction of projected cash flows. It is advisable to apply the scenario method, sensitivity analysis, fuzzy logic method. The historical data should be adjusted to reflect the change in the revenue side of the project due to the pandemic. When forecasting, it is advisable to rely on the experience of foreign countries and similar industries that are also experiencing this situation.
3. Risk management system. It is necessary to adapt the risk management system to the pandemic situation. It is necessary to include measures that allow managing and, if possible, leveling the risks associated with the negative consequences of the coronavirus pandemic.

3. Research Design, Methodology and Data Analysis

The recommendations described above were applied in the preparation for project financing of an investment project from the fitness industry. The author of the paper is participating in this project as business consultant. The project consisted of expanding the existing network of fitness centers in the form of creating a new club of 1,500 sq. m. with a swimming pool and SPA zone in one of the regions of Russia. The financing strategy consisted in attracting loan from the bank in the format of project financing (80% of the investment project value), investing its own funds (20%). The following features of business and project assessment were identified in the process of preparing it for project financing in the situation of a coronavirus pandemic:

1) the method of scenarios, sensitivity analysis in combination with the approach of fuzzy logic were used due to uncertainty and changing conditions of both financing and the structure of the transaction

2) cash flows were predicted taking into account the loan term, a decrease in the growth rate of household income, as well as new business formats - online programs, outdoor activities

3) the risk management system provided for the following activities in the operating clubs of the network to maintain cash flow:

- conducting classes online, as well as in the open air to retain network customers

- pre- sale of season tickets to existing clubs of the network, as well as to new

4) The forecast took into account the experience of business partners from European countries.

In the paper main project data are presented.

4. Results/Findings, Discussion

- During a pandemic situation, when preparing for project financing, expert assessment methods come to the fore, including the fuzzy logic method, the scenario method, and sensitivity analysis
- It is necessary to take into account and conduct a detailed analysis of the market taking into account changes in the macroeconomic situation
- Projected cash flows need to take into account flows from new activities associated with

new formats (for example, new on-line formats). At the same time, we will not necessarily see a decrease in cash flows in the forecast period.

- The risk management system should provide for measures to ensure the financial stability of the business in order to show the bank the ability of the cash flow to pay off the debt.
- Analyzing the presented scenarios, the bank, most likely, when making a decision in a situation of uncertainty, will focus on the indicators of the pessimistic scenario

5. Conclusion, Contribution and Implication

All mentioned above recommendations developed by international and Russian experts can be used in preparing for project financing in an adapted format, taking into account the specifics of the business, the macroeconomic situation, and the requirements of the bank. The fuzzy logic method can also be used to evaluate business and projects under conditions of uncertainty.

6. References

COVID-19: Navigating volatility and distress.// https://www2.deloitte.com/global/en/pages/about-deloitte/articles/covid-19-navigating-volatility-and-distress.html

Message from TEGoVA concerning valuation during the Pandemic// https://www.tegova.org/data/bin/a5e78e8f60c448_TEGoVA.Message_from_the_Board.23.03.2020.pdf

Recommendations of the Institute of Appraisals of Canada.// https://www.aicanada.ca/members-home/covid-19/

Recommendations of Cushman and Wakefield.//https://www.cwrussia.ru/cwiq/reviews/obzory-rynka-rossii/trendsradar/

Biznes posle pandemii: vosstanovlenie ot shoka. [Business after pandemic situation:recovering after shock].https://nafi.ru/analytics/biznes-posle-pandemii-vosstanovlenie-ot-shoka/

Metodicheskie razyasneniya po ozenke stoimosti v usloviyah pandemii.[Methodology of business appraisal in the pandemic situation].//https://srosovet.ru/activities/Metod/pandemic/MR_pandemiya_actual/

Airlines values proposition: post COVID-19 changes and passengers perceived level of service differentiation

Maxim Fokeev – National Research University Higher School of Economics, Russia fokeev.maxim@ya.ru

Nikolay Filinov – National Research University Higher School of Economics, Moscow, Russia

Keywords: airlines business-models, airlines value proposition, airline passenger behaviour; Russian air transport market; customization strategy in the airlines industry

1. Introduction

One of the hardest hits by anti-coronavirus restrictions is the air transport market. Post-crisis recovery leads carriers to change consumer behaviour of passengers and transform the value proposition. We determined main directions of airlines value proposition transformation in historical and post-COVID-19 perspective and compared airlines intentions about value proposition development and passengers mental process of choosing airline. We based our research on the cluster content analysis of 902 research articles since 1984, which were published in Web of Science and Scopus and comprehensive case study and a survey of 808 passengers on domestic routes in April 2020. As the main conclusion we highlighted the dissimilarities between airlines intentions to expand the number of services and, passengers mental process of choosing airlines, where differences of services do not determine their consumer choice.

2. Theoretical Background and Literature Review

Passenger airlines are a driver of the development of the world transport system, which is confirmed by the stable growth rates of the main indicators of the industry, both at the global and regional levels. The outbreak of the coronavirus pandemic led to an almost complete closure of international flights and a significant decrease in passenger traffic for domestic flights in March-April 2020. In this regard, airlines are faced with the question of determining the post-crisis configuration of the value proposition as a factor of restoring passenger traffic. The aim of the paper is to study the evolution of airlines value proposition and identify ways of this changes that are relevant in the context of the crisis.

Firstly, we conducted a literature review to identify the evolution of airline value proposition configurations. We used articles from Web of Science and Scopus. There are 1034 publications started from 1984 in databases. We used Bibliometrix R software for hierarchically cluster analysis (Glanzel, 1999). Analysis of the most cited publications allowed us to identify the stages of value proposition development, which were described in terms of the continuum of strategies by J. Lampal and G. Mintzberg (Lampel & Mintzberg, 1996). Starting from full-service national carriers and "pure standardization", airlines moved to polarization of value proposition and segmented standardization, where the range of available services was determined by the price sensitivity of the passenger. The need to increase the profitability of flights, at the next stage, created additional incentives to expand the range of services within the framework of alliance and non-alliance interactions, as well as a hybrid value proposition and customized standardization, with the possibility of choosing services from a predetermined set of components limited by the technical capabilities of the aircraft. The historical propensity to expand the range of services available leads to the formulation of research questions of work.

Q1: How airlines plan to develop their value proposition after crisis?

Q2: How do airlines manage profitability while customizing their value proposition?

H1: The breadth of available airline ground and flight services is a factor in consumer choice of a carrier on regional routes.

3. Research Design, Methodology and Data Analysis

We conducted combined case-study to solve research questions. At first stage, in April 2020 (pre-crisis period), we conducted an interviews with strategy and marketing experts from "Aeroflot - Russian Airlines", "Azimut", "Red Wings", "Institute for Transport Economics and Transport Policy of Higher School of Economics", "Publishing house "ABE Media" about value proposition evolution and practices of profitability management.

The interview results were verified using qualitative comparative analysis as a method for quantitatively analyzing the results of the case study. As the results of the first stage, it was noted that airlines are more inclined to expand the breadth (options) of services and implement a segmented standardization strategy (Q1), while the main channel for managing the amount of costs is cross-subsidizing of tickets (Q2).

Pointing to the expansion of the available service options, the influence of the breadth of services on the factor of the airline's consumer choice was studied from the passenger's point of view. Multidimensional scaling was chosen as a satisfying method, as a way of spatial interpretation of the magnitude of differences between objects.

The collection of data for the application of the procedure took place on the basis of a questionnaire containing 5 blocks of questions, where four of them consist of a comparison of carriers with different value proposition, and the fifth block is determined from socio-demographic questions. The question of personal perception of the degree of differences in the range of services of airlines was available to participants only when they had flight experience with two of the compared airlines. The assessment of the degree of differences was carried out using a 5-point Likert scale, where 1 - the set of airline services does not differ; 5 - the range of airline services varies significantly.

The characteristics of the general population are determined based on flight log-files tracked by Flightradar 24. This fee is due to the impossibility of direct observation, questioning at airports due to a significant decrease in passenger traffic and cancellations of most flights. The Lime Survey service was used as a technical platform, which allows constructing multi-level logical schemes for presenting questions. The distribution of questionnaires took place in the European part of Russia within the boundaries of Kaliningrad-Tyumen, Murmansk-Sochi from 04/21/2020 to 04/26/2020 using targeted advertising and mailing according to the characteristics of the general population. The total number of submitted questionnaires was 87402, 808 completed forms were received back. The response rate was 0.92%. The received answers formed the basis for constructing a convergence matrix and two and three-dimensional space of differences, where the further task was to interpret the content of the axes.

4. Results/Findings and Discussion

After obtaining a spatial representation of objects in multidimensional scaling, the question arises of interpreting the axes of space, that is, those latent, not called by respondents, but perceived parameters that make the analyzed objects different. As in the case of other similar statistical methods, this part of the study does not lend itself to strict formalization and is based on several empirical techniques. The most important of them is the analysis of objects that are most spaced along a certain axis (dimension).

In the first dimension, the perception of the airline by the passenger differs in the convenience of the user interfaces of the booking system, in the second, in the "speed" of service on board, associated with the service-class structure of aircraft, and in the third, in the possibilities of reducing the total ticket price using the internal currency of the frequent flyer program. Aggregating the results of expert interviews and a passenger survey, it is possible to see two trends, possibly containing a grain of contradiction.

For the most part, airlines, regardless of the existing configuration of the value proposition, are more focused on following the strategy of segmented standardization of air transportation services, i.e. expanding

331

choice within the package offers, which, on the one hand, allows them to attract new passengers, and, on the other hand, it's increase the level of customer satisfaction and encourage them to repeat purchases. At the same time, no empirical confirmation has been received for the hypothesis H1 about the breadth of the range of services as a factor of consumer choice. High range of services does not attract the passengers, but, on the contrary, complicates their decision-making process. This conclusion correlates with literature about architecture of choice.

5. Conclusion, Contribution and Implication

The discrepancy between the strategic intentions of airlines and the expectations of passengers leads to the formulation a special type of recommendations that would satisfy both sides. Traditionally, the literature identifies 12 tools for constructing a choice, which, on the one hand, will allow it to expand (attract new categories of passengers), on the other hand, reduce the complexity of decision-making for the client (Johnson, 2012). These solutions range from simply reducing the set of low-demand alternatives to focusing on "user experience" (Schkade & Kahneman, 1998). Measures related to the creation of default options and the historical memory of selected options for members of the loyalty program seem to be most applicable for airlines. Given the multi-class aircraft, different target flight models, the configuration of predefined sets would reduce the complexity of choice faced by passengers, and airlines expand passenger classes, which correlates with the goals of carriers' transition to hybrid value proposition configurations (Cronqvist & Thaler, 2004).

6. References

Cronqvist, H., & Thaler, R. (2004). Design choices in privatized social security systems: learning from the Swedish experience. American Economic Review, 94(2), 424–428. https://doi.org/10.1257/0002828041301632

Glanzel, W., Schubert, A., & Czerwon, H. (1999). A bibliometric analysis of international scientific cooperation of the European Union (1985–1995). Scientometrics, 45(2), 185–202. https://doi.org/10.1007/BF02458432

Lampel, J., Mintzberh, H. Customizang Customization. Sloan Management Review, (38), 21-30.

Schkade, D., & Kahneman, D. (1998). Does living in California make people happy? A focusing illusion in judgments of life satisfaction. Psychological Science, 9, 340–346. https://doi.org/10.1111/1467-9280.00066.

The Impact of COVID-19 Pandemic on Consumer Behaviour and Business Models

Svetlana Berezka – National Research University Higher School of Economics, Moscow, Russia
svtl.berezka@gmail.com

Vera Rebiazina – National Research University Higher School of Economics, Moscow, Russia

Keywords: COVID-19, consumer behaviour, digital transformation age, customer centricity

1. Introduction

Currently, it is crucial to pay close attention to the transformation of consumer behaviour due to the COVID-19 pandemic and the potential consequences for business. The precautions introduced by governments forced the digital transformation of both companies and consumers. It creates a need to provide an understanding of how consumers adapt to this situation and what has changed in their preferences and behaviour. Moreover, it is important to foresee what long-term impact it can have because many general consumer habits were discarded and replaced by new ways to consume (Sheth, 2020). Online shipping became more prevalent (Donthu & Gustafsson, 2020; Sheth, 2020)

Following the point that to specify the customers that the company is serving and what their specific needs is an initial step in adapting the business model to make it well-functioning (Ritter & Pedersen, 2020), we focus on consumers. The purpose of the paper is to reveal the impact on consumer behaviour caused by the COVID-19 pandemic and identify the strategies aimed to cope with the crisis. Thus, our research questions are: How does pandemic change consumer behaviour? What are the adaptation strategies and market opportunities?

2. Theoretical Background and Literature Review

The challenges of the COVID-19 pandemic for business are in the primary focus of researchers and practitioners worldwide (Donthu & Gustafsson, 2020; Fetzer et al., 2020; Sheth, 2020). Most of the papers focused on public policy decisions and consumer relationship marketing activities (Crick & Crick, 2020). Researchers noticed that society changes significantly, and it led to transformations in how consumers behave and in the ways how business can meet their needs (Donthu & Gustafsson, 2020). The COVID-19 pandemic seems to be one of the most dramatic environmental changes for some decades and it could have a high impact on basic marketing philosophy and corporate social responsibility. That means that companies have to rethink their visions and missions. The pandemic forced business commerce to change in some different ways (Crick & Crick, 2020).

Some recommendations on how to cope with the COVID-19 crisis are already provided in the academic literature. Ritter & Pedersen (2020) consider customers as one of the key elements of a business model. They highlighted the importance of reviewing their business models and focusing on consumer needs, customer value propositions, and value demonstration. Pantano, Pizzi, Scarpi, & Dennis (2020) claimed that companies (especially, retailers) should optimize and re-access technologies and business models that they use, and also revise their business plans to reassure customers that their needs will be met. Other recommendations are focused on developing strategic agility that allows them to reach customers and meet their needs.

However, there is very little empirical research in consumer behaviour and lack of understanding of shifts in their preferences and habits. Our study is aimed to contribute to this area.

3.   Research Design, Methodology and Data Analysis

Quantitative data from an online study was analysed using factor analysis and cluster analysis in R (https://www.rdocumentation.org/). The questionnaire consists of 5 blocks: (1) general behaviour and personal precautions, (2) consumer anxiety, (3) hygiene concerns, (4) changes in consumer preferences and experience, (5) social and demographic profile. It includes 45 indicators to identify changes in consumer behaviour were developed following Fetzer et al. (2020) approach.

The quantitative data was collected from a survey of internet users who participated in the online course "Marketing", held on the Russian National Educational Platform "Open Education". The survey link was sent to participants of the course in April-May 2020. Completing the questionnaires was voluntary, we receive 500 responses. 476 valid responses from Russian residents were used in further analysis. 73.89% of respondents were female, 26.11% were male. The larger age group is 18-25 years old (77.94%), their income level in general, correspond to the general population. Most of the respondents (47.06%) are located in large cities (Moscow, Vladivostok, St. Petersburg, etc.).

4.   Preliminary results

An exploratory factor analysis with R has been applied to reduce the number of items and prepare data for cluster analysis. All items which were included in factor analysis were measured with a 7-point Likert scale. We have revealed five factors that describe consumer response to the new conditions: (1) Social distancing and self-isolation behaviour, (2) Hygiene concerns, (3) Packaging preferences, (4) Buying behaviour, (5) Personal anxiety. Based on these factors three clusters of consumers were identified.

The first cluster (180 respondents) has the highest level of anxiety (mean: 4.67) among three clusters. These people strictly follow social distancing and self-isolation recommendations (mean: 6.45) and very concern about hygiene (reversed scale, mean: 2.48) and package (mean: 4.90). Their preference for online shopping for any type of goods is much stricter in comparison with other clusters. The second cluster (159 respondents) has the lowest level of anxiety (mean: 3.25). They have fewer hygiene concerns (reversed scale, mean: 4.27) among three clusters and moderate preference to shop online (mean: 3.22). The third cluster (106 respondents) has a higher level of anxiety (mean: 3.59) then the second cluster, but there are much more concerned about hygiene (reversed scale, mean: 2.17). Nevertheless, they don't switch to online shopping (mean: 3.59).

5.   Conclusion, Contribution and Implication

Theoretical analysis of the publications on COVID-19 systemizes the main strategies adopted by companies to survive in the crisis and find new opportunities to improve their competitiveness in the long run.

At the current stage, our study identified that consumers have anxiety caused to be the COVID-19 pandemic that brought, to the daily agenda, the hygiene concerns. It makes a call for new products and services.

The preliminary results of the empirical data analysis allow us to assume that the consumer experience earned during the lockdown will affect consumer behaviour in the long run. It improves their readiness to adopt digital technologies and resulted in raising the demand for the development of digital services in some fields that were traditionally offline (such as fitness classes). We are going to conduct further analysis to reveal the motives and understand to the difference in consumer behaviour that is vital to find the ways to use market opportunities and adjust business models.

6. References

Crick, J. M., & Crick, D. (2020). Coopetition and COVID-19: Collaborative business-to-business marketing strategies in a pandemic crisis. *Industrial Marketing Management*, *88* (May), 206–213. https://doi.org/10.1016/j.indmarman.2020.05.016

Donthu, N., & Gustafsson, A. (2020). Effects of COVID-19 on business and research. *Journal of Business Research*, *117* (June), 284–289. https://doi.org/10.1016/j.jbusres.2020.06.008

Fetzer, T., Witte, M., Hensel, L., Jachimowicz, J., Haushofer, J., Ivchenko, A., … Yoeli, E. (2020). Global Behaviours and Perceptions at the Onset of the COVID-19 Pandemic. *National Bureau of Economic Research*. https://doi.org/10.31234/osf.io/3kfmh

Pantano, E., Pizzi, G., Scarpi, D., & Dennis, C. (2020). Competing during a pandemic? Retailers' ups and downs during the COVID-19 outbreak. *Journal of Business Research*, *116* (May), 209–213. https://doi.org/10.1016/j.jbusres.2020.05.036

Ritter, T., & Pedersen, C. L. (2020). Analyzing the impact of the coronavirus crisis on business models. *Industrial Marketing Management*, *88*, 214–224. https://doi.org/10.1016/j.indmarman.2020.05.014

Sheth, J. (2020). Impact of Covid-19 on consumer behaviour: Will the old habits return or die? *Journal of Business Research*, *117*, 280–283. https://doi.org/10.1016/j.jbusres.2020.05.059

Track: Miscellaneous Track

Chairperson: Artem Alsufiev

Fractional Integration Model for the Russian Wholesale Electricity Market

Yuri Balagula – Institute for Regional Economic Studies RAS, Russia yuri.m.balagula@gmail.com

Keywords: ARFIMA, time series, long memory, electricity market

1. Introduction

Empirical Industrial Organization Studies in power industry use time series of wholesale electricity prices, for example (Orea, Steinbuks, 2018). Such studies need investigation of statistical properties of the time series and proper model selection. One of the characteristic features of power price time series is long memory. To capture it, the autoregressive fractionally integrated moving average (ARFIMA) model has been suggested (Granger, Joyeux, 1980). The present study is dedicated to econometric modelling of daily electricity prices from the Russian Wholesale Electricity Market for six regional subdivisions of the Unified Power System of Russia. The Wholesale Electricity Market of the Russian Federation has started operations in 2003. Only few papers, to the author's knowledge, consider econometric models of power price time series based on the Russian data. The main goal of the paper is the application of the ARFIMA model to the Russian wholesale electricity market with regional differentiation. It comprises the following aims: 1) to reveal the long-memory effect in the time series of wholesale electricity prices and estimate its intensity (calculate the order of fractional integration d); 2) evaluate forecast accuracy of the ARFIMA model compared to the ARIMA model; 3) assess the improvement of the forecast accuracy due to taking into account the long-memory effect.

2. Theoretical Background

Analytically, an ARFIMA(p,d,q) process Y_t can be defined as

$$\Phi(L)(1-L)^d Y_t = \mu + \Theta(L)\,\varepsilon_t,$$

where ε_t is a white noise process; $\Phi(L)$ and $\Theta(L)$ – polynomials in a lag operator L, corresponding to the AR (of order p) and MA (of order q) parts respectively; μ is the mean of the process Y_t; d is the integration order, also referred to as a fractional differencing parameter, that is allowed to be non-integer. $(1-L)^d$ is a fractional differencing operator. The fractional integration order d can be estimated by GPH-test (Palma, 2007). When $0 < d < 0.5$, the process is said to exhibit long memory.

3. Research Design, Methodology and Data Analysis

We analyse time series of daily buy spot electricity price from the wholesale day-ahead market for six regional unified power systems, namely Centre, Volga, Ural, North-West, South, Siberia. Every time series contains 1369 observations, from 16.01.2016 till 15.10.2019. The week seasonality has been eliminated by the STL procedure. The holydays effect was not taken into account, since the research aims to compare models, but not to achieve the best possible forecast accuracy. Every investigated time series was split into a training set (the first 1095 samples, 3 years) and a test set (the last 274 samples).

We compare ARFIMA family (d is allowed to be non-integer and estimated by the exact maximum likelihood method) with ARIMA family (d is integer and fixed: $d = 0$ and $d = 1$). The set of ARIMA models comprises 18 models with all combinations of parameters $\{p = 1,2; q = 1,2; d = 0,1\}$. The set of ARFIMA models consists of 9 models with all combinations of parameters $\{p = 1,2; q = 1,2\}$. The models were estimated on the training set using the **arfima** package of **R** (Veenstra, 2012), then their forecasting performance has been evaluated on the test set using cross-validation. To reveal the best model and to compare the two families, we used the following approaches: 1) the best model of each family is chosen by BIC on the training set, and then its forecasting performance is evaluated by cross-validation MAPE on the test set; 2) the best model of each family is chosen by cross-validation MAPE only.

4. Results/Findings, Discussion

The long-memory effect is present in all of the time series. For most of the regional power systems estimated values of fractional integration order d lie in the range $0.48 \div 0.5$, that corresponds to the results for some European markets and for Italian zonal prices (Gianfreda, Grossi, 2012). Remarkable, that there is no connection between size or generation structure of power system and corresponding fractional integration order. For regional power systems Centre, Volga, North-West and South both approaches choose the best model from the ARFIMA family. For the Ural region the results are comparable. For Siberia the ARFIMA model seems to be not appropriate (possibly due to the periods of flood, when price is very low). In the cases, when ARFIMA model is the best, it outperforms the best ARIMA model up to 0.143 p.p. MAPE.

5. References

Orea L., Steinbuks J. (2018). Estimating Market Power Using a Composed Error Model: Application to the California Electricity Market. Economic Inquiry, 56(2), 296–1321.

Granger C. W. J., Joyeux R. (1980). An introduction to long-memory time series models and fractional differencing. Journal of Time Series Analysis, Vol.1, 15–30.

Palma W. (2007). Long-memory time series. Theory and methods. Wiley.

Veenstra J. (2012). Persistence and Anti-persistence: Theory and Software. Ph.D. Thesis, Western University.

Chaabane N. (2014). A hybrid ARFIMA and neural network model for electricity price prediction. Electrical Power and Energy Systems, 55, 187–194.

Gianfreda A., Grossi L. (2012). Forecasting Italian electricity zonal prices with exogenous variables. Energy Economics, 34, 2228–2239.

Application of the Ohlson model to estimate the value of companies in Russian market

Varvara Nazarova – National Research University Higher School of Economics, Russia nvarvara@list.ru

1. Introduction

The ultimate goal of any firm is to maximize its value; however, the best method to get an unbiased and accurate assessment is unclear. Many different models have been designed for this purpose and evaluate and predict a firm's actual value, but none of them can give an answer without fail. This has led to the creation of new models to fill the gaps in the previous models or to suggest new valuation methods and approaches. Ohlson suggests the linear information model (LIM), which links equity book value, abnormal earnings and "other information", and combines it with the residual income model (RIM), which is the sum of equity book value and discounted abnormal earnings (1995).

In this article we try to find evidence of cointegration between the market value of a company and its intrinsic value, and our findings suggest that these two variables do indeed exhibit a long-term equilibrium relationship. In addition, we evaluate the predictive ability of the Ohlson model in terms of forecasting a company's market value.

Our research goal is to determine if the Ohlson model is valid in the Russian context based on the MICEX index of the Moscow Stock Exchange dataset from 2001 to 2017.

2. Theoretical Background and Literature Review

The intrinsic valuation of a firm is normally based on the dividend discount model, which uses the theory that a firm's value mainly depends on its discounted future dividends. Although considered traditional, this approach does not explain the connection between a company's value and accounting indicators (Bernard, 1995), while the Ohlson model does exactly that without taking into account dividend predictions (Ohlson, 1995; Feltham, Ohlson, 1995). It treats a firm's intrinsic value as a linear function of its equity book value and discounted future abnormal earnings, suggesting that the latter (being a proxy for the firm's economic outlook) are the reason why the intrinsic equity value can be either greater or less than its book value.

Over time, many successive stock valuation models have been proposed. Among others, the Markowitz model, the CAPM concept, the comparative approach and the discounted cash flow model are highlighted most often. The Ohlson model, which was proposed in 1995, can be classified as one of the newer methods of company valuation.

A number of papers published over the past decades examine the relationship between a firm's market value and the intrinsic value of its equity or individual accounting indicators (Dechow, Hutton, Sloan, 1999; Morel, 2003; Gregory, Saleh, Tucker, 2005) by attempting to determine which accounting-based valuation model has the greatest explanatory ability (e.g. Ashbaugh, Olsson, 20020 and therefore drawing attention to the question whether accounting information affects a firm's value (Barth, Beaver, Landsman, 2001; Ciftci, Darrough, Mashruwala, 2014). It would be fair to say that a relatively small number of such studies use evidence from emerging markets as most scholars focus on developed ones.

Previous studies include the following data as a proxy for "other information":

- New patents, enactment of new legislation on new medicines for pharmaceutical companies, long-term contracts, and portfolios of orders. At the same time, the inclusion of a portfolio of orders does not affect the growth of residual earnings (although it should) and distorts the results, which makes its addition undesirable (Spilioti, 2012; Martínez, 2012);
- Analytical consensus forecasts (i.e., forecasts of future earnings), which is the most popular method (Liu, Ohlson, 2000);
- "Other information" for the previous period (Akbar and Stark, 2003); and

$$v_{t+1} = v_t \ (11)$$

- Income forecasts based on a sector's price/earnings ratio and a company's earnings/price ratio (Gregory, Saleh, Tucker, 2005).

3. Research Design, Methodology and Data Analysis

At our study, we explore the relationship between equity book value, market capitalization and net income over the entire sample using the regression model proposed by Collins, Pincus and Xie (1999). Their method is based on the Ohlson model, and we add two more major alterations of our own: first, zero intercept (a constant) as, economically speaking, a firm with no profit and zero book value cannot have non-zero market value (Bukhvalov, Akulaeva, 2014), and second, absolute values for the indicators (not per share) (Bukhvalov, Volkov, 2005). The resulting model is as follows:

$$MV_j = \beta_1 NI_j + \beta_1 BV_{j-1} + \varepsilon_j \ (15), \text{ where:}$$

MV_j is the market capitalization of the firm for a given year,

NI_j is its net income for the same year,

BV_{j-1} is the book value of the firm at the beginning of that year,

εj is an error term.

Hypothesis

We propose the hypothesis that the Ohlson model can successfully explain the interdependence of a firm's value with accounting data and other information, and that the proposed models are significant.

H_1 – The Ohlson model without a deflator and with "other information" is significant;

H_2 – The Ohlson model without a deflator and without "other information" is significant;

H_3 – The Ohlson model with a deflator and without "other information" is significant;

H_4 – The Ohlson model with a deflator and with "other information" is significant;

H_5 – The Ohlson model by sector with a deflator and without "other information" is significant;

H_6 – The Ohlson model by sector without a deflator and without "other information" is significant.

List of Variables

We propose creating a model with two different types of variables. We leave the first type of variables, such as market capitalization, net assets, and abnormal earnings, as they are and calculate the second type of variables with the number of ordinary shares as a deflator, finding market share price, net assets per share and abnormal earnings per share as a result. Since the sample includes firms of different sizes, we use the deflator to mitigate the "scale effect", which may lead to bias and heteroscedasticity, resulting in econometric issues in market-based accounting research. We also add more independent variables (traded stocks, percentage change in the total value of traded stocks) following suggestions from papers on earlier studies.

The variables in the model are affected by heteroscedasticity and autocorrelation. Since trimming, winsorizing and using logarithms do not solve this problem within the classic Ohlson model, we create regressions calculating a robust range of estimators in order to eliminate within-group correlation and heteroscedasticity.

In our analysis, we use data from 460 companies in 9 industries over the period from 2001 to 2017, as provided in the Thomson Reuters database. The full dataset includes 3070 observations. We design a model for the whole sample with and without a proxy for "other information" and a model by industry without a proxy for "other information". The proxy for "other information" is calculated in accordance with the method suggested by Akbar and Stark (2003).

To make our research valid and efficient, we use information on companies listed on the Moscow Stock Exchange and exclude companies that belong to the financial sector.

Our study covers the following sectors: energy, basic materials, industrial, consumer cyclicals, consumer non-cyclicals, healthcare, technology, telecommunications, and utilities.

4.   Results/Findings and Discussion

The main hypothesis of our study is that book value, abnormal earnings and "other information" have a positive influence on share prices. Each regressor is tested using 4 modifications of the Olson model with different parameters. Table 8 below presents the most significant model results.

Table 5 - Overall Model Results

	Model 1	Model 2	Model 3	Model 4
	Capitalization		Market share price	
Net assets	1.415*	1.396*		
	(2.24)	(2.36)		
Abnormal earnings	0.585***	0.573***		
	(4.96)	(5.06)		
"Other information"		0.0722***		
		(11.55)		
Net assets per share			0.468	0.468
			(0.82)	(0.82)
Abnormal earnings per share			0.093	0.093
			(0.58)	(0.58)
Other information per share				0.0000105
				(0.87)
Constant	3.92376e+10***	3.98520e+10***	4543.8***	4543.9***
	(7.45)	(7.74)	(6.08)	(6.08)
N	3030	3030	3019	3019
R-squared	0.218	0.372	0.007	0.007

$*p<0.1, **p<0.05, ***p<0.01, ****p<0.001$

As stated above, we obtain different results using the deflator method in order to minimize the "scale effect". It should be mentioned that adding a deflator to any model (with or without a proxy for "other information") lowers the model's significance level. Model 2 has the greatest explanatory power with the highest adjusted R-squared value of 0.372, which confirms that abnormal revenue, net assets, and a proxy

for "other information" indeed influence market capitalization. We recommend using non-deflated models to analyze specific sectors, taking into account their individual features and conditions.

Our conclusions differ from those by Al-Hares, Abu Ghazaleh and Haddad (2011). They investigate the Kuwait equity market over the period from 2003 to 2009 and find that the proxy for "other information" in an Ohlson model with ordinary shares used as the deflator does make a difference in assessing market share price. In our case, however, a proxy for "other information" does not improve the model and has no effect on determining share prices. On the other hand, according to Martinez, Prior, and Rialp (2012), both models show the capacity to explain market capitalization, but there are differences in coefficients and the dataset used. The subsample results show that individual features of countries or their industries mean that the Ohlson model is only suitable for some of them and cannot be applied universally. Our results are similar to those obtained by Volkov (2006), but they are not consistent with D-CAPM (Bukhvalov and Okulov, 2006).

The non-deflated Ohlson model shows that accounting values have a positive relationship with market capitalization and that the proxy for "other information" is essential in order to explain this effect and should not be assumed to be equal to zero. Both models 1 and 2 show growth over the period in question, which is confirmed by the period's trends of equity market capitalization in Russia.

5. Conclusion, Contribution and Implication

This study presents an attempt to investigate the correlation between market capitalization, earnings and equity book value of Russian firms. Our analysis is premised on the claims made in the papers by Burgstahler, Dichev (1997), Collins, Pincus, Xie (1999), Zhang (2016) and Ying-Hua (2013] – the authors of these studies state that there is a non-linear relationship between a firm's market and accounting indicators, which is tied to that firm's financial position and economic outlook.

Our comparative analysis shows that the regressors in our model anticipate price dynamics more accurately and that the "other information" coefficient is positive and statistically significant, which suggests that there are factors that are not reflected in financial statements but that still affect stock prices.

As our findings help to better understand the valuation of Russian firms, we believe that they could have considerable practical use. Our primary conclusion is that the choice of a valuation model depends on a given firm's outlook and financial position – determining a firm's potential for future growth can help to see whether net asset value, abnormal earnings or "other information" is the most relevant accounting indicator for making market capitalization forecasts.

The study could be used as a basis for future testing of Ohlson model modifications because it provides the latest results on this subject. The next step might be considering different specifications for the proxy for "other information" and reporting standards. Moreover, it might be beneficial to consider the prediction power and to compare different stock valuation models. All these actions have the potential to influence the development of the Ohlson model and accounting-based studies.

We suggest taking abnormal earnings and net assets into account when making investment decisions, as abnormal earnings are quite common in emerging markets.

The results show that the Ohlson model can forecast future stock price movements much more accurately in any predicted horizon.

The practical application of our findings is that they make it possible to establish the value of companies after the publication of quarterly, semi-annual and annual financial statements. Our model can be used by investors, managers or indeed anyone interested in making a long- or medium-term investment as it can help to outline a strategy and create an investment portfolio. It can also help predict the future value of a given firm.

Apart from that, our model can serve as a starting point for developing further modifications with a greater explanatory and prediction ability.

6. References

Akbar, S. and Stark, A.W., 2003. Deflators, net shareholder cash flows, dividends, capital contributions and estimated models of corporate valuation. Journal of Business Finance & Accounting, 30 (9-10), pp.1211-1233.

Al-Hares, O.M., Abu Ghazaleh, N.M. and Haddad, A.E., 2013. The effect of 'other information' on equity valuation: Kuwait evidence.

Ashbaugh H., Olsson P., 2002. An exploratory study of the valuation properties of cross- listed firms' IAS and U.S. GAAP earnings and book values. Accounting Review 77 (1), pp.107–126.

Barth M. E., Beaver W. H., Landsman W. R., 2001. The relevance of the value relevance literature for financial accounting stan- dard setting: Another view. Journal of Ac- counting and Economics 31 (1–3), pp.77–104.

Bernard V., 1995. The Feltham-Ohlson frame- work: Implications for empiricists. Con- temporary Accounting Research 11 (2), pp. 733–747.

Bukhvalov A. V., Akulaeva E. A., 2014. pirical fundamental value of Russian com- panies: In search for strategic value. Russian Management Journal 14 (2), pp. 3–12.

Bukhvalov A. V., Volkov D. L., 2005. The re- search of relationship between fundamen- tal value indicators and market capital- ization of Russian companies. Vestnik of Saint Petersburg University. Management 4 (1), pp.26–43.

Bukhvalov A.V., Okulov V.L., 2006. Capital Asset Pricing Models and Russian Stock Market. Part 2. Modified CAPM Applicability, 36(R). Institute of Management, Saint- Petersburg State University: St. Petersburg

Burgstahler D., Dichev I., 1997. Earnings, adaptation value and equity value. Account- ing Review 72 (2), pp. 187–215.

Ciftci M., Darrough M, Mashruwala R., 2014. Value relevance of accounting information for intangible-intensive industries and the impact of scale: The US evidence. Euro- pean Accounting Review 23 (2), pp.199–226.

Collins D., Pincus M., Xie H., 1999. Equity valuation and negative earnings: The role of book value of equity. Accounting Review 74 (1), pp. 29–61.

Dechow P., Hutton A., Sloan R., 1999. An empirical assessment of the residual in- come valuation model. Journal of Account- ing and Economics 26 (1–3), pp. 1–34.

Feltham, G.A. and Ohlson, J.A., 1995. Valuation and clean surplus accounting for operating and financial activities. Contemporary Accounting Research, 11(2), pp.689-731.

Gregory, A., Saleh, W. and Tucker, J., 2005. A UK Test of an Inflation-Adjusted Ohlson Model. Journal of Business Finance & Accounting, 32(3-4), pp.487-534.

Martínez, P., Prior, D. and Rialp, J., 2012. The price of stocks in Latin American financial markets: An empirical application of the Ohlson model. International Journal of Business & Finance Research, 6(4), 73-85.

Morel, M., 2003. Endogenous parameter time series estimation of the Ohlson model: Linear and nonlinear analyses. Journal of Business Finance & Accounting, 30(9-10), pp.1341-1362.

Ohlson, J.A., 1995. Earnings, book values, and dividends in equity valuation. Contemporary Accounting Research, 11(2), pp.661-687.

Ying-Hua, C. & Shih-Chin, W., 2013. Integration of evolutionary computing and equity valuation models to forecast stock values based on data mining. Asia Pacific Management Review, 18(1), p. 63-78. doi:10.6126/APMR.2013.18.1.04

Zhang, X., 2016. Value relevance of historical information and forecast information in China: Empirical evidence based on the Ohlson and Feltham-Ohlson models. Academy of Accounting and Financial Studies Journal, 20(3), pp.14-27.

Benefits of Glocalization Marketing Strategy of International Companies in Fast-Moving Consumer Goods Sector

Aleksandra Selezneva – National Research University Higher School of Economics, Russia
aleksandra.seleznewa@gmail.com

Sergey Kazakov– National Research University Higher School of Economics, Russia

1. Introduction

The current paper is intended to cover some major issues pertaining to the sphere of glocalization marketing strategy and reveal its benefits applicable to international companies in FMCG sector. The primary aim of the research is to identify the benefits of glocalization marketing strategy for international FMCG companies.

The goal of the study was achieved by deployment of various research methods: survey of international companies' executives, case study gathering hard data from secondary open sources and cross-tabulation analysis. The research advances existing theoretical knowledge be means of compilation of glocalization marketing strategy benefits in the context of all four marketing mix elements. In practical terms, the research study will be of primary significance to corporate and marketing strategy managers, financial managers and supply chain department executives.

2. Theoretical Background and Literature Review

All types of IMSs are conventionally distinguished between standardization and adaptation strategies. The most recent direction of the IMS discussion makes an emphasis on symbiosis of those two viewpoints. So-called "contingency perspective" on the standardization vs. adaptation debate have gained special attention in the scientific world when it became more evident that "neither complete standardization nor complete adaptation of marketing program is conceivable" (Cavusgil et al., 1993).

Ghemawat (2013) even stated that in this decade, the world is characterized as "semi-globalized" rather than globalized (Ghemawat, 2013). Eventually, global and local trends intermingle which leads to the emergence of a new marketing strategy direction – glocalization. This strategy involves adoption of globalization aspects in local culture in order to drive its internal growth and diversity, while at the same time not allowing for the full dominance of globalization over national self-development (ibid.).

Numerous authors have pointed out benefits of glocalization IMS for the FMCG market players. However, there was no research on the subject presented that could distinguish those benefits between all four elements of the company's marketing mix. Such differentiation is presented in Table 1. In order for the current research to be more accurate, we will concentrate on three elements of the marketing mix and one benefit in each of those elements that can be easily quantified. We will concentrate on the following marketing mix elements and on the respective benefits of glocalization IMS that are connected with those elements within the boundaries of FMCG market:

1) Product & Promotion – greater market share;

2) Price – higher profits;

3) Place – adaptation of distribution processes to the local resource availability.

Table 1. Benefits of glocalization marketing strategy for each of the marketing mix elements in FMCG sector

		Standardization level		
		High	**Medium**	**Low**
Element of the marketing mix	**Product**	- High notoriety of the brand worldwide, higher brand consistency - Lower costs due to scale economies - Speeding up the manufacturing processes - Maintaining the same quality and safety levels	- Brand portfolio diversification - Greater ***market share*** - Facing competition from both local and international brands in a better way	- Appealing to local markets -> increased consumer loyalty - Avoiding ethical issues by tailoring the product to the local culture
	Price		- ***Higher profits*** due to implementation of global pricing strategy with adapting some of its elements to the local market	
	Place			- Adaptation of global production and ***distribution processes*** to the resource availability in different countries

	Promotion		- Opportunity for both global and local marketing activities to be optimized simultaneously - Harmony and balance between the different levels of marketing activity: strategic, tactical and operative - Greater *market share*	- Taking full advantage of local expertise, knowledge and information

Source: compiled by the author from (Dumitrescu & Vinerean, 2010), (Ietto-Gillies, 2000), (Kotler, 2009)

From all the literature analyzed and from the Table 1 as the key outcome of theoretical literature analysis, we are able to formulate three primary hypotheses that will be tested further in the empirical part of the research:

1) Medium standardization level of product and promotion strategy is connected with greater company market share;
2) Medium standardization level of pricing strategy is connected with greater company value sales;
3) Low standardization level of distribution strategy is connected with greater company weighted distribution.

3. Research Design, Methodology and Data Analysis

Methodology of the current research is divided into three stages: 1) survey of international companies' executives; 2) case study; 3) cross-tabulation of results for two independent samples with the aim of getting statistically significant conclusions that could be extrapolated on a wider sample.

The first stage of the research – survey of the executives – was conducted in order to make standardization level of various marketing mix elements quantifiable. We analyzed three key dimensions (product & promotion, pricing, and distribution strategies) in application to the brands represented by the producers chosen for the analysis under consideration: Bref (Henkel), Domestos (Unilever), and Toilet Duck (SC Johnson).

For the first stage of the research, 68 people were asked to participate in the survey. Those people represented executives of various international FMCG companies specialized in marketing (to assess brands' product & promotion strategy), finance (pricing strategy) and supply chain (distribution strategy). Based on averaged responses of all executives for all compared countries, one rating was given for each brand together with one dimension resulting in *standardization ratings*.

The second stage of the research is represented by case study gathering information on various indices of three brands under analysis that are closely connected with the dimensions scrutinized during the previous

346

research stage. Namely, data on three indices were obtained: market share (measured in percent), value sales (RUB), and weighted selling distribution (%). The information encompassed the figures for those indices with regard to the Russian toilet care market on a 10-year period from 2010 to 2019 for market share and value sales indices, and on a 7-year period from 2013 to 2019 for weighted selling distribution indicator. Results of the second research stage were compiled into the database with ***indices ratings***. All survey answers as well as case study results with MS, VS, and WD calculations can be boiled down to Table 2.

The third – and final – stage of the research is connected with ***contingency table analysis*** – a widespread research instrument with implementation possibility to compare two independent samples of observations from the first two research stages: standardization ratings and indices ratings. As discussed in research methodology section, three contingency tables were built regardless of the brand so that there could be an opportunity to extrapolate the research findings on a wider sample.

Table 2. Generalized standardization ratings and indices ratings of Bref, Domestos, and Toilet Duck brands

	Standardization ratings				
	1 – High		2 – Medium	3 – Low	
Product and promotion strategy	Domestos		Bref	Toilet Duck	
Market share level	*3*		*1*	*2*	
Pricing strategy	Domestos	Toilet Duck	Bref		
Value sales level	*3*	*2*	*1*		
Distribution strategy			Toilet Duck	Bref	Domestos
Weighted distribution level			*2*	*1*	*3*

Source: calculated by the author based on survey answers, (Euromonitor International, 2020), and (Nielsen reporting, 2020)

4. Results/Findings and Discussion

Representation of the hypotheses testing is provided in Table 3 with three colors – green, red, and yellow – indicating confirmed, not confirmed, and partially confirmed hypotheses respectively.

Table 34. Benefits of glocalization marketing strategy for each of the marketing mix elements in FMCG sector: compilation of research findings

		Standardization level		
		High	Medium	Low
Element of the marketing mix	**Product & promotion**		Greater *market share*	
	Price		*Higher profits*	
	Place			Better *distribution processes*

Source: compiled by the author based on cross-tabulation analysis, (Dumitrescu & Vinerean, 2010), (Ietto-Gillies, 2000), (Kotler, 2009)

Hypothesis №1

The vast majority of respondents mentioned medium standardization level of product and promotion strategy that was connected with the highest market share among the brands under consideration. As p-value in Chi-square test is less than 0,05 we can conclude that at a 5% significance level, the evidence in our sample is strong enough to be able to reject the null hypothesis at the population level. Hence, medium standardization level of product and promotion strategy is connected with greater company market share and therefore, the first hypothesis is fully confirmed.

Hypothesis №2

The cross-tabulation analysis represents circumstances that provide reasonable ground for the second hypothesis to be confirmed. However, results of the Chi-square test do not allow us to reject the null hypothesis (p-value is greater than 0,05). Consequently, we cannot deduce that at a 5% significance level, variables in the analysis are interconnected. The second hypothesis therefore cannot be confirmed.

Hypothesis №3

We can discern that suggestion stated in the hypothesis has its reasons to be confirmed. Moreover, the value of Chi-square test is less than 0,05 which makes it possible to confirm the connection between low standardization level of the company's distribution strategy and its higher weighted distribution. Nevertheless, one research finding cannot be left unnoticed. Despite for interrelation with greater weighted distribution, lower standardization level of the company's distribution strategy turned out to be connected with lower weighted distribution, according to the results of cross-tabulation analysis. This outcome can be referred to as ambivalent and definitely needs some deeper research to be conducted. Hence, the third hypothesis is partially confirmed.

The outcome of the hypothesis testing based on the conducted cross-tabulation analysis and Chi-square test is represented in the Table 4.

Table 45. Results of the research hypothesis testing

	Hypothesis formulation	Result*
Hypothesis №1	Medium standardization level of product and promotion strategy is connected with greater company market share	+
Hypothesis №2	Medium standardization level of pricing strategy is connected with greater company value sales	–
Hypothesis №3	Low standardization level of distribution strategy is connected with greater company weighted distribution	±

* Signs:

+ fully confirmed

± partially confirmed

– rejected

Source: compiled by the author

5. Conclusion, Contribution and Implication

The current research is an attempt to advance our understanding of GMS benefits applicable to FMCG industry. Based on the research findings, we could answer the key research question as follows: one of the primary GMS benefits for international company in FMCG sector is greater market share on the local market. On the contrary to the existing literature, it was not confirmed that international company in FMCG sector can benefit from higher profits on the local market. Finally, the research outcomes enable us to suggest that some of the possible GMS benefits for international FMCG company is greater weighted distribution together with some other advantages, but these propositions need to be proved in a more detailed study and therefore constitute a solid base for prospective directions of further research.

In terms of managerial aspect, the key study results may be of particular interest for corporate and marketing strategy managers, financial managers and supply chain department executives to better understand the influence of particular marketing mix factors' standardization level on various indices of the company's performance and to advance their decision-making process with regard to the standardization level of the marketing mix elements they are connected with.

6. References

Cavusgil, T.S., Zou, S., & Naidu, G.M. (1993). Product and Promotion Adaptation in Export Ventures: an Empirical Investigation. Journal of International Business Studies, 24(3), 479-506

Dumitrescu, L. & Vinerean, S. (2010). The Glocal Strategy of Global Brands. Studies in Business and Economics, 5(3), 147-155

Ghemawat, P. (2013). Depth Index of Globalisation / P. Ghemawat, S. Altman. IESE Business School

Ietto-Gillies, G. (2000). Transnational Corporation: Fragmentations Amidst Integration. Routledge

Kalygina, V. & Chernysheva, A. (2019). Glocalization Strategy of the International Companies in the Russian FMCG Market Under the Import Substitution Policy. 10th Business & Management Conference, Paris, 73-89

Kotler, P. et al. (2009). Marketing Management (European Edition). Pearson Prentice Hall Publishing

impact of the two-tier system on the company's performance, since it is a substitute for such a system.

The following hypotheses were formulated based on the literature analysis:

H1. The presence of a two-tier board system has a positive effect on the financial performance of Russian publicly traded companies.

H2. CEO human capital moderates the relationship between the board system and the financial performance of the company. The stronger the CEO human capital, the weaker the relationship between the board system and firm performance.

3. Methodology

The empirical analysis is based on the data on Russian publicly traded companies for the period from 2004 to 2019. The data on the board system, CEO characteristics and financial indicators were collected from the companies' annual reports, official websites and the SPARK database.

The dependent variable in this study is the financial performance of the company, measured by return on assets (ROA) and Tobin's Q. The main independent variable is the board system (one-tier or two-tier). The moderating variable is CEO human capital, which is measured by CEO education, experience and tenure.

The following control variables were included in the model: firm size, firm age, leverage, and industry.

The following regression model was used to test the hypotheses:

$$Performance_{it} = \beta_0 + \beta_1 BoardSystem_{it} + \beta_2 CEOHumanCapital_{it} + \beta_3 (BoardSystem_{it} \times CEOHumanCapital_{it}) + \sum \beta_k Controls_{it} + \varepsilon_{it}$$

where i denotes the company, t denotes the year, and ε_{it} is the error term.

potential negative effect of one-tier system on company performance. In this article, the human capital of the board of directors, in particular, the CEOs of companies, will be considered as a moderator. Based on some previous research, board human capital can be operationalized with measures of knowledge and skill (Tuwey, Tarus, 2016), tenure and age (Tuggle et al., 2010) and educational background (Atinc et al., 2017).

3. Research Design, Methodology and Data Analysis

An empirical analysis of the research is based on a database of 311 publicly traded Russian companies for the period from 2008 to 2018. The sample includes companies whose shares were listed / traded on the Moscow Exchange. Companies are included in the sample if their shares were traded / quoted on the last business day of each calendar year. The main sourced are SKRIN and SPARK databases as well as companies' websites. Some of the data in need is still in the process of collection.

The main research methods in this paper are descriptive analysis and econometric methods. To determine the relationship between the board system and the financial results of enterprises with CEOs' human capital indicators as moderators it is proposed to use a pooled OLS model, a model with random effects and a 2SLS model with several instrumental variables. However, the search for strong and valid instruments is in the process.

4. Results/Findings and Discussion

Preliminary results show that the companies with two-tier boards are on average associated with higher ROA unless we take into account a moderating effect of CEO age. As for ROE, the effect of board system on the value of this indicator appears to be insignificant. For further research, it is necessary to use more CEO human capital indicators. Still, based on preliminary results, it is possible to develop several thoughts on probable outcomes and further research.

The paper attempts to shed some light on the problem of board system influence on firm performance by employing human capital theory as a mean to explain why potential agent costs may be mitigated by certain characteristics of company's CEO. By analyzing the moderating effect of CEO human capital on the relationship between board system and firm performance it seems possible to explain to the certain extent the heterogeneity of the results of previous research as well as fill the gap in the existing knowledge. So far, the CEO age was used as one of the measures of CEO human capital, and we can see that the positive effect of two-tier board, which is possible to explain with the help of agency theory, becomes insignificant as we introduce the moderating variable of CEO age.

The results of the study will be of interest both to the members of the academic community interested in the topic of corporate governance and to the business representatives, primarily owners and managers of large public companies. In particular, it is expected that the results of the study will help to find out some ways to mitigate possible negative effect of one-tier board on firm performance due to low board monitoring capacity apart from changing board system which appears to be a long and costly process.

5. Conclusion, Contribution and Implication

Corporate governance plays a particularly important role in the modern world as large corporations make a great contribution to the national and global economies. Moreover, the features of corporate governance are such that its implementation raises a number of problems, such as the problem of collective action, the agent problem and others, which entail significant organizational costs. One of the mechanisms that could solve these problems is the board of directors.

However, in spite of the fact that the academic interest in the relationship between the activities of boards of directors and the performance of enterprises has not been weakened for more than two decades, the influence of the characteristics of boards of directors on the financial results of enterprises remains

relatively poorly studied. It is also worth noting that studies of this effect based on Russian samples are extremely rare and are notable for small and unrepresentative samples, cross-sectional, rather than panel, data and not generally accepted indicators of financial results.

The paper attempts to partially fill the gap in existing knowledge by determining the influence of board systems on the financial performance of Russian companies employing human capital theory to explain the possible moderating role of CEOs' characteristics. Such econometric analysis methods as a model with random effects and pooled OLS were used, and it is also proposed to use a 2SLS model with several instrumental variables as this method takes into account, in particular, the endogeneity problem, and therefore the results obtained on its basis can be trusted more than the results of a simple regression analysis (OLS).

Nevertheless, it is necessary to mention a number of research limitations related to the nature of the sample (only Russian public companies) as well as the methods and measures used. In this regard, further research is needed for a more complete understanding of the impact of the board system on company performance considering the moderating role of CEO human capital. Directions for further research include studying the influence of board system on other aspects of the company's activities, namely, innovation activity, as well as expanding the sample. In addition, it is possible to employ qualitative methods to determine the reasons for choosing certain systems or to use additional measures of board members' human capital.

6. References

Atinc, G., Kroll, M., & Walters, B. (2017). Detrimental effects of post-IPO corporate governance changes: The case of young entrepreneurial firms. Management Decision, 55(2), 234–247. https://doi.org/10.1108/MD-02-2016-0084

Eisenhardt, K. M. (1989). Agency Theory: An Assessment and Review. The Academy of Management Review, 14(1), 57. https://doi.org/10.2307/258191

Krause, R., Semadeni, M., & Cannella, A. A. (2014). CEO Duality: A Review and Research Agenda. Journal of Management, 40(1), 256–286. https://doi.org/10.1177/0149206313503013

Tang, J. (2017). CEO duality and firm performance: The moderating roles of other executives and blockholding outside directors. European Management Journal, 35(3), 362–372. https://doi.org/10.1016/j.emj.2016.05.003

Tuggle, C. S., Sirmon, D. G., Reutzel, C. R., & Bierman, L. (2010). Commanding board of director attention: Investigating how organizational performance and CEO duality affect board members' attention to monitoring. Strategic Management Journal, n/a-n/a. https://doi.org/10.1002/smj.847

Tuwey, J. K., & Tarus, D. K. (2016). Does CEO power moderate the relationship between board leadership and strategy involvement in private firms? Evidence from Kenya. Corporate Governance: The International Journal of Business in Society, 16(5), 906–922. https://doi.org/10.1108/CG-01-2016-0010

Nonlinearity in Labour Share Forecasting – Intersectoral Approach

Stanislav Rogachev – National Research University Higher School of Economics, Russia
srogachev@hse.ru

Keywords: Labor Income Share, Elasticity of Substitution, Automation

1. Introduction

The recent research highlights rich variety of reasons why labour share in the economy may decline and what are the drivers for this. For instance, (Manyika et al., 2019) list five factors (in the order of decreasing significance – percent in parenthesis) that in their view may impact LS decline: economic cycle effects (33%), depreciation of the increased capital stock which additionally has a big percentage of intangible assets and shorter period of depreciation (26%), 'Superstar Firms' which earn substantially higher profits than the others (18%), labour-to-capital substitution due to automation (12%), globalization (11%). (Acemoglu & Restrepo, 2018) propose a theoretical framework "in which tasks previously performed by labour can be automated and new versions of existing tasks, in which labour has comparative advantage, can be created". (Karabarbounis & Neiman, 2014) say that "the decrease in the relative price of investment goods, often attributed to advances in information technology explains roughly half of the observed decline in the labour share, even when increasing profits, capital-augmenting technology growth, and the changing skill composition of the labor force" are considered. In summary, all above-mentioned papers try to investigate **how** human labour is replaced by technologies and what is the major impact to it.

2. Theoretical Background and Literature Review

To contrast, there are macroeconomic studies which are more methodologically coherent and advanced in terms of empirical methods. (Antras, 2004) examines US production function and finds that factor-augmenting technical change has an advantage in comparison to Cobb-Douglas PF. Still, the economy is analyzed on the whole whereas (Young, 2013) enhances the method with intersectoral decomposition. (Autor & Salomons, 2018) in their 'micro-macro' study also exploit sectoral approach and acknowledge that technological advances captured by total factor productivity growth do not necessarily erode employment or decrease LS.

In the current paper we use CES production function with factor-augmenting technical change in the design of (Antras, 2004) – see formulas 1-2 – but with (Acemoglu, 2003) and (Acemoglu et al., 2018) notion on the appropriateness of including nonlinear models and structural breaks $\boldsymbol{\varphi}(t)$.

$$ln\left(\frac{w}{r}\right) = ln\left(\frac{\alpha}{1-\alpha}\right) + \frac{1}{\sigma} ln\left(\frac{K}{L}\right) + \frac{\sigma-1}{\sigma}\boldsymbol{\varphi}(t) + \varepsilon \quad (1)$$

$$ln\left(\frac{K}{L}\right) = \sigma\, ln\left(\frac{1}{\alpha}-1\right) + \sigma\, ln\left(\frac{w}{r}\right) + (\sigma-1)\,\boldsymbol{\varphi}(t) + \varepsilon \quad (2)$$

3. Research Design, Methodology and Data Analysis

In this paper labour share is forecasted for eleven EU countries and the UK in the decomposition into eighteen economic sectors. Similar data selection was reported in (Autor & Salomons, 2018), however, our choice is impacted more by the availability of data. $\boldsymbol{\varphi}(t)$ may be specified with nonlinear time component and additionally to account for structural break. Next, complex criteria of regressors significance, the stationarity and autocorrelation of residuals are considered to outline consistent models and draw forecasts based only on these 'powerful' models (see figure 1 – with dimensions country-model-sector).

4. Results/Findings, Discussion

In summary, the decline of labour share cannot be reported as forecast proved this on average only in seven of eighteen economic sectors (see table 1). To add, four intervals were derived to approximate average forecasted labour share value. The last but not the least, nonlinear models are better in terms of predictive power.

Table 1 Labor share trends by economic sector

Sector / Country	A	B	C	D	E	F	G	H	I	J	K	L	M-N	O	P	Q	R	S
Austria	↗	↗	→	↗			→	↘			↗	↘	→		↗		↗	→
Belgium	↗	↗		↗		→	→		↗	↗	↘		→	↘		↗	→	
Denmark	↘	↘				↗	→	→	↗	↘	↘	↘	→	↗	↘	↗	↘	→
Germany				↘		↘	↘		↗	↗							→	
Italy	↗	↗	→		→	↘	↗	→	↗	↗			↗	→	→	→	↗	↗
Lithuania	↗		↘			↘	↗		↗		↘	↗		→	→			→
Luxembourg						↘		→	→		↗			↘	→			
Netherlands	↗		→	↘		↘	↘		↘	↗			→		→		↘	↘
UK	→	→	↘	↘	↗	↗	↗	↘	→	→	↗	↗	→	↘	↘	→	↗	→
Finland	↗		↘	→	→	↗	→						↗	↘	↘	↘	↗	

Sector / Country	A	B	C	D	E	F	G	H	I	J	K	L	M-N	O	P	Q	R	S
France		↗	↗	↗	→	→	↗				→			↗	↘	→		↗
Czech Republic	→	↗	↗	↗	↗	↘		↗	↗	↗	↘	↗	↗	→	↗	↗	↘	↗

Source: Author calculations

Figure 1 Cube of selected models by model power criteria
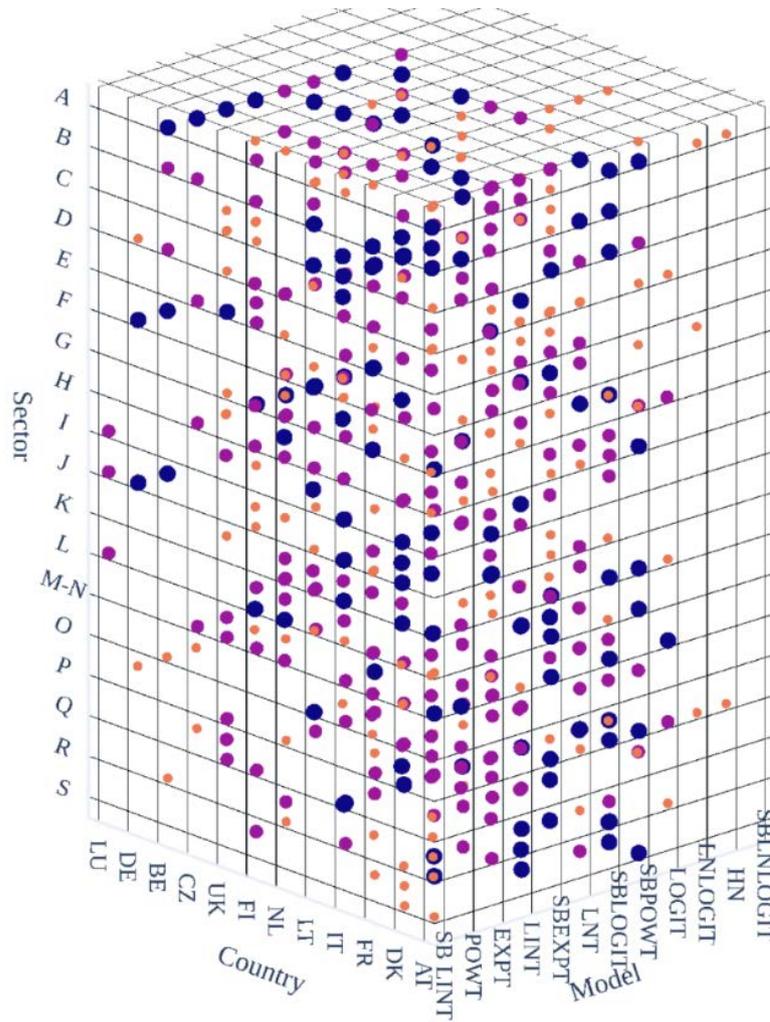
Source: Author estimation

5. References

Acemoglu, D. (2003). Labor- and Capital-Augmenting Technical Change. Journal of the European Economic Association, 1(1), 1–37.

Acemoglu, D., & Restrepo, P. (2018). The Race between Man and Machine: Implications of Technology for Growth, Factor Shares, and Employment. American Economic Review, 108(6), 1488–1542. https://doi.org/10.1257/aer.20160696

Antras, P. (2004). Is the U.S. Aggregate Production Function Cobb-Douglas? New Estimates of the Elasticity of Substitution. Contributions in Macroeconomics. https://dash.harvard.edu/handle/1/3196325

Autor, D., & Salomons, A. (2018). Is Automation Labor Share–Displacing? Productivity Growth, Employment, and the Labor Share. Brookings Papers on Economic Activity, 1–63.

Karabarbounis, L., & Neiman, B. (2014). The Global Decline of the Labor Share. The Quarterly Journal of Economics, 129(1), 61–103. https://doi.org/10.1093/qje/qjt032

Manyika, J., Mischke, J., Bughin, J., Woetzel, J., Krishnan, M., & Cudre, S. (2019, May). A new look at the declining labor share of income in the United States. 64.

Young, A. T. (2013). U.S. ELASTICITIES OF SUBSTITUTION AND FACTOR AUGMENTATION AT THE INDUSTRY LEVEL. Macroeconomic Dynamics, 17(4), 861–897. https://doi.org/10.1017/S1365100511000733

Higher School of Economics National Research University, Saint Petersburg, Russia

Is There the Value of an International Accreditation Beyond Quality? An Empirical Analysis of the AACSB Accredited Schools

Olga Okulova – National Research University Higher School of Economics, Russia ookulova@hse.ru

Elena Shakina – National Research University Higher School of Economics, Russia

1. Introduction

The tendency of massification of higher education and online learning lead a fiercer competition in the global market of higher education. The countries adopt for new policies for higher education, which increases the importance of adopting external assessment mechanisms, which are considered as a proxy or "signals" for quality (Marconi, 2013). These mechanisms are widely accepted in business education where a growth of international accreditations has been witnessed. Top international business education accreditations are AACSB (by AACSB International) and EQUIS (by EFMD Global). The study is aimed to analyze how is AACSB accreditation as a quality signal influences the performance of the business schools. The study applies the quantitative data and employs the quasi-experimental design to test the hypotheses. The analysis of the AACSB accreditation's value and its changes over time is made based on the 2001 to 2018 panel data of the AACSB International member schools.

2. Theoretical Background and Literature Review

Higher education is an experience good which is characterized by the asymmetry of information. The study utilizes the signaling theory (Spence, 1973) as a theoretical framework of the study where an important role of "signals" consists of a verified quality and reputation to decrease the asymmetry of information. The signaling function of international accreditations is still understudied in economics of higher education. The higher education institutions are differentiated based on its quality (Рощин, Рудаков, 2014). The study hence poses the hypothesis that obtaining AACSB accreditation sends a positive signal to the market and is positively associated the economic performance of the business schools. Previous studies (Elliot & Soo, 2016) identify that the MBA programmes as the most important for the business schools, so the study assumes that the value of the AACSB accreditation is heterogenous across the degree levels and higher for the MBA programmes. The literature of the effects of international accreditations of business schools as organizations is dominated by the qualitative studies. The decision-making factors have been discussed from the perspective of competition (Alajoutsijärvi, Kettunen, & Sohlo, 2018). There are few empirical studies that indicate positive association of the international accreditations and research activities with the business schools (Nigsch & Schenker-Wicki, 2013). The previous studies acknowledge the need for quantitative research especially based on archival data (Nigsch & Schenker-Wicki, 2013; Marconi, 2013).

3. Research Design, Methodology and Data Analysis

The main method of the study is the endogenous switching regression. The probit estimation is used in a first stage to predict the relationship between the policy decision. In the second stage, the model identifies factual and counterfactual conditions the policy choice whether an international accreditation has been received or not. In order to ensure the validity of the inference, the robustness check on a smaller subsample is done in the study to analyze the outcomes of the baseline model with the difference-in-

differences estimation. As the proxy for economic performance the annual turnover in USD is measured. The determinants of an economic performance at a business schools are the enrollment of students for undergraduate and MBA programmes to test the hypotheses of a heterogeneity of the AACSB accreditation effect. There are three control variables used in the study. The governance control is presented as a dummy variable. The business schools strive for more than one top international accreditation, so the status of an EQUIS-accredited school is also used as a dummy variable. The exogenous instrument is the change of AACSB focus from a national to an international accreditation since 2002. The index of AACSB expansion is the variance of a standard deviation of the accreditations received each year during the observations period.

4. Results and Discussion

The results show that the accredited schools with an increase of undergraduate enrollment by one unit increase of performance by 0,024% in comparison with marginally lower 0,022% for not accredited schools. The increase of the MBA enrollment by one unit increases the performance by 0,1% in comparison with the 0,023% for not accredited schools.

The predicted values of counterfactual conditions demonstrate that if business school loses the accreditation, the annual turnover, on average, is significantly reduced to 4,732.669 thousand USD. On the contrary, if a not-accredited business schools would receive the accreditation, its annual turnover would increase to 9,919.370 thousand USD. It provides evidence that AACSB accreditation, on average, has a positive value of the economic performance of business schools. The outcomes of the difference-in-differences estimator confirm the findings of the endogenous switching regression showing also that the effect is higher for MBA programmes, but lagged in time.

Driven by the signaling theory, the study provided empirical evidence about the effect of the signals in higher education. The effect is fully observed after one cycle and weakened with each following cycle. It raises a question about the importance of regional effects for the signals. Previous studies approached this issue claiming the importance of regional educational hubs with a specific status (Juusola, Alajoutsijärvi, 2019). The study has tried to bridge the gap between the signaling theory and the specific context of the business education while inviting for further empirical research on the importance of the market signals for higher education.

5. References

Marconi, G. (2013). Rankings, accreditations, and international exchange students. IZA Journal of European Labor Studies, 2(1), 5. https://doi.org/10.1186/2193-9012-2-5

Spence, M. (1973). Job Market Signaling. The Quarterly Journal of Economics, 87(3), 355. https://doi.org/10.2307/1882010

Рощин С. Ю., Рудаков В. Н. Измеряют ли стартовые заработные платы выпускников качество образования? Обзор российских и зарубежных исследований // Вопросы образования. 2015. № 1. С. 137-181. : 10.17323/1814-9545-2015-1-137-181

Caroline Elliott & Kwok Tong Soo (2016). The impact of MBA programme attributes on post-MBA salaries. Education Economics. DOI: 10.1080/09645292.2015.1113233

Alajoutsijärvi, K., Kettunen, K., & Sohlo, S. (2018). Shaking the Status Quo: Business Accreditation and Positional Competition. *Academy of Management Learning and Education*, 17 (2), 203-225. doi:10.5465/amle.2015.0199

Nigsch, S., & Schenker-Wicki, A. (2013). Shaping performance: do international accreditations and quality management really help? *Journal of Higher Education Policy and Management, 35*, 668 - 681, doi: 10.2139/ssrn.2183699

Sales Forecasting Methods for Catering Sphere

Angelina Vologzhanina – National Research University Higher School of Economics, Russia

Tatiana Lychenkova – National Research University Higher School of Economics, Russia
Tatiana.lychenkova@gmail.com

Mikhail Denisov – National Research University Higher School of Economics, Russia

Keywords: sales forecasting, catering sphere, sales dynamics, write-off analysis, factor analysis

1. Introduction

Many researchers note the importance and necessity of a reliable sales forecast, since it has an impact on many, if not all, areas of the company's business, including production, operations and marketing. More specifically, this work is devoted to forecasting sales in a bakery and developed for the Korjov company. The goal of this paper is to review and identify suitable sales forecasting and analysis methods for Korjov's company using its annual sales data. The study is essential for the company due to the rapid increase of competition in the bakeries market of Saint Petersburg.

2. Theoretical Background and Literature Review

The theoretical foundation analysis showed a lack of the most recent studies on the topic of sales forecasting in the catering sphere. Along with that, the present paper provides a sales forecast requested by a particular company and based on the company's own sales data. Therefore, there was very limited prior information on the topic of the study.

The studied data is based on the unstructured interview with Korjov's business analytic and the historical annual sales figures of the Korjov company. The analysis methods used in the term paper combines the implementation of managerial techniques, namely extended SWOT analysis and Michael Porter's 5 Forces analysis, with sales analysis methods, including sales dynamics analysis, ABC analysis, XYZ analysis, sales structure analysis, write-offs control analysis and factor analysis.

3. Results and Conclusion

As a result, this study helped to identify the most valuable product categories of the company in terms of sales, the problem of declining sales in already developed and long-existing branches, and reveal unnecessary overproduction of particular product categories.

4. References

Boone, T., Ganeshan, R., Jain, A., & Sanders, N. (2019). Forecasting sales in the supply chain: Consumer analytics in the big data era. International Journal of Forecasting, 35(1), 170-180. doi: 10.1016/j.ijforecast.2018.09.003

Dellino, G., Laudadio, T., Mari, R., Mastronardi, N., & Meloni, C. (2017). A reliable decision support system for fresh food supply chain management. International Journal of Production Research, 56(4), 1458–1485. doi: 10.1080/00207543.2017.1367106

Fan, Z., Che, Y., & Chen, Z. (2017). Product sales forecasting using online reviews and historical sales data: A method combining the Bass model and sentiment analysis. Journal of Business Research, 74, 90-100. doi: 10.1016/j.jbusres.2017.01.010

Petropoulos, F., & Carver, S. (2019). Forecasting for food demand. Sustainable Food Supply Chains, 237–248. doi: 10.1016/b978-0-12-813411-5.00016-8

Tanizaki, T., Hoshino, T., Shimmura, T., & Takenaka, T. (2019). Demand forecasting in restaurants using machine learning and statistical analysis. Procedia CIRP, 79, 679–683. doi: 10.1016/j.procir.2019.02.042

Comparing Returns on Collaborative Research in STEM and Social Sciences: the Case of University in Emerging Research Country

Elena Veretennik – National Research University Higher School of Economics, Russia veretennik@hse.ru

Keywords: social network analysis, research productivity, research output, collaboration

1. Introduction

In the context of the increased international competition of the higher education institutions, universities are striving to obtain places in prestigious international rankings. Many of these rating systems are based on the number and quality of publications of university employees, which makes the issue of long-term, sustainable, manageable increase in research productivity one of the most relevant for the administration of a higher educational institution. Governmental initiatives aimed at increasing the competitiveness of universities, set tasks regarding the changes in the collaborative strategy of faculty and universities. Among those are the internationalization of activities, the development of collaboration with Russian and international scientific organizations, industry and business. Many scientists acknowledge the positive returns of collaborative research in terms of citation metrics. But two aspects of scientific collaboration should be discussed in a broader way. Firstly, the comparison of scientific reception of collaborative papers in STEM (natural Sciences: Technology, Engineering, computer science, Math, physics, etc) and social sciences should be investigated further using the case of emerging research countries. Russian scientists have vastly entered international research markets only several decades ago; such emerging research countries, on the one hand, do not have settled patterns of research collaboration and publication strategies and, on the other hand, stress the importance of the assessment of the results of scientific work (Соколов, 2019). By knowing the difference in returns on collaboration in different scientific areas government can allocate limited resources accordingly and plan appropriate initiatives for faculty development and collaborative projects. Secondly, little is known regarding the effect of different type of collaboration: on domestic and international levels.

Given the following input, the question of this study is formulated as follows: How collaboration of researchers impact research output and reception of research output? This question is expanded in two ways: (1) How type of collaboration shape the aforementioned impact? (2) Does the area of researcher (STEM or social sciences) moderate the impact?

Using panel data on personal attributes and research output of faculty of leading Russian university, I plan to deconstruct the structure of collaborative networks of university employee and conduct an empirical analysis of the relationship between employee network metrics and scientific output.

2. Theoretical Background and Literature Review

The topic of this study is multifaceted; therefore, it makes sense to provide an overview of the degree to which the problem is developed within several research fields.

First, let us pay attention to how the academic literature presents the problem of searching and selecting factors that determine faculty's research productivity. The literature separately studies various models of stimulating faculty's publication activity (based on monetary and non-monetary compensation). As a rule, the empirical analysis uses data from the personal pages of teachers, from country studies of higher education, from scientific citation databases (Abramo, 2017; Horta et al., 2018). Often, surveys design

(Horta et al., 2018)and quasi-experimental research design are used to assess the intensity and other characteristics of publication productivity. Several studies compare different approaches to determining research productivity, visibility, and activity (Abramo, 2017). Separately, in this context, there is a layer of research in which contextual data and faculty's attributes themselves are studied in terms of their effect on publication productivity. Among the attributive characteristics, which are often associated with different levels of research productivity, gender, scientific degree, position, work experience (Nafukho et al., 2019) are also analyzed. Researcher pay relative low attention towards different types of collaboration. Among the collaboration taxonomies the work of (Abramo, D'Angelo, et al., 2017) requires attention. The collaboration is subdivided by the affiliation of coauthors: domestic (from the same country), international (from different country), intramural (from the same university).

Secondly, researchers have different approaches to the assessment of research interaction in a university context. Some studies focus on cooperation between scientists developed only based on joint publications. Such studies have a scientometric nature. Scientometrics, which is one of the key journals in this area, regularly publish studies covering the issues of research co-authorship in secondary and higher education (Maltseva & Batagelj, 2019). Scientometric studies are based on objective empirical data obtained from various citation bases, such as Web of Scince, Scopus, Google Scholar, Publish or Perish. Using the SNA (social network analysis) toolkit, scientists build maps of the keyword co-occurrence, identify the most significant authors in a particular field, and study the dynamics of the study on a specific topic (Kawa et al., 2018).

Thirdly, the topic of different collaborative outputs in various research areas is discussed. There is empirical evidence that different subject areas are characterized by dissimilar patterns of research collaboration. Research area may be a moderator of the relationships between collaboration and research output. (Abramo et al., 2012) concluded that mathematics, computer science and engineering are scientific areas that interact the least. A quantitative assessment of the differentiated sizes of professional networks among researchers from different scientific disciplines can be found in (Fields, 2015): on average, a computer science researcher will have 3.6 coauthors, while the average network size for biomedicine is around 18. (Cheng et al., 2017) found that collaboration between researchers and industry is common mostly for computer science. (Li et al., 2018) emphasizes that the difference in the size of the professional network can also depend on the country in which the researcher works.

Russian researchers rarely appear in the context of collaborative research studies, whereas other emerging research countries are studied a lot (China, India). (Xie & Willett, 2013) concluded that Russia has a surprisingly low level of international recognition (article indexing in WOS, Scopus) of research activity in computer science, given the vast practical research in this thematic area in our country. This conclusion is continued by the work (Fiala & Willett, 2015) who note that the growth rate of the number of publications in Russia is the second largest after Poland among all post-Soviet countries, while the quality of research and their perception (the number of citations) is not growing so actively. Taking into account the results of previous studies presented in this section, the author concludes that the study of the potential moderation effect of the subject area in the relationship between collaborative patterns and scientific productivity of employees of leading Russian universities is significant.

3. Research Design, Methodology and Data Analysis

The choice of research design and methods is conditioned, on the one hand, by the research niches indicated in the theoretical justification. On the other hand, the subject of research imposes certain restrictions on the type and structure of data that can be used in the work.

Personal attributes of university faculty is automatedly gathered from personal web pages via web scrapping techniques. A sample of approximately a thousand faculty members of one of the leading russian univerisities (selected by a criterion "have at least one publication indexed in WoS or Scopus since 2010) is considered. For each of the sample units information on publications of employees in journals indexed

by the international databases Web of Science and Scopus, were collected automatically based on the unique user IDs. Both databases - Web of Science and Scopus – are used since a number of studies (Cavacini, 2015; Deng & Xia, 2020) note the imperfection of different databases in terms of the representation of scientific works in different research areas (for example, works on computer science are mostly indexed in journals in the Scopus database).

Ego networks of different nature (by publications, by grants, by affiliation) are constructed for each of the faculty included in the sample. Ego networks (i.e. personal networks) are a common practice for analysing scientific collaborations in this thematic field (Jadidi et al., 2018). A number of network measures (degree) are calculated to assess the structure of personal networks of faculty. Types of collaboration are assessed by using the propensity metrics (Abramo, Ciriaco, et al., 2017): percentage of papers co-authored by faculty from the same university (intramural collaboration), from different university in the same country (domestic collaboration), from an international university (international collaboration). The numbers are normalized by research area and country benchmarks.

As the sample of this studies is in a way censored (faculty without publications is not taken intro consideration) selection regression models are used to assess the impact of collaboration on research output. Research output is measured by citation metrics and H-index.

4. Expected Results/Findings and Discussion

The data processing is still on, so the results and implications are presented in the expected way.

The expected results have both fundamental and applied value. From the point of view of scientific field expansion, this work sheds light on the understanding of effects of collaboration among university staff. The existing pool of studies (both in the Russian and international contexts) contain practically no comparative studies devoted to the impact of network communities of different nature on the research productivity of university employees. Through the use of objective secondary data on publication productivity and involvement in network communities, this study makes it possible to obtain conclusions that are significant and generalized not only for Russian researchers, but also at the level of various scientific disciplines.

5. Conclusion, Contribution and Implication

These conclusions also have managerial significance. University management will be able to know development initiative for faculty have greater potential in terms of increasing academic performance, and, as a consequence, strengthening positions in international rankings of a particular university. Greater awareness of the specifics of working with different clusters of employees reduces the uncertainty that accompanies the decision-making process in the management environment of higher education in Russia.

6. References

Abramo, G. (2017). Bibliometric Evaluation of Research Performance : Where Do We Stand ? *Вопросы Образования*, *1*, 112–127. https://doi.org/10.17323/1814-9545-2017-1-112-127

Abramo, G., Ciriaco, A., Angelo, D., & Murgia, G. (2017). The relationship among research productivity , research collaboration , and their determinants. *Journal of Informetrics*, *11*(4), 1016–1030. https://doi.org/10.1016/j.joi.2017.09.007

Abramo, G., D'Angelo, C. A., & Di Costa, F. (2012). Identifying interdisciplinarity through the disciplinary classification of coauthors of scientific publications. *Journal of the American Society for Information Science and Technology*. https://doi.org/10.1002/asi.22647

Abramo, G., D'Angelo, C. A., & Di Costa, F. (2017). Specialization versus diversification in research activities: the extent, intensity and relatedness of field diversification by individual scientists. *Scientometrics*, *112*(3), 1403–1418. https://doi.org/10.1007/s11192-017-2426-7

Cavacini, A. (2015). What is the best database for computer science journal articles? *Scientometrics*. https://doi.org/10.1007/s11192-014-1506-1

Cheng, H., Chen, C. T., Wei, L. F., Yen, C. L., & Huang, M. H. (2017). Exploring University-Industry Collaboration Trends in Computer Science: A Study on Hardware and Architecture and Software Engineering. *IETE Technical Review (Institution of Electronics and Telecommunication Engineers, India)*. https://doi.org/10.1080/02564602.2016.1185974

Deng, S., & Xia, S. (2020). Mapping the interdisciplinarity in information behavior research: a quantitative study using diversity measure and co-occurrence analysis. *Scientometrics*, *0123456789*. https://doi.org/10.1007/s11192-020-03465-x

Fiala, D., & Willett, P. (2015). Computer science in Eastern Europe 1989-2014: a bibliometric study. *Aslib Journal of Information Management*. https://doi.org/10.1108/AJIM-02-2015-0027

Fields, C. (2015). Co-authorship proximity of A. M. Turing Award and John von Neumann Medal winners to the disciplinary boundaries of computer science. *Scientometrics*, *104*(3), 809–825. https://doi.org/10.1007/s11192-015-1575-9

Horta, H., Cattaneo, M., & Meoli, M. (2018). PhD funding as a determinant of PhD and career research performance. *STUDIES IN HIGHER EDUCATION*, *43*(3), 542–570.

Jadidi, M., Karimi, F., Lietz, H., & Wagner, C. (2018). Gender disparities in science? Dropout, productivity, collaborations and success of male and female computer scientists. *Advances in Complex Systems*. https://doi.org/10.1142/S0219525917500114

Kawa, N. C., Michelangeli, A. C., Clark, J. L., Ginsberg, D., & Mccarty, C. (2018). The Social Network of US Academic Anthropology and its inequalitites. *American Anthropologist*, *121*(1), 14–29. https://doi.org/10.1111/aman.13158

Li, X., Rong, W., Shi, H., Tang, J., & Xiong, Z. (2018). The impact of conference ranking systems in computer science: a comparative regression analysis. *Scientometrics*, *116*(2), 879–907. https://doi.org/10.1007/s11192-018-2763-1

Maltseva, D., & Batagelj, V. (2019). Social network analysis as a field of invasions : bibliographic approach to study SNA development. In *Scientometrics* (Vol. 121, Issue 2). Springer International Publishing. https://doi.org/10.1007/s11192-019-03193-x

Nafukho, F. M., Wekullo, C. S., & Muyia, M. H. (2019). International Journal of Educational Development Examining research productivity of faculty in selected leading public universities in Kenya. *International Journal of Educational Development*, *66*(January), 44–51. https://doi.org/10.1016/j.ijedudev.2019.01.005

Xie, Z., & Willett, P. (2013). The development of computer science research in the People's Republic of China 2000-2009: A bibliometric study. *Information Development*, *29*(3), 251–264. https://doi.org/10.1177/0266666912458515

Соколов, М. М. (2019). Трансформирующие и селективные системы : исследование по сравнительной социологии академических рынков и карьер. *Вопросы Образования*, *2*, 35–77.

Higher School of Economics National Research University, Saint Petersburg, Russia

The influence of macroeconomic factors on the export of agribusiness of the Russian Federation

Efim Grigorievich Semyashkin – National Research University Higher School of Economics, Russia, semyashkin-efim@mail.ru

Keywords: export, agribusiness, financial stress index, macro indicators, linear, binomial and ordinal models.

1. Introduction

The research is devoted to studying the influence of macro factors on the level of export of agricultural products of the Russian Federation. In recent years, the government pays great attention to the development of its own production, the development of export products and, in particular, agricultural products.

2. Theoretical Background and Literature Review

In the course of the research, the works of Russian and foreign authors were studied, such as Zarubayko DR «Econometric analysis of the dependence of China's GDP on export operations»,

Jana, S.S., Sahu, T.N., Pandey, K.D. «How far is FDI relevant to India's foreign trade growth? An empirical investigation».

3. Research Design, Methodology and Data Analysis

The goal of the research is to determine the relationships between macroeconomic indicators and the export of agricultural sector of the Russian Federation.

The following tasks are set:

• build a linear regression model, highlight key factors;

• build binomial models and an ordinal regression model;

• conduct tests on the quality of the model.

4. Results/Findings, Discussion

In the course of the work, such tools as linear regression, logistic regression (logit, probit), ordered probit model were considered. Quarterly data on the dynamics of the level of export of agricultural products of the Russian Federation for the period from 1998 to 2019 (83 observations) with macro-factors corresponding to the same period were taken as initial data. As a criterion for the quality of the model, the Gini coefficient was used, (area under the Roc curve). A number of tests for multicollinearity and heteroskedasticity were carried out. As a result of the study, a nonlinear effect of some parameters or their relative values (relative to the previous period) was revealed.

5. Conclusion, Contribution and Implication

The most significant factors were identified including import growth (Del_Import), logarithm of GDP (Log_GDP,) logarithm of GDP per capita (Log_GDP_for_people), logarithm of the RSI index (Log_RSI), model adequacy was verified and models were compared by the above criterion.

6. References

Development Strategy of JSC Russian Export Center until 2019

Resolution on state support for investment activities in the agricultural sector .. Ministry of Agriculture of Russia Resolution of September 6, 2018 No. 1063

The decision on changes in the procedure for providing subsidies to manufacturers of agricultural machinery. Ministry of Agriculture of Russia. Ministry of Agriculture of Russia. Decree of September 12, 2018 No. 1085

Lapin A. V. Construction of econometric models and analysis of export and import factors of St. Petersburg // Young scientist. - 2016. - No. 13. -p . 44-46.)

Zarubayko D.R. Econometric analysis of the dependence of China's GDP on export operations // Problems of Economics and Management. - 2018.

Semyashkin E.G. Agricultural development as a problem of national security. systems approach. 2015 year

Karminsky A.M. Credit Ratings and Their Modeling, Publishing House of the Higher School of Economics, 2015, c. 84-97

Jana, S.S., Sahu, T.N., Pandey, K.D. How far is FDI relevant to India's foreign trade growth? An empirical investigation. Journal of Economic Structures. Volume 9, Issue 1, 1 December 2020. p. 30-42

Laborda, J., Salas, V., Suárez, C. Manufacturing firms export activity: Business and financial cycles overlaps! International Economics. Volume 162, August 2020, p. 1-14

Sashi, S., Bhavish, S. Macroeconomic implications of us sanctions on Iran: A sectoral financial balances analysis. Studies in Business and Economics. Volume 14, Issue 3, 1 December 2020, p. 182-20

Web sources

Rosstat. Macro indicators. 2020. https://www.gks.ru/accounts

Bank of Russia website. Currency quotes. 2020. http://www.cbr.ru/currency_base/daily/

Agroinvestor Analytics. Export volume. 2019 https://www.agroinvestor.ru/analytics

Export center. Export Analytics. 2020 https://www.exportcenter.ru/services/analitika-i-issledovaniya/

ACRA. ACRA Financial Stress Index for Russia. 2020 https://www.acra-ratings.ru/research/index