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THE SYSTEMIC APPROACH TO MANAGING THE QUALITY OF COMPANY'S BUSINESS PROCESSES

Abstract: *The purpose of this paper is to develop an alternative – systemic – approach to managing the quality of company's business processes, which would describe – precisely and correctly – the causal connections of provision of quality of company's business processes under the influence of endogenous and exogenous factors in a hi-tech market environment. Originality of the research consists in the fact that it fills the gaps in the system of scientific knowledge on the topic of quality in entrepreneurship. The advantages of this paper include the following: firstly, it takes into account the hi-tech context of the modern market economy and considers quality from the positions of innovations and digitalization. Secondly, it opens a “black box” and shows the internal structure of quality, studying it not from the positions of the final result but in view of business processes. Thirdly, it considers endogenous and exogenous factors, reflecting the conditions of formation of quality in entrepreneurship. Practical significance of the authors' conclusions and recommendations consists in their high level of detalization, which simplifies their implementation into the managerial practice of modern entrepreneurship. As additional advantage of the results of this research is the fact that they were obtained based on experience of the leading developed and developing countries by the level of digitalization. This makes the authors' recommendations universal – they could be applied around the world.*

Keywords: *Quality; Systemic approach; Quality management; Business processes; Company; Digital economy; Hi-tech markets.*

1. Introduction

Quality is a universal tool for achieving not only commercial effectiveness and competitiveness of a company but also its corporate social and ecological responsibility and sustainability to the changes of the market environment and crises. That's why the criterion of quality is used for evaluating the successfulness of modern entrepreneurship and dynamics, future

opportunities, and perspectives of its development. The scientific concept of quality in entrepreneurship is rather developed and presented by a lot of works. However, the issues of measuring and management of quality in entrepreneurship are not studied thoroughly.

One of the gaps is insufficient accounting of the specifics of the modern context of the market environment in entrepreneurship functions and development. The traditional

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treatment of quality – as absence of failure and correspondence to the national, international, and corporate standards of quality – has become obsolete and does not reflect quality as a static characteristic, while the dynamic aspect of quality (preservation in the long-term) is not taken into account.

In the conditions of the knowledge society and innovative economy, quality in entrepreneurship is determined by the knowledge-intensity of its activities. The digital business environment requires from companies to use the leading technologies and digital modernization of business processes for provision of high quality of their activities. Quality is also determined by entrepreneurship's involvement in the fourth industrial revolution and Industry 4.0. In view of the new context, quality is determined by innovativeness and hi-tech character of entrepreneurship.

Another gap is poor elaboration of the internal structure of quality. The traditional view of quality treats it as a “black box”, at which input there are standards of quality and resources (factors of production), and at the output – the products of certain quality. The existing scientific knowledge is not enough for quality management in entrepreneurship. Though, in view of the specifics of entrepreneurship in the market economy, there is no doubt that each separate company manages quality in its own way, and so the “black box” model is inadmissible and has to be replaced by the generalized (framework) views of quality management in entrepreneurship.

This envisages deep transformation of the scientific and methodological approach to treatment of quality in entrepreneurship, which is connected to transition from evaluation of final products' quality to evaluation of quality of various business processes, which are necessary and are involved – directly or indirectly – in generation of products as a synergetic effect that appears as a result of functioning of the integrated business processes. In the hi-tech

context of the modern markets, business processes should be treated as stages of company's innovative activities.

The gaps include also the uncertainty regarding the factors of quality products of a company. The existing traditional approach treats quality as a function of company's management's effectiveness. Though significance of management for provision of products' quality in entrepreneurship is doubtless, it could be different in different business processes. Secondly, consideration of primarily endogenous (internal) factors, which include corporate management, forms a one-sided view of quality management, which should be supplemented in view of exogenous (external) factors.

Originality of this research consists in its filling the above gaps in the system of scientific knowledge on the topic of quality in entrepreneurship. The advantages of this paper include consideration of the hi-tech context of the modern market economy and treatment of quality from the positions of innovations and digitalization. It also dwells on “black box” and shows the internal structure of quality, studying it not from the positions of final result but in view of business processes. It also takes into account endogenous and exogenous factors, fully reflecting the conditions of formation of quality in entrepreneurship.

Thus, the purpose of this research is to develop an alternative – systemic approach to managing the quality of company's business processes, which fully and precisely describes the causal connections of provision of quality of company's business processes under the influence of endogenous and exogenous factors in the hi-tech market environment. This paper consists on the following parts: introduction is followed by literature review, which defines the theoretical basis of the research and contains gap analysis; then, materials and methods of the research are described.

The main part (results) is structured in the following way: part one contains the factor

analysis of quality of a company's business processes; part two contains a systemic model of formation of quality of a company's business processes of company; part three offers framework recommendations for systemic quality management of a company's business processes of company. Then comes the conclusion.

2. Literature Review

The fundamental and applied issues of quality measurement and management in the activities of entrepreneurship are studied in multiple works of the following authors. Garza-Reyes (2018) offers the systemic approach to diagnostics of the current state of the systems of quality management and business processes.

Bhatia and Awasthi (2018) perform evaluation of the interconnection between the systems of quality management and effectiveness of business and its intermediaries (by the example of subjects of small and medium entrepreneurship from different countries).

Muttakin et al. (2017) substantiate the connection between belonging to business groups, management of revenues, and quality of audit (by the example of companies from Bangladesh). Mehra (2018) recommend using the criterions that is based on assets for implementing the philosophy of quality management in service operations for increasing business's effectiveness. Sahoo (2020) studies the effectiveness of service strategies and quality management (by the example of Indian production companies).

Soares et al. (2017) perform an empirical research and prove a vivid influence of the practice of quality management of supply chain on the indicators of quality. Kuhn et al. (2018) think that complexity of business processes of a company is the problem of future development, and quality of management requires simplification of business processes – i.e., restructuring of a company. Leggat and Balding (2019)

substantiate the influence of the outflow of leadership on quality management (by the example of Australian hospitals).

Thai and Jie (2018) point out the influence of general quality management and integration of supply chains on effectiveness of companies (proved by the example of container shipping in Singapore). Isaksson (2019) offer a perspective table of maturity for evaluating the reports on sustainable development based on the principles of quality management. Antunes et al. (2017) determine the interconnection between innovations and general quality management and the influence of innovations on the results of an organization's activities.

Krajcsák (2018) performs a thematic inter-country research and determine the connection between success of the systems of quality management and self-evaluation and loyalty in various organizational cultures. de Menezes and Escrig (2019) perform a two-level research of employees' perception and labor efficiency and offer a methodological approach to measuring and providing effectiveness in quality management.

Wilcock and Boys (2017) note the advantages of ISO 9001 and offer the applied recommendations for improving quality management based on this international standard (by the example of agro-industrial companies). Nguyen and Chau (2017) describe the influence of general quality management on a competitive advantage and note the intermediary role of innovations' effectiveness. Chakraborty et al. (2019) deem it necessary to form a separate practice of quality management for the subjects of small and medium entrepreneurship in view of their specifics (proved based on a comparative research of India and Namibia).

The specifics of the modern treatment of quality from the positions of hi-tech character in the conditions of the knowledge economy, the digital economy, the Fourth industrial revolution, and Industry 4.0 are determined in the works Alpidovskaya and Popkova (2019), Inshakova and Bogoviz (2020), Popkova and

Sergi (2020), Popkova (2017), Popkova (2019), Popkova (2020), Popkova et al. (2020), Popkova et al. (2017), Popkova and Sergi (2018), Popkova and Sergi (2019), Popkova et al. (2018), Ragulina (2019), Shahin (2019), Shulus et al. (2020), Sozinova (2019), Sozinova et al. (2019), Sozinova et al. (2018), Mon (2020), and Stolyarov et al. (2020).

Khan et al. (2019) prove the interconnection between personal innovativeness, quality of digital resources, and general convenience of use, on the one hand, and satisfaction of users, on the other hand (by the example of Pakistan). Behmer and Jochem (2019) note the necessity for organizational planning for quality management in the digital age. Grandinetti et al. (2020) show the significant influence of the Fourth industrial revolution and digital services on quality of relations (by the example of Italian manufacturers B2B: entrepreneurial markets, which occupy an intermediary position in added value chains).

The influence of different business processes on products' quality is studied in the following works. Ali (2017) models the function of quality of support services on the complexity of marketing and the main competencies (by the example of the banking sphere). Solimun and Fernandes (2018) determine the intermediary effect of customers' satisfaction in the interconnection of quality of services, service orientation, and the strategy of combining marketing with customer loyalty.

Lasrado (2019) shows the role of marketing motives and advantages of the systems of bonuses for quality management. Pattanayak et al. (2017) note the influence of services' quality and orientation at the market on satisfaction and loyalty of customers (by the example of the Indian banking sector). Wardhani (2019) shows an important role of audit of quality for the market consequences of voluntary disclosure of information (by the example of the data from East Asia).

Sharma et al. (2018) develop an approach "DMAIC Six Sigma" to improvement of

quality at the stage of anodizing of the production process. Attri and Grover (2017) create a model of factors that ensure quality at the initial stage of a production system's life cycle. Taleizadeh et al. (2019) compile a range of production models of several products with the use of one machine, according to the rules of quality control and processing.

The role company's management in formation of quality of entrepreneurship is described in the following publications. Sharma and Kumar (2018) note the necessity for stimulating the selection of a good project manager for business environment with the use of the analytical hierarchy process (by the example of India). Ojekalu et al. (2019) develop a methodology of quality management of services of trading complexes that control real property (based on the analysis of empirical data in Nigeria).

Bäckström (2019) show the differences in treatment of the values of quality management, connected to health of the manager and employees. Hartviksen et al. (2020) note the potential of middle-rank managers of healthcare and its ability for improvement of quality. Al-Hussami et al. (2017) substantiate the influence of the leadership competencies and quality of work on the perceived readiness for organizational changes among managers (by the example of healthcare organizations).

Nilsson and Blomqvist (2017) define the quality of the examination process as an issue of healthcare manager's approach. Amati et al. (2018) describe the determinants of good and bad quality and their treatment by healthcare managers and substantiate taxonomy (by the example of the USA). Shokri and Nabhani (2019) note the specific vision of quality management of managers at an early stage of career building.

An overview of the existing research literature shows that it contains the theoretical basis of formation of a new treatment of quality from the positions of hi-tech character and the use of digital technologies in

entrepreneurship, but the treatment itself is in the process of scientific discourse. The role of business processes in formation of quality is clearly determined, but the feedback has not been elaborated – the specifics of quality in view of business processes has not been determined, which is a gap in the existing scientific knowledge.

Another gap is one-sided study of the factors of quality formation in entrepreneurship – emphasis on the endogenous factors – with poor elaboration of exogenous factors. Here we try to fill these gaps and form a systemic approach to managing the quality of company’s business processes.

3. Materials and methodology

For developing the systemic approach to quality management in entrepreneurship in the modern – hi-tech - market environment, we use a classification of business processes that conforms to the stages of innovative activities of a company. 1st stage – marketing, aimed at determining consumer preferences and forming a company’s brand – unique and characterized by loyalty of the interested parties. The indicators that characterize quality in this business process are consideration of opinions of interested parties and trademark (brand) registration. Both indicators are in the Global Competitiveness Report by the World Economic Forum; they are measured in points – the higher the indicator’s value the better.

2nd stage – formation of technological support for further stages. This stage corresponds to R&D. Indicators that characterize quality in this business process are knowledge exchange (for attracting knowledge, technologies, and information from external environment of companies) and patent registration (for legal protection of the created technologies and innovations that are produced with their help). Knowledge exchange is the indicator calculated by IMD within World Digital Competitiveness Ranking; it is measured in positions. Patent

registration could be found in the World Economic Forum’s report.

3rd stage - production of innovative, hi-tech, and/or digital products with application of borrowed or created and patented leading technologies. The indicator that characterizes quality in this business process is robotization of production, for it defines the level of authomatization and precision of production as a business process. This indicator is calculated by IMD.

4th stage – selling products. As we speak of an innovative process in the conditions of Industry 4.0, quality is determined not by sales volume but by volume of hi-tech export (which shows global competitiveness of products), activity of online commerce (which reflects the use of digital technologies for sales and convenience for the interested parties), and market capitalization of business (which characterizes commercial effectiveness of a company and its investment attractiveness). Hi-tech export and Internet trade are available in the IMD Report, and market capitalization – in the World Economic Forum’s report.

Management cannot be treated as a separate stage, as it is present at all stages of the algorithm of company’s innovative activities. At the same time, innovations management is clearly distinguished as a separate business process, which includes initiation, organization, coordination, monitoring, control, and stimulation of the innovative activity of company’s employees during all of the above stages.

Indicators that characterize quality in this business process are support for breakthrough ideas (favorability of corporate environment for the innovative activity of its subjects, determines by management) and intellectual decision support (activity of application of AI and technologies of Big Data processing in the practices of corporate management). Support for breakthrough ideas could be found in the World Economic Forum’s report, and intellectual decision support – in IMD report.

The factors that influence and largely determine the quality of the described business processes are as follows. 1st factor (exogenous): progress and requirements of society as the indicator of social requirements and support and stimulation of companies for provision of high quality of business processes. 2nd factors: (endogenous): professionalism of business management as the indicator of influence of intra-corporate management on quality of business processes. 3rd factors (exogenous): state regulation of competition as the indicator of stimulating high quality of business processes in entrepreneurship through support for a competitive market environment. Here we do not consider norming and standardization as factors of quality, as their influence in the market environment is limited, and they cannot be applied to innovations.

It should be emphasized that all the above indicators were selected from two reports for a reason. Though a lot of them, as well as similar indicators, could be found in other reports, the use of indicators from different

sources increases the risk of an error in calculations and distortion in the research results. That’s why here we use only two reports – for ensuring the highest precision and correctness of the results, authors’ conclusions, and recommendations.

The research objects are top 3 developed and top 3 developing countries from IMD Digital Competitiveness Ranking 2019 – as economic systems with the most progressive entrepreneurship, in which quality of business processes is the highest, which allows treating them as “models” for other countries and using their experience in the global scale. The data on these countries (as of 2020) are shown in Tables 1-2.

Correlation analysis is used for determining correlation dependencies between the indicators of quality and the selected factors at each distinguished business process. The influence of the considered factors on quality is positive if the correlation with the indicators from the World Economic Forum’s report is positive, and the correlation with the indicators from IMD report is negative.

Table 1. Manifestations of quality in view of business processes

| Business process | Indicator that characterizes the quality of business process | Original title of the indicator | Top 3 developed countries | | | Top 3 developing countries | | |
|------------------|---|---------------------------------|---------------------------|-----------|--------|----------------------------|----------|--------|
| | | | USA | Singapore | Sweden | China | Malaysia | Russia |
| Marketing | Consideration of the opinions of the interested parties, points 1-100 | Multi-stakeholder collaboration | 73.9 | 66.0 | 72.0 | 57.3 | 69.0 | 49.5 |
| | Registration of trademarks (brand), points 1-100 | Trademark applications | 85.94 | 91.24 | 99.84 | 79.23 | 70.96 | 65.44 |
| R&D | Knowledge exchange, positions 1-63 | Knowledge transfer | 4 | 5 | 14 | 31 | 20 | 57 |
| | Registration of patents, points 1-100 | Patent applications | 91.44 | 87.91 | 100.00 | 50.31 | 36.53 | 28.88 |
| Production | Robotization of production, positions 1-63 | World robots distribution | 4 | 15 | 17 | 1 | 22 | 34 |

Table 1. Manifestations of quality in view of business processes (continued)

| Business process | Indicator that characterizes the quality of business process | Original title of the indicator | Top 3 developed countries | | | Top 3 developing countries | | |
|------------------|--|--------------------------------------|---------------------------|-----------|--------|----------------------------|----------|--------|
| | | | USA | Singapore | Sweden | China | Malaysia | Russia |
| Sales | Hi-tech export, positions 1-63 | High-tech exports (%) | 20 | 2 | 25 | 6 | 4 | 34 |
| | Internet trade, positions 1-63 | Internet retailing | 2 | 26 | 15 | 21 | 48 | 41 |
| | Market capitalization of business, points 1-100 | Market capitalization | 10.00 | 100.00 | 100.00 | 70.20 | 100.00 | 38.90 |
| Management | Support for breakthrough ideas, points 1-100 | Companies embracing disruptive ideas | 68.1 | 59.6 | 59.6 | 53.8 | 68.0 | 44.0 |
| | Intellectual decision support, positions 1-63 | Use of big data and analytics | 6 | 15 | 7 | 12 | 9 | 31 |

Source: compiled by the authors based on IMD (2020), World Economic Forum (2020).

Table 2. Factors of business processes' quality.

| Factor that potentially determines quality | Original title of the indicator | Top 3 developed countries | | | Top 3 developing countries | | |
|--|-------------------------------------|---------------------------|-----------|--------|----------------------------|----------|--------|
| | | USA | Singapore | Sweden | China | Malaysia | Russia |
| Progress and requirements of society, points 1-100 | Buyer sophistication | 68.8 | 63.5 | 57.9 | 58.2 | 62.9 | 41.2 |
| State regulation of competition, points 1-100 | Extent of market dominance | 70.6 | 63.8 | 63.7 | 58.9 | 67.4 | 44.4 |
| Professionalism of business management, points 1-100 | Reliance on professional management | 78.9 | 83.5 | 80.7 | 59.0 | 74.3 | 49.6 |

Source: compiled by the authors based on IMD (2020), World Economic Forum (2020).

4. Results

4.1. Factor analysis of quality a company's separate business processes

For determining strength, character, and differences in the influence on quality of business processes among the considered factors, let us use the results of factor analysis with the help of the correlation method (Figures 1-5). Direct averages of correlation on business processes, which include the components which correlation with the

factors is considered positive with negative values, are calculated with the opposite sign of these components for obtaining correct data (prevention of their distortion due to differences in the sign).

As shown in Figure 1, all factors in marketing are rather important for provision of quality of this business process and influence it positively. The most important factor is reliance on professional management (correlation - 84.30%). Extent of market dominance (73.91%) and buyer sophistication (68.50%) are also important.

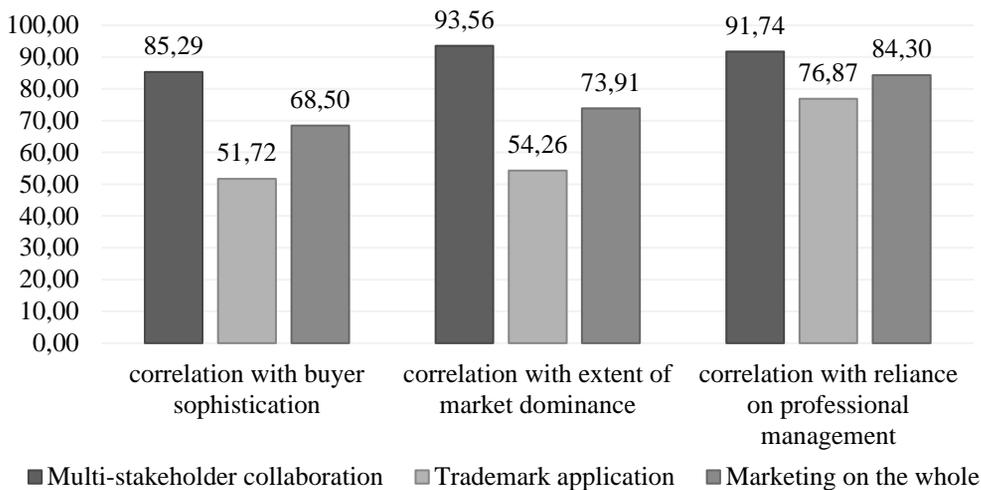


Figure 1. Correlation between quality of marketing and the factors that influence it.

Source: calculated and built by the authors

It should be noted that multi-stakeholder collaboration largely depends on the considered factors of quality. Its correlation with buyer sophistication constitutes 85.29%, with extent of market dominance – 93.56%, and with business management - 91.74%.

Trademark applications also strongly (but to a lesser extent) depends on the considered factors of quality. Its correlation with buyer sophistication constitutes 51.72%, with extent of market dominance – 54.26%, and with business management – 76.87%.

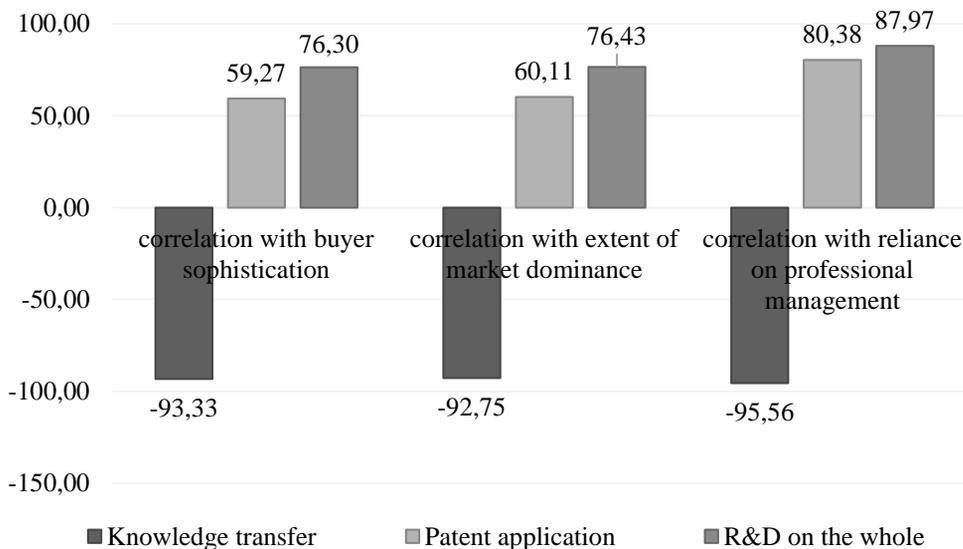


Figure 2. Correlation between quality of R&D and the factors that influence it.

Source: calculated and built by the authors.

As shown in Figure 2, all factors in marketing are very important during R&D for provision of quality of this business process and influence it positively. Reliance on professional management has the largest importance (87.97%), followed by extent of market dominance (76.43%), and buyer sophistication (76.30%). It should be noted that knowledge exchange depends on the considered factors of quality. Its correlation

(negative values are treated positively) with buyer sophistication equals -93.33% , with extent of market dominance -92.75%, and with reliance on professional management - 95.56%. Patent application also largely depends on the considered factors of quality. Its correlation with buyer sophistication equals 59.27%, with extent of market dominance – 60.11%, and with reliance on professional management – 80.38%.

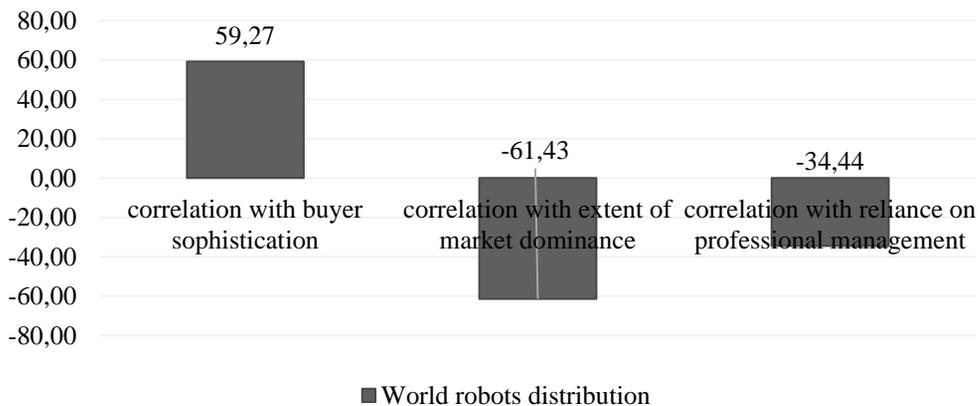


Figure 3. Correlation quality of production and the factors that influence it

Source: calculated and built by the authors.

As shown in Figure 3, factors in production have different importance for provision of quality of this business process and influence it in different ways. In this business process, negative values of correlation coefficients are treated positively. Buyer sophistication (-61.43%) is of the highest importance. It is followed by reliance on professional management (84.30%), and extent of market dominance (73.91%). Buyer sophistication has a vivid negative influence on quality (59.27%).

As shown in Figure 4, all factors in sales are equally important for provision of quality of this business process and influence it positively. Buyer sophistication is the most important factor (41.23%). It is followed by reliance on professional management (39.82%) and extent of market dominance (38.95%). It should be noted that hi-tech export largely depends on the considered

factors of quality. Correlation (negative values are treated positively) with buyer sophistication constitutes -63.49%, with extent of market dominance -54.36%, and with reliance on professional management - 40.53%.

Internet reliance also strongly depends on the considered factors. Its correlation (negative values are treated positively) with buyer sophistication constitutes -50.01%, with extent of market dominance -45.62%, and with reliance on professionalism of management -42.14%. Internet retailing also largely depends on the considered factors. Market capitalization of business has moderate dependence on the considered factors of quality. Its correlation with buyer sophistication constitutes 10.19%, extent of market dominance – 16.88%, and with reliance on professional management – 36.79%.

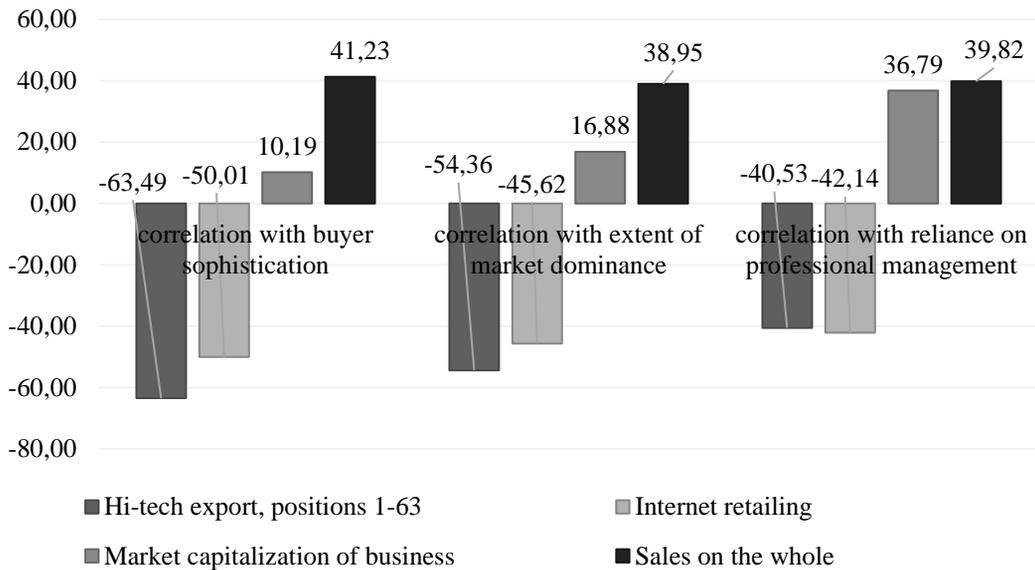


Figure 4. Correlation quality of sales and the factors that influence it

Source: calculated and built by the authors

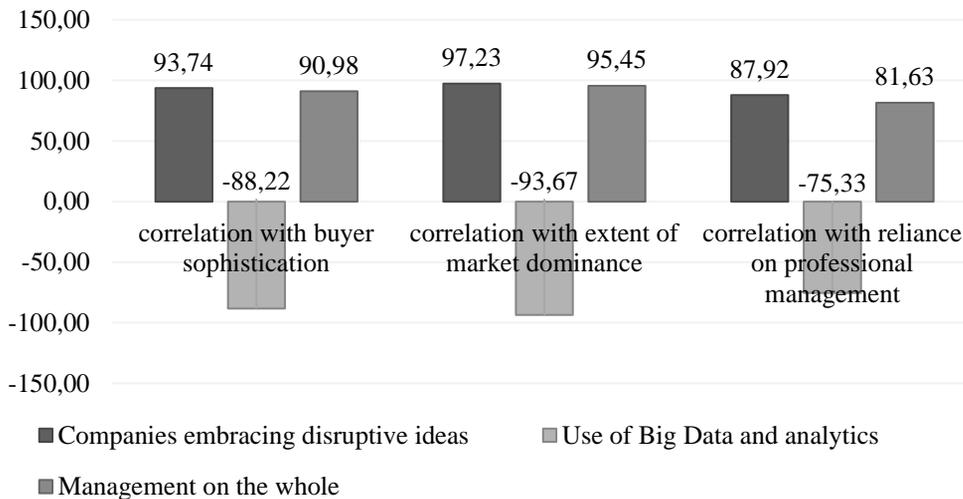


Figure 5. Correlation between quality of management and the factors that influence it

Source: calculated and built by the authors

As shown in Figure 5, all factors in management are very important for provision of quality of this business process and positively influence it. Extent of market dominance is of the highest importance (95.45%). It is followed by buyer

sophistication (90.98%) and reliance of professional management (81.63%). It should be noted that support for breakthrough ideas by interested parties largely depends on the considered factors of quality. Its correlation with buyer sophistication constitutes 93.74%,

with extent of market dominance – 97.23%, and with reliance on professional management – 87.92%. Intellectual decision support also strongly depends on the considered factors of quality. Its correlation (negative values are treated positively) with buyer sophistication constitutes -88.22%, with extent of market dominance -93.67%, and with reliance on professional management -75.33%.

Thus, buyer sophistication is the most significant factor (correlation constitutes 67.26% on average) with quality of company's business processes. Reliance on

professional management (51.86%) and extent of market dominance (44.66%) are also important. The differences in significance of the selected factors regarding quality are vivid and string among the modern companies' business processes.

4.2. The systemic model of formation of quality of company's business processes

Based on the obtained results of the correlation analysis, a systemic model of formation of quality of company's business processes is created (Figure 6).

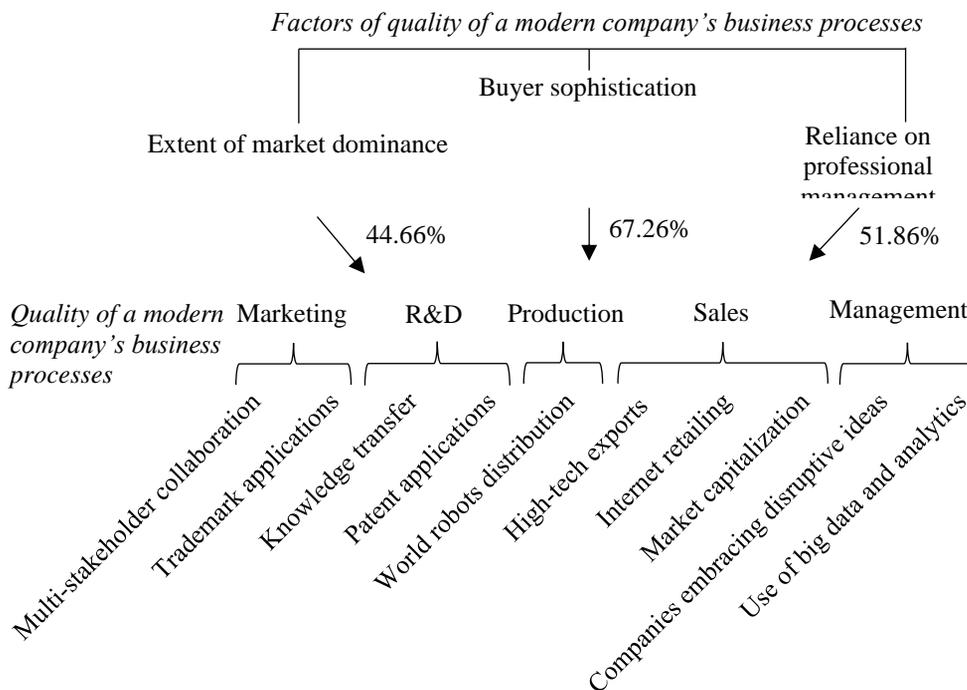


Figure 6. The systemic model of formation of quality of company's business processes.

Source: developed and compiled by the authors.

The advantages of the developed systemic model of formation of quality of a company's business processes, as compared to the existing traditional view of quality in the company's activities, consist in the following. Firstly, the offered model takes into account the hi-tech context of the modern market

economy and considers quality from the positions of innovations and digitalization. Thus, in the conditions of the digital economy, there are expanded opportunities for communications with interested parties based on digital marketing – e.g., advertising, PR, and feedback collection in social

networks and via e-mail. That's why multi-stakeholder collaboration is a mandatory and main component of quality in marketing.

Trademark application is also more accessible in the digital economy, where a lot of attention is paid to the issue of intellectual property protection. That's why, unlike "impersonal" marketing in the pre-digital age, it is necessary to promote a specific brand in the digital economy – i.e., a registered trademark. Globalization and the digital economy expand opportunities for knowledge exchange, which is accessible in the digital (remote) form. While in the pre-digital economy knowledge exchange was difficult, which led to different companies' R&D repeating each other, this is inadmissible in the conditions of the digital economy.

Results of R&D should have the form of registered patents, for use by the company and implementation in the market of innovations. Robotization covers all aspects of quality in production, including increased precision of production and full-scale control for prevention of defects and saving of production resources. Unlike internal sales and low-tech export, hi-tech export determines the long-term international evaluation of the company's products' quality. Unlike the traditional sales, Internet retailing determines the width of sales markets for the company's products. Market capitalization of business shows its global competitiveness.

Support for breakthrough ideas is especially necessary in the conditions of the digital economy, in which technological progress is very quick. Intellectual decision support allows increasing their rationality, ensures the fullest consideration of the factors and conditions, and accelerates management. Due to consideration of the hi-tech context and treatment of quality of business processes from the positions of innovations and digitalization, the obtained results are most correct and precise, being in high demand in the practice of entrepreneurship.

Secondly, the developed model opens the "black box" and determines the internal structure of quality, studying it not from the positions of final result but in view of business processes. As shown in Figure 6, quality of products is not assigned to any business process of a company, as it is a derivative from all its business processes. That's why consideration of quality in view of business processes allows for the most precise and correct determination of the causal connections of formation of quality of products, which is similar to the integral quality of all business processes of a company.

Thirdly, the systemic model takes into account endogenous and exogenous factors, fully reflecting the conditions of formation of quality in entrepreneurship. Reliance on professional management (endogenous factors) is even less important than exogenous factors in aggregate – buyer sophistication and extent of market dominance (51.86% vs. 55.96%). Each of the distinguished factors of quality of company's business processes influences them in a vivid positive way, and the average influence of factors constitutes 54.59%. Therefore, quality of business processes in a modern company in the digital economy is determined by the selected factors by more than 50%. This proves the statistical significance and scientific and practical value of the obtained results.

4.3. Framework practical recommendations for systemic quality management of a company's business processes

Buyer sophistication and society's requirements should be aimed at growth of activity of communications between consumers and representatives of the wide public and a company's representatives, for transferring the opinion of the interested parties. This requires the development of telecommunication infrastructure, which would be accessible – in term of territory and finances – for population of the whole

country. It is expedient to offer subsidies for the use of telecommunication infrastructure for people on lower incomes (this should be financed by the government and hi-tech entrepreneurship).

Consumer must also be able to assess the advantages of robotized products. For this they must have a positive attitude towards mass (conveyor) products, manufactured with the help of automatization means, and have knowledge and skills with hi-tech products. This envisages social advertising of robotization, performed by jointly by the government and hi-tech entrepreneurship, and increase of the level of media literacy of population through including digital competencies in the educational standards of higher education and increasing qualification, as well as organization of social (by means of corporate and budget financing) course of increase of population's media-literacy for reaching mass effect.

Development of Internet retailing requires society's readiness and population's sufficient experience in remote selection and purchase (payment, registration, and acceptance of an order) of goods and services via Internet. The most perspective means of providing this experience is companies' giving wide groups of population an opportunity for initial discounted purchase of their products via Internet. Government has to adopt national standards and regulate Internet retailing, for making it highly-effective for consumers and raising trust to it. Therefore, buyer sophistication will not be growing on its own in the necessary rate and will require active measures from large hi-tech companies and government.

State regulation of competition should ensure simplicity and reliable protection of intellectual property, for making trademark and patent application accessible and popular in entrepreneurship. For this, it is recommended to transfer trademark and patent application to the sphere of digital public services and perform automatization of this process for companies and for

registration and controlling bodies of the government. Robotization of production entails large expenditures and is an investment project with a long-term return period. For stimulating robotization of state regulation, competition should include a ranking of companies by the level of robotization, for creating marketing advantages of robotization in the form of increased loyalty of consumers.

For supporting hi-tech export, state regulation of competition has to ensure free trade. In this case, foreign rivals will inevitable come to domestic markets. Therefore, state regulation of competition should be flexible and, instead of the traditional limitation of competition (protectionism), it should be aimed at support for domestic entrepreneurship in a highly-competitive market environment by means of tax and banking crediting of digitalization and the information & consultation support for technological modernization of business.

Reliance on professionalism of management should support the active marketing communications of a company. That's why manager has to possess developed digital competencies. For a successful exchange of knowledge, manager has to be able to start and support business communications and cooperate with other companies. A perspective form of implementation of these practices is integration of entrepreneurship, in particular based on clustering. For managing a company that is a part of cluster, manager has to have vivid skills of managing a conflict of interests.

For robotization of production, manager has to know the specifics of a company's production activities and possess not only managerial but also sectorial professional communications. For supporting breakthrough ideas, manager has to develop a liberal style of management at a company. For systemic provision of the above requirements to professionalism of a business manager, it is recommended to implement a new standard of managerial staff training, which would take into account the specifics of the digital economy would cover

all the above competencies.

Advantages of the developed framework practical recommendations for systemic quality management of a company's business processes consist, firstly, in their provision of maximum effectiveness of management, as they are oriented at maximization of "effect" (contribution to increase of quality) of the factors that are most effective in the set business process. A refusal from managing insignificant factors reduces expenditures for management. Secondly, the offered recommendations take into account the specifics of each business process and are generalized at the same time – which allows for management at the level of a company, not at the level of each separate business process.

6. Conclusion

Thus, it has been proved - by the example of top 3 developed and top 3 developing countries by the level of digitalization in 2020 – that though the selected factors – buyer sophistication, extent of market dominance, and reliance of professionalism of management – are critically important for quality management, their influence on business processes is different. Therefore, management of these factors should take into account the character and the scale of their role in each business process; thus, it is complicate and flexible.

Contrary to the existing belief that exogenous factors, of which the key one is professionalism of management, have a decisive role for achieving quality in entrepreneurship, it has been determined that endogenous factors – buyer sophistication and extent of market dominance – are more important on the whole. Correlation of endogenous and exogenous factors is 51.86% vs. 55.96%. The developed systemic model of formation of quality of a company's business processes shows dependence of quality on the selected factors and reflects the manageability of quality. Due to the presented model, business processes of a

company cease to be a "black box" and become visible, having their own quality, which is specific for each business process according to the character and level of influence of the factors and according to the indicators and essential manageability.

The offered framework applied recommendations for systemic quality management of a company's business processes outlines the perspectives of practical implementation of the authors' conclusions. For increasing buyer sophistication and society's requirements, joint non-commercial efforts of government and large hi-tech entrepreneurship are offered. Refusal from protectionism and a striving for free trade are offered for state regulation of competition for the purpose of stimulating the increase of quality of business processes in entrepreneurship. Standardization of managerial personnel training in view of the modern requirements (the main new competencies are described) is offered for improving the practices of business management and increasing the level of its professionalism. The contribution of the performed research to development of economics consists in its determining the internal structure of a company's business processes and reflecting the characteristics of their quality in a new market environment, which has formed in the conditions of the digital economy and Industry 4.0. The theoretical and methodological significance is due to determination and substantiation of the factors of quality of company's business processes, their classification in view of endogenous and exogenous factors, and determination of the character, level, and differences in the influence between the factors and business processes. Modeling of quality management of a company's business processes has allowed for a systemic presentation of its essence and perspectives.

Practical significance of the authors' conclusions and recommendations consist in their high level of detalization, which simplifies their implementation into the managerial practice of modern

entrepreneurship. An additional advantage of the research results is the fact that they have been received on the basis of experience of the leading developed and developing countries. This makes the offered recommendations universal.

It could be supposed that in countries with low level of digitalization the influence of the distinguished factors on quality of business processes in entrepreneurship is distorted or weaker. Ignoring the experience of countries that perform delayed digitalization is a certain limitation of this work's results. In the course

of development of the digital economy, these countries will reach the state of the leading countries, and the offered recommendations might be applicable in them; however, these countries might also have their own, unique, way of digitalization, which will require new studies, focused on their experience. Thus, further studies should be devoted to generalization of the experience of quality management of companies' business processes in countries with slow digitalization and to development of a specific managerial approach for them.

References:

- Al-Hussami, M., Hamad, S., Darawad, M., & Maharmeh, M. (2017). The effects of leadership competencies and quality of work on the perceived readiness for organizational change among nurse managers. *Leadership in Health Services*, 30(4), 443-456. <https://doi.org/10.1108/LHS-11-2016-0058>
- Ali, M. S. Y. (2017). Moderating effect of support service quality on marketing IS sophistication and bank's core competencies. *Journal of Islamic Marketing*, 8(4), 711-731. <https://doi.org/10.1108/JIMA-10-2015-0078>
- Alpidovskaya, M. L., & Popkova, E. G. (2019). Marx & Modernity: A Political & Economic Analysis of Social Systems Management. A volume in the series Popkova, E.G. (Ed.) *Advances in Research on Russian Business & Management*. Charlotte, NC, USA: Information Age Publishing.
- Amati, R., Kaissi, A. A., & Hannawa, A. F. (2018). Determinants of good & poor quality as perceived by US health care managers: A grounded taxonomy based on evidence from narratives of care. *Journal of Health Organization & Management*, 32(5), 708-725. <https://doi.org/10.1108/JHOM-03-2018-0075>
- Antunes, M. G., Quirós, J. T., & Justino, M. d. R. F. (2017). The relationship between innovation and total quality management & the innovation effects on organizational performance. *International Journal of Quality & Reliability Management*, 34(9), 1474-1492. <https://doi.org/10.1108/IJQRM-02-2016-0025>
- Attri, R., & Grover, S. (2017). Modelling the quality enabled factors in initiation stage of production system life cycle. *Benchmarking: An International Journal*, 24(1), 163-183. <https://doi.org/10.1108/BIJ-12-2014-0113>
- Bäckström, I. (2019). Health-related quality management values – comparing manager and co-worker perceptions. *International Journal of Quality & Service Sciences*, 11(4), 588-603. <https://doi.org/10.1108/IJQSS-08-2018-0071>
- Behmer, F. J., & Jochem, R. (2019). Organizational planning for quality management in the digital age. *Business Process Management Journal*, 26(3), 679-693. <https://doi.org/10.1108/BPMJ-12-2018-0365>

- Bhatia, M. S., & Awasthi, A. (2018). Assessing relationship between quality management systems & business performance and its mediators: SEM approach. *International Journal of Quality & Reliability Management*, 35(8), 1490-1507. <https://doi.org/10.1108/IJQRM-05-2017-0091>
- Chakraborty, A., Mutingi, M., & Vashishth, A. (2019). Quality management practices in SMEs: a comparative study between India and Namibia. *Benchmarking: An International Journal*, 26(5), 1499-1516. <https://doi.org/10.1108/BIJ-08-2017-0210>
- de Menezes, L. M., & Escrig, A.B. (2019). Managing performance in quality management: A two-level study of employee perceptions and workplace performance. *International Journal of Operations & Production Management*, 39(11), 1226-1259. <https://doi.org/10.1108/IJOPM-03-2019-0207>
- Garza-Reyes, J. A. (2018). A systematic approach to diagnose the current status of quality management systems & business processes. *Business Process Management Journal*, 24(1), 216-233. <https://doi.org/10.1108/BPMJ-12-2016-0248>
- Grandinetti, R., Ciasullo, M.V., Paiola, M. & Schiavone, F. (2020). Fourth industrial revolution, digital servitization and relationship quality in Italian B2B manufacturing firms. An exploratory study. *The TQM Journal*, 32(4), 647-671. <https://doi.org/10.1108/TQM-01-2020-0006>
- Hartviksen, T. A., Aspfors, J., & Uhrenfeldt, L. (2020). Healthcare middle managers' capacity and capability to quality improvement. *Leadership in Health Services*, 33(3), 279-294. <https://doi.org/10.1108/LHS-11-2019-0072>
- IMD (2020). *World Digital Competitiveness Ranking 2019*. Retrieved from: <https://www.imd.org/wcc/world-competitiveness-center-rankings/world-digital-competitiveness-rankings-2019/> (30.07.2020).
- Inshakova, A. O., & Bogoviz, A. V. (Ed.) (2020). Alternative Methods of Judging Economic Conflicts in the National Positive & Soft Law. A volume in the series Popkova, E.G. (Ed.) *Advances in Research on Russian Business & Management*. Charlotte, NC, USA: Information Age Publishing.
- Isaksson, R. (2019). A proposed preliminary maturity grid for assessing sustainability reporting based on quality management principles. *The TQM Journal*, 31(3), 451-466. <https://doi.org/10.1108/TQM-12-2017-0167>
- Khan, A., Masrek, M. N., & Mahmood, K. (2019). The relationship of personal innovativeness, quality of digital resources and generic usability with users' satisfaction: A Pakistani perspective. *Digital Library Perspectives*, 35(1), 15-30. <https://doi.org/10.1108/DLP-12-2017-0046>
- Krajcsák, Z. (2018). Successes of quality management systems through self-evaluation & commitment in different organizational cultures: A case study. *Management Decision*, 56(7), 1467-1484. <https://doi.org/10.1108/MD-09-2017-0870>
- Kuhn, M., Schaefer, F. & Otten, H. (2018). Process complexity as a future challenge – a quality management perspective. *The TQM Journal*, 30(6), 701-716. <https://doi.org/10.1108/TQM-10-2017-0123>
- Lasrado, F. (2019). Examining the role of marketing motives & benefits of quality award frameworks. *Measuring Business Excellence*, 23(2), 182-198. <https://doi.org/10.1108/MBE-06-2018-0033>

- Leggat, S., & Balding, C. (2019). The impact of leadership churn on quality management in Australian hospitals. *Journal of Health Organization & Management*, 33(7/8), 809-820. <https://doi.org/10.1108/JHOM-08-2018-0216>
- Mehra, S. (2018). Using asset-based criterion to implement quality management philosophy in service operations to enhance business performance. *International Journal of Quality & Reliability Management*, 35(10), 2195-2211. <https://doi.org/10.1108/IJQRM-12-2016-0223>
- Mon, T.Y. (2020). Study of Risks Assessment for Implementation of QMS in Myanmar Construction Industry. *Proceedings on Engineering Sciences*, 2(1), 73-80. doi: 10.24874/PES02.01.008
- Muttakin, M. B., Khan, A., & Mihret, D.G. (2017). Business group affiliation, earnings management & audit quality: evidence from Bangladesh. *Managerial Auditing Journal*, 32(4/5), 427-444. <https://doi.org/10.1108/MAJ-01-2016-1310>
- Nguyen, V. C., & Chau, N. T. (2017). Research framework for the impact of total quality management on competitive advantage: The mediating role of innovation performance. *Review of International Business & Strategy*, 27(3), 335-351. <https://doi.org/10.1108/RIBS-02-2017-0016>
- Nilsson, P., & Blomqvist, K. (2017). Survey process quality: a question of healthcare manager approach. *International Journal of Health Care Quality Assurance*, 30(7), 591-602. <https://doi.org/10.1108/IJHCQA-05-2016-0077>
- Ojekalu, S. O., Ojo, O., Oladokun, T. T., Olabisi, S. A., & Omoniyi, S. S. (2019). Service quality of property managers of shopping complexes in Ibadan, Nigeria: Empirical evidence. *Property Management*, 37(3), 310-326. <https://doi.org/10.1108/PM-04-2018-0029>
- Pattanayak, D., Koilakuntla, M., & Punyatoya, P. (2017). Investigating the influence of TQM, service quality and market orientation on customer satisfaction & loyalty in the Indian banking sector. *International Journal of Quality & Reliability Management*, 34(3), 362-377. <https://doi.org/10.1108/IJQRM-04-2015-0057>
- Popkova E. G., Sozinova A. A., Grechenkova O. Yu., & Menshchikova V. I. (2018) Deficiencies in the legislative support of innovative activities in contemporary Russia and ways of addressing them in the determination of modern crime. *Vserossiiskii kriminologicheskii zhurnal = Russian Journal of Criminology*, 12(4), 515-524. doi: 10.17150/2500-4255.2018.12(4).515-524. (In Russian).
- Popkova, E. G. (2017). *Economic & Legal Foundations of Modern Russian Society*. A volume in the series Popkova, E.G. (Ed.) *Advances in Research on Russian Business & Management*. Charlotte, NC, USA, Information Age Publishing.
- Popkova, E. G. (2019). Preconditions of formation & development of industry 4.0 in the conditions of knowledge economy. *Studies in Systems, Decision & Control*, 169(1), 65-72.
- Popkova, E. G. (2020). A new treatment of quality of goods and services in the conditions of the knowledge economy: opposition of traditions and innovations. *International Journal for Quality Research*, 14(2), 329-346. <https://doi.org/10.24874/IJQR14.02-01>.
- Popkova, E. G., & Sergi, B. S. (2018). Will Industry 4.0 & Other Innovations Impact Russia's Development? In Bruno S. Sergi (Ed.) *Exploring the Future of Russia's Economy and Markets: Towards Sustainable Economic Development* (pp. 51-68). Bingley, UK: Emerald Publishing Limited.
- Popkova, E. G., & Sergi, B. S. (2020). Human Capital & AI in Industry 4.0. Convergence & Divergence in Social Entrepreneurship in Russia. *Journal of Intellectual Capital*, <https://doi.org/10.1108/JIC-09-2019-0224>.

- Popkova, E. G., & Sergi, B. S. (Eds.) (2019). *Digital Economy: Complexity & Variety vs. Rationality*. Berlin, Springer International Publishing.
- Popkova, E. G., Poluyufta, L., Beshanova, Y., Popova, L. V., & Kolesnikova, E. (2017). Innovations as a basis for marketing strategies of Russian oil companies in the conditions of oil prices reduction. *Contributions to Economics*, (9783319606958), 449-455. https://doi.org/10.1007/978-3-319-60696-5_57
- Popkova, E. G., Przhedetsky, Yu V., Przhedetskaya, N.V. & Borzenko, K.V. (Ed.) (2020). Marketing of Healthcare Organizations: Technologies of Public-Private Partnership. A volume in the series Popkova, E.G. (Ed.) *Advances in Research on Russian Business & Management*. Charlotte, NC, USA: Information Age Publishing.
- Ragulina, Y. V. (2019). Priorities of development of industry 4.0 in modern economic systems with different progress in formation of knowledge economy. *Studies in Systems, Decision & Control*, 169, 167-174.
- Sahoo, S. (2020). Exploring the effectiveness of maintenance & quality management strategies in Indian manufacturing enterprises. *Benchmarking: An International Journal*, 27(4), 1399-1431. <https://doi.org/10.1108/BIJ-07-2019-0304>
- Shahin, A. (2019). Quality & innovation: how to create value for customers by value-added innovation. *The TQM Journal*, 31(6), 873-873. <https://doi.org/10.1108/TQM-11-2019-233>
- Sharma, K. K. & Kumar, A. (2018). Facilitating quality project manager selection for Indian business environment using analytical hierarchy process. *International Journal of Quality and Reliability Management*, 35(6), 1177-1194. <https://doi.org/10.1108/IJQRM-10-2016-0175>
- Sharma, P., Malik, S. C., Gupta, A., & Jha, P. C. (2018). A DMAIC Six Sigma approach to quality improvement in the anodising stage of the amplifier production process. *International Journal of Quality & Reliability Management*, 35(9), 1868-1880. <https://doi.org/10.1108/IJQRM-08-2017-0155>
- Shokri, A., & Nabhani, F. (2019). Quality management vision of future early career operations managers. *International Journal of Quality & Reliability Management*, 36(2), 162-185. <https://doi.org/10.1108/IJQRM-06-2017-0114>
- Shulus, A. A., Akopova, E. S., Przhedetskaya, N. V., & Borzenko, K.V. (2020). Intellectual Production & Consumption: A New Reality of the 21st Century. *Lecture Notes in Networks & Systems*, 92, 353-359.
- Soares, A., Soltani, E., & Liao, Y.-Y. (2017). The influence of supply chain quality management practices on quality performance: an empirical investigation. *Supply Chain Management*, 22(2), 122-144. <https://doi.org/10.1108/SCM-08-2016-0286>
- Solimun, S., & Fern&es, A. A. R. (2018). The mediation effect of customer satisfaction in the relationship between service quality, service orientation, & marketing mix strategy to customer loyalty. *Journal of Management Development*, 37(1), 76-87. <https://doi.org/10.1108/JMD-12-2016-0315>
- Sozinova, A. A. (2019). Causal connections of formation of industry 4.0 from the positions of the global economy. *Studies in Systems, Decision and Control*, 169, 131-134.
- Sozinova, A. A., Kataeva, N. N., Berezina, E. S., Fufacheva, L. A., & Sergeeva O. V. (2018) Priorities of using new Information and Communication Technologies in the modern economy. *Espacios*, 39(28), 10.
- Sozinova, A. A., Nabokikh, A. A., Ryattel, A. V., & Sanovich, M. A. (2019). Analysis of “underdevelopment whirlpools” as a tool of managing the regional market of education in the conditions of Industry 4.0. Vol. 27. No. 3-4. pp. 173-179.

- Stolyarov, N. O., Petrenko, E. S., Serova, O. A., & Umuralieva, A.S. (2020). The Digital Reality of the Modern Economy: New Actors and New Decision-Making Logic. *Lecture Notes in Networks & Systems*, 87, 882-888.
- Taleizadeh, A. A., Yadegari, M., & Sana, S. S. (2019). Production models of multiple products using a single machine under quality screening and reworking policies. *Journal of Modelling in Management*, 14(1), 232-259. <https://doi.org/10.1108/JM2-06-2018-0086>
- Thai, V., & Jie, F. (2018). The impact of total quality management & supply chain integration on firm performance of container shipping companies in Singapore. *Asia Pacific Journal of Marketing & Logistics*, 30(3), 605-626. <https://doi.org/10.1108/APJML-09-2017-0202>
- Wardhani, R. (2019). The role of audit quality on market consequences of voluntary disclosure: Evidence from East Asia. *Asian Review of Accounting*, 27(3), 373-400. <https://doi.org/10.1108/ARA-03-2018-0083>
- Wilcock, A. E., & Boys, K.A. (2017). Improving quality management: ISO 9001 benefits for agrifood firms. *Journal of Agribusiness in Developing & Emerging Economies*, 7(1), 2-20. <https://doi.org/10.1108/JADEE-12-2014-0046>
- World Economic Forum (2020). *The Global Competitiveness Report 2019*. Retrieved from: <https://www.weforum.org/reports/how-to-end-a-decade-of-lost-productivity-growth> (30.07.2020).

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