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CONTENTS

EDITORIAL

The onset of a new decade – the 2020s – allows us to refocus *Intellectual Economics* towards continuing the traditions of MRU by paying special attention to the social, economic, and jurisprudential aspects of innovation. It is an honor to remember that, in the past few years, MRU has consistently been evaluated in the top 200–250 of the QS World University Rankings by Subject. This issue of *Intellectual Economics* is also published in a renewed OJS, which will be more useful within the contemporary editing process.

Several of the studies presented in this issue of *Intellectual Economics* are interconnected with direct aspects of human capital – including the training of professional competencies, modern educational technologies, and increasing innovation. Of these, K. Ketners and M. Petersone's article opens by providing introductory suggestions concerning sustainable human resources used within the EU Customs Competency Framework. A. Rauf, A. Rehman, and G. Y. Khan analyze skill mismatch as an important factor in diminishing the efficiency of human capital on economic growth. In particular, the lag between receiving qualifications and starting an appropriate job is considered as one of the main parameters of university rankings that evaluate their competitiveness. W. Adikara and B. W. Soetjipto concern their research with the impacts of psychological capital and job crafting on innovative behavior within the public sector, and suggest that their conclusions might help to enhance public sector services and the process of leader-member exchange. Interesting sociometric aspects of the institutional transformation of digital values form the research objects of I. Malyi, N. Gavkalova et al., and their results might be useful for the development of modern regional youth policy. K. Nurasheva et al. attempt to cover some comparative aspects of competitiveness between Central Asian countries, including an exploration of their perspectives and the stages of their cooperation.

However, most of the articles in our portfolio are dedicated to the practice of financial administration in developing countries such as Kazakhstan, Ukraine, and Pakistan. In this issue, some empirical evidence of the negative impact of financial development on the risk-taking of banks by lowering their equity ratios are characterized by F. Abas. The options for accounting for the costs of industrial innovation are reviewed by V. Hyk et al. in order to provide suggestions for the more effective management of enterprises. The prospects for the investment of financial institutions in innovation are studied by G. Kalkabayeva et al. A. T. Okanova and her colleagues from universities across Kazakhstan consider the measurement of income tax assessments, using the building sector as an experimental basis. This issue is rounded off by the interesting methodological suggestions of N. Plaskova et al., which detail the margin analysis in management and operational profitability, and also consider the pricing of production.

The main suggestion for all future authors or applicants is to appeal to our readers' interest in clear conclusions based on the presented research, paired with suggested scientific and methodical innovations and other recommendations.

Antanas Buračas

THE PERSONALIZED MODEL FOR THE SUSTAINABLE DEVELOPMENT OF HUMAN RESOURCES IN CUSTOMS

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Abstract. *For customs administrations to function effectively and to uphold European Union (EU) values, it is crucial that they work together, with consistent quality standards and with the uniform application of regulations and initiatives. This is because different approaches and standards in education and training make it difficult to share information on best practices and disseminate knowledge and skills between different customs administrations. The EU Customs Competency Framework (CustCompEU) sets out a consensus on the optimal set of knowledge, skills, and behaviours required by customs professionals in the EU. However, from the perspective of customs institutions, several practical issues arise – chiefly, how to provide their employees with the necessary knowledge and skills in a cost effective and efficient way, by investing in customs employee training. This study provides a flexible methodology for generating competency, which allows employers to systematize the requirements for specific customs positions and to connect with the requirements of international and supranational organizations. The approach provided is practical from the perspective of the customs institution, and provides educators and human resource managers with the necessary information regarding the knowledge and skills acquired as a result of the educational process. The meta-analysis of the study is based on the use of qualitative data from existing data sources which utilize the professional standards system implemented in Latvia, EU-implemented initiatives, and the principles of the process management system. The standards of the customs profession are a key element in the development of an integrated learning and management model, which would be a central*

element in a coordinated and harmonized vocational education and training system for professional customs officers.

Keywords: *customs education, EU Customs Competency Framework; customs profession standards; customs administration process management.*

Jel classification: *M53; H12*

1. Introduction

The development of human resources is considered to be the most important issue in the customs administrations of the EU Member States. One of the objectives of the Customs 2020 Programme (European Commission, n.d.-b) is to strengthen the skills and competences of customs officials.

There is no common system for the training and professional growth of customs employees in the European Union, and establishing such a system for the customs authorities of the 27 EU Member States would be very difficult (perhaps even impossible) as:
- Training for EU customs officers involves a wide variety of training models which lack a coherent approach;
- Training is mainly organised at educational institutions and training centres under the auspiecs of the office;
- Customs services have very different institutional affiliations and degrees to which they fall under the dependency and authority of their Ministries.

For customs administrations to function effectively and to support EU values, it is important that they operate in a uniform manner, taking into account consistent quality standards and ensuring the uniform application of regulations and initiatives. The current methods of work, the means of implementing the regulatory enactments of the European Union, and the standard skills of customs officers and officials vary greatly from one Member State to another. This situation impedes the synchronous operation of customs administrations and decreases the overall customs capacity of the EU. The various education and training approaches and standards make it difficult to share information on best practices and disseminate knowledge and skills between different customs administrations (Pētersone et al. 2013), and even between customs brokers and other border control authorities (Laurinavičius 2018; Jablonskis, Petersone, and Ketners 2018). Therefore, an EU-wide tool has been established to provide a framework within which consistently high standards could be achieved in all of the customs administrations of the Member States – the EU customs system of competences (CustCompEU). By introducing a harmonised approach, the EU hopes to establish a uniform system for the training and education of customs officers in order to enable Member States to provide customs officers with the necessary knowledge and skills.

This system of ensuring the competence of customs authorities should ensure interaction with national, World Customs Organization (2019), or internal professional

standards, if established, as well as with other competency generation mechanisms.

From the perspective of the customs institution, a number of practical issues arise regarding how to better provide staff with the required knowledge and skills:

- deciding whether to employ staff who already possess the knowledge and skills required, or whether the organisation should be engaged in conducting the training of its employees;
- establishing whether the knowledge and skills of employees are sufficient for performing their duties prior to their recruitment;
- defining the knowledge and skills that are missing that would enable employees to start performing their duties and be transferred to another workplace;
- training employees only for the needs of a specific position or functional position, effectively improving training expenditures;
- understanding whether the employee who obtains knowledge and work experience in the customs service would be interested in transferring to work in the private sector (Ketners and Petersone 2020).

The aim of this research is to provide customs administrations with a methodology for generating flexible competencies that are personalised but highly effective from the perspective of the customs institution.

2. Materials and Methods

The meta-analysis of this study is based on the use of qualitative data from the existing data sources of the professional standards system implemented in Latvia, the initiatives implemented as part of the CustCompEU, and the principles of the process management system.

In the education sector, a quality-oriented service requires excellence in the design and planning of the service activities, as well as in their delivery and the accepted method of assessing the performance of the services (Lupo 2013). In order to avoid possible confusion, partial ignorance, and subjectivity, the content of both the study programme and the training programme should be prepared based on the requirements of the main stakeholder in the outcome of the study process – the employer.

In this case, the guidelines for the content of the study process will be professional standards. Professional standards determine the basic tasks and duties of professional activity corresponding to the profession, the requirements of professional qualifications, and the general and professional knowledge, skills, attitudes, and competencies required to perform these tasks and duties. Based on the professional standards of the customs processes, it is possible to create an integrated and complementary model of education and training in customs matters.

2.1. EU Customs Competency Framework

In 2011, the European Commission (EC) performed a wide-scale study on the training and education of EU customs employees. The study of the Directorate General Taxation and Customs Union regarding the training of customs employees and entrepreneurs in the EU revealed that: 75% of the member states conduct internal training for customs employees; 55% carry out training for customs officials only in classrooms – a rather formal method of training, in which less than a half of the required professional competences are acquired; 20% provide workplace training; 14% implement training remotely via the internet; and only 4% conduct training through seminars, conferences, or other training events (European Commission 2016).

In 2015, the EC published the first version of the CustCompEU. This framework aimed at harmonising and raising customs performance standards throughout the EU. The CustCompEU is the foundation which sets out a consensus on the optimal set of knowledge, skills, and behaviours required by customs professionals in the EU (European Commission 2019; n.d.-a).

The EU Certificate of Recognition ran its first pilot year in 2018, during which the process, methodology, and accompanying documentation were evaluated in terms of quality, clarity, and usability. The certification process for master's and bachelor's degree programmes in the field of customs was launched, and 11 bachelor's and master's degree programmes were recognised in the EU (EU Reference Training Programmes for Academic Customs Education 2019).

2.2. Process Management System

The synergy of the process management system in managing human resources is an innovative approach. There are workplace descriptions, position descriptions, and professional standards that supplement each other and are conceptually contracted. For example, if a change in the process occurs, it is necessary to introduce changes to workplace descriptions, which, in turn, provide a basis for changing the description of the position. In particular, how changes in processes affect professional standards is analysed. An organisation's internal documentation in the field of human resource management is used as a basis for an objective background analysis. This documentation follows the principle of compatibility, where processes and process actions are identified, and the final product(s) of the process, their performance indicators, and the required general and special knowledge and skills are identified for the implementation of each process. Consequently, the general and special knowledge and skills identified for the implementation of the process form the basis for both descriptions of positions and professional standards (Pētersone and Krastiņš 2012).

Such an approach to training will eliminate weaknesses in three key areas: 1) flexible financing options; 2) awarding credit for prior learning; and 3) enhancing strategic community partnerships. Parallels are drawn to similar challenges the EU faces in meeting the social dimension of the Bologna Process (Serowick and Cardelle 2015) and

other socio-economic problems (Barinov et al. 2020; Okunevičiūtė-Neverauskienė and Rakauskienė 2018). The Bologna Process contributes to the fact that higher education is no longer isolated from lifelong learning, since the knowledge and skills acquired beyond studies can be expressed in credits which can count towards the total amount of study needed to acquire a degree/qualification or a specific study module. The integrated education and training module will ensure flexible financing options (Erins and Erina 2015; Arhipova 2014; Arhipova et al. 2017) and the cost-efficient training of customs officers.

3. Results and Discussion

To systematize the requirements of specific customs service positions, a methodology for the identification of key knowledge and skills is proposed, which combines them with the requirements of international and supranational organisations and provides an educational system with the information necessary regarding the knowledge and skills acquired as a result of the educational process.

The general and special knowledge and skills that are necessary to perform the relevant process are identified and formulated for each process (Pētersone and Krastiņš 2014), and an identification code is assigned for each indicator of general and special knowledge and skill. Thereafter, each indicator of general and special knowledge and skills is given a value depending on its importance in the appropriate professional standard. This value ranges from 1 to 30, where 1 is the least significant and 30 the most significant indicator of general and special knowledge and skills in the professional standard. Indicators of general and special knowledge and skills can only be identified and formulated by those involved in the process concerned, together with organizers of training as experts of the methodology. The EU competence framework (CustCompEU) and the World Customs Organization's (2019) *Professional standards* can be used as guidelines for the formulation of general and special knowledge and skills. Table 1 provides the procedure for identifying the value of each indicator of general knowledge.

Table 1. *General Knowledge Assessment*

Process	General knowledge code	General knowledge indicator	Value		
			1–10	11–20	21–30
P.004.004	P.004.004.vz001				
	P.004.004.vz002				
	P.004.004.vz003				
P.004.005	P.004.005.vz001				
	P.004.005.vz001				
P.nnn.nnn	P.nnn.nnn.vz001				
	P.nnn.nnn.vz002				
	P.nnn.nnn.vznnn				

Source: *Table made by the authors*

The same methodology is used to identify and formulate indicators for specific knowledge and skills as well as general skills, and a value is assigned to each unit. Accordingly, the model consists of a four-row matrix obtained according to the professional standard, position description, and both the workplace and professional qualifications of the employee. First, according to the requirements of a particular profession and the standard of competence, a standard professional matrix is obtained (see formula 1).

$$A = \begin{bmatrix} a_{11} & a_{12} & a_{13} & \dots a_{1i} \dots a_{1n} \\ a_{21} & a_{22} & a_{23} & \dots a_{2i} \dots a_{2n} \\ a_{31} & a_{32} & a_{33} & \dots a_{3i} \dots a_{2n} \\ a_{41} & a_{42} & a_{43} & \dots a_{4i} \dots a_{2n} \end{bmatrix}$$

(1),

where   A = professional standards;

$a_{11}\ a_{12}\ a_{13}\ \dots a_{1i}\ \dots a_{1n}$ – general knowledge in the professional standard;
$a_{21}\ a_{22}\ a_{23}\ \dots a_{2i}\ \dots a_{2n}$ – general skills in the professional standard;
$a_{31}\ a_{32}\ a_{33}\ \dots a_{3i}\ \dots a_{3n}$ – specific knowledge in the professional standard;
$a_{41}\ a_{42}\ a_{43}\ \dots a_{4i}\ \dots a_{4n}$ – specific skills in the professional standard.

When formulating the description of a particular position in the customs service, the respective indicators should be taken into account: general knowledge, general skills, specific knowledge, and specific skills (see formula 2).

$$B = \begin{bmatrix} b_{11} & b_{12} & b_{13} & \dots b_{1i} \dots b_{1n} \\ b_{21} & b_{22} & b_{23} & \dots b_{2i} \dots b_{2n} \\ b_{31} & b_{32} & b_{33} & \dots b_{3i} \dots b_{3n} \\ b_{41} & b_{42} & b_{43} & \dots b_{4i} \dots b_{4n} \end{bmatrix}$$

(2),

where   B = description of the specific position;

$b_{11}\ b_{12}\ b_{13}\ \dots b_{1i}\ \dots b_{1n}$ – general knowledge in the position description;
$b_{21}\ b_{22}\ b_{23}\ \dots b_{2i}\ \dots b_{2n}$ – general skills in the position description;
$b_{31}\ b_{32}\ b_{33}\ \dots b_{3i}\ \dots b_{3n}$ – specific knowledge in the position description;
$b_{41}\ b_{42}\ b_{43}\ \dots b_{4i}\ \dots b_{4n}$ – specific skills in the position description.

In this way, the position description matrix is assessed (see formula 2). Since, in most cases, the descriptions of the positions of customs officials do not reflect a whole series of processes and process activities, the value of these indicators will be 0. This means that the value of several indicators of the position descriptions will, in most cases, be lower than the value of the same indicators of the professional standard. Still, there remains a theoretical possibility that they will be identical to the values of the position description when one customs official works alone at one customs control point while performing all of the duties there (see formula 4).

When formulating the description of the specific workplace of the customs service, the relevant indicators should be taken into account – such as general knowledge, general skills, and the specific knowledge and skills needed to fulfil work duties at the corresponding workplace. Following a similar methodology, the workplace is identified (see formula 3).

$$C = \begin{bmatrix} c_{11} & c_{12} & c_{13} & \cdots c_{1i} \cdots c_{1n} \\ c_{21} & c_{22} & c_{23} & \cdots c_{2i} \cdots c_{2n} \\ c_{31} & c_{32} & c_{33} & \cdots c_{3i} \cdots c_{3n} \\ c_{41} & c_{42} & c_{43} & \cdots c_{4i} \cdots c_{4n} \end{bmatrix}$$

(3),

where C = description of the workplace;

$c_{11}\, c_{12}\, c_{13}\, \ldots c_{1i}\, \ldots c_{1n}$ – general knowledge in the workplace description;

$c_{21}\, c_{22}\, c_{23}\, \ldots c_{2i}\, \ldots c_{2n}$ – general skills in the workplace description;

$c_{31}\, c_{32}\, c_{33}\, \ldots c_{3i}\, \ldots c_{3n}$ – specific knowledge in the workplace description;

$c_{41}\, c_{42}\, c_{43}\, \ldots c_{4i}\, \ldots c_{4n}$ – specific skills in the workplace description.

In this way, the workplace description matrix is calculated (see formula 3). The description of the workplace reflects processes and activities from the process management system according to the functionality of a specific workplace and the institutional affiliation of a series of processes and process activities from the process management system. Depending on the size of the Customs Control Point (CCP), several workplaces where one or more persons can work at the same time are provided. Therefore, the value of multiple indicators may also be 0. This means that the workplace will always be less than the position description (see formula 4).

$$A \geq B \geq C, \qquad (4)$$

Following a similar methodology, it is possible to determine professional qualifications of each customs officer to ascertain whether they comply with the professional standard (see formula 5).

$$D = \begin{bmatrix} d_{11} & d_{12} & d_{13} & \cdots d_{1i} \cdots d_{1n} \\ d_{21} & d_{22} & d_{23} & \cdots d_{2i} \cdots d_{2n} \\ d_{31} & d_{32} & d_{33} & \cdots d_{3i} \cdots d_{3n} \\ d_{41} & d_{42} & d_{43} & \cdots d_{4i} \cdots d_{4n} \end{bmatrix}$$

(5),

where D = professional qualification of the employee;

$d_{11}\, d_{12}\, d_{13}\, \ldots d_{1i}\, \ldots d_{1n}$ – general knowledge of the employee;

$d_{21}\, d_{22}\, d_{23}\, \ldots d_{2i}\, \ldots d_{2n}$ – general skills of the employee;

$d_{31}\, d_{32}\, d_{33}\, \ldots d_{3i}\, \ldots d_{3n}$ – specific knowledge of the employee;

$d_{41}\, d_{42}\, d_{43}\, \ldots d_{4i}\, \ldots d_{4n}$ – specific skills of the employee.

By analysing the existence of the general and specific knowledge and skills of each individual customs official, it is possible to compare their individual indicators both with the professional standard indicators and with the position description indicators (see formula 6).

$$A \geq B \geq D, \qquad (6)$$

If D is less than A, this indicates that the customs officer does not have the corresponding professional qualification. On the other hand, if D is less than B, this indicates that the customs officer needs to improve some of their general knowledge and skills or their specific knowledge and skills.

According to this methodology, when analysing the professional qualifications of employees, it can be concluded that it is rational for customs authorities to employ workers

with the required general and specific knowledge and qualification-based skills. By comparing each indicator, it is possible to identify and complement gaps in knowledge and skills.

Such a comparison and analysis of the knowledge and skills of employees is consistent with the performance assessment system of the civil service, and forms the basis for algorithms in the management of the progress of services.

4. Conclusions

Standards for the profession of customs officer are universal operational tools which help both universities and training centres, regardless of their institutional affiliation, to provide customs authorities with the required staff without their direct involvement. Professional standards, in a similar way to position descriptions and workplace descriptions, are derived from the objectives and tasks of the employer. The standard of the customs profession is the most important element in the development of the integrated learning model, which would be a central element for a coordinated and harmonised vocational education and training system.

In the field of training, the EU Customs Competencies Framework offers the integration of four elements: customs; the private sector; the national level; and the international level, where training remains the individual responsibility of the Member States and is managed in accordance with national requirements. However, the following issue of the customs operation remains: there are 27 national customs authorities, all of which are separately regulated in the content of their training programmes and in the various elements of their training structures, such as the requirements of professional standards and competence.

Future studies should concern the impact of training activities based on the knowledge and skills identification methodology of the process management system on the performance indicators of customs authorities.

References

1. ARHIPOVA, I. Analysis of the efficiency of Latvia research institutions public spending. *Procedia – Social and Behavioral Sciences.* 2014, **109**, 24–28. Available from: https://doi.org/10.1016/j.sbspro.2013.12.415
2. ARHIPOVA, I., L. PAURA, J. EIDUKS and G. VITOLS. Comparative analysis of higher education study programs' quality, efficiency and effectiveness. *Proceedings of the HEAD'17 – 3rd International Conference on Higher Education Advances.* Universitat Politecnica de Valencia, Valencia, 2017, pp. 55–63. Available from: https://doi.org/10.4995/HEAd17.2017.4857
3. BARINOV, V., M. KULAPOV, O.G. RAKAUSKIENĖ, P. KARASEV and N. URAEV. Challenges of Russian economy digitalization in the context of socio-economic development. *Montenegrin Journal of Economics.* 2020, **16**(3), 17–30. Available from: https://doi.org/10.14254/1800-5845/2020.16-3.2

4. EUROPEAN COMMISSION. *CustCompEU. EU Customs Competency Framework* [online]. N.d.-a [viewed 25 December 2020]. Available from: https://ec.europa.eu/taxation_customs/eu-training/eu-customs-competency-framework_en

5. EUROPEAN COMMISSION. *The Customs 2020 Programme* [online]. N.d.-b [viewed 25 November 2020]. Available from: https://ec.europa.eu/taxation_customs/business/customs-cooperation-programmes/customs-2020-programme_en

6. EUROPEAN COMMISSION. *BTRAIN2 – Feasibility study on a potential EU academic programme for the customs profession. Final Report 05.12.2011.* Luxembourg: Publications Office of the EU, 2016. ISBN 978-92-79-59236-2. Available from: https://doi.org/10.2778/694111

7. EUROPEAN COMMISSION. *The CustCompEu: Modernising customs through competency-based human resource management.* Luxembourg: Publications Office of the EU, 2019. ISBN 978-92-76-08742-7. Available from: https://doi.org/10.2778/770112

8. ERINS, I., and J. ERINA. The higher education financing system: the case of Latvia. *Procedia – Social and Behavioral Sciences.* 2015, 177, 183–185. Available from: https://doi.org/10.1016/j.sbspro.2015.02.377

9. *EU Reference Training Programmes for Academic Customs Education. Master's and Bachelor's programmes.* 2019 sectional revision [viewed 2 December 2020]. Available from: https://ec.europa.eu/taxation_customs/sites/taxation/files/eu_rtp_for_academic_customs_education_2019_sectional_revision.pdf

10. JABLONSKIS, A., M. PETERSONE and K. KETNER. Insights into the definition of customs logistics. *Intellectual Economics*. 2018, **12**(1), 16–33. Available from: https://doi.org/10.13165/IE-18-12-1-02

11. KETNERS, K. and M. PETERSONE. (2020). Customs skills and knowledge – just for customs officer? *CC&RM Journal for Practitioners in Europe.* 2020, Issue 5 (October / November 2020) [viewed 25 November 2020]. Available from: https://www.customsclearance.net/en/articles/customs-skills-and-knowledge-just-for-customs-officer

12. LAURINAVIČIUS, A. Administrative discretion assumptions in developing customs logistics. *Intellectual Economics*. 2018, 12(1), 34–46. Available from: https://doi.org/10.13165/IE-18-12-1-03

13. LUPO, T. A fuzzy ServQual based method for reliable measurements of education quality in Italian higher education area. *Expert Systems with Applications*. 2013, **40**(17), 7096–7110. Available from: https://doi.org/10.1016/j.eswa.2013.06.045

14. OKUNEVIČIŪTĖ-NEVERAUSKIENĖ, L. and O.G. RAKAUSKIENĖ. Identification of employment increasing possibilities in the context of the EU socioeconomic environment evaluation: The case of Lithuania. *Economics and Sociology*. 2018, **11**(4), 51–68. Available from: https://doi.org/10.14254/2071-789X.2018/11-4/3

15. PĒTERSONE, M., K. KETNERS and A. KRASTIŅŠ. (2013). On some aspects of process management and human resource management interaction at the customs authorities. In: *Recent Advances in Education & Modern Educational Technologies:*

Educational Technologie Series 9: International Conference on Education and Modern Educational Technologies (EMET'13), *Italy, Venice, 28–30 September 2013.* Italy: Venice, 2013, pp. 82–90. ISBN 978-1-61804-210-1. ISSN 2227-4618.

16. PĒTERSONE M. and A. KRASTIŅŠ. The role of professional standards in the creation of a coordinated system of professional advancement and training in the field of customs. *Scientific Journal of RTU, Series 3: Ekonomika un uzņēmējdarbība.* 2012, 22, 139–143.

17. PĒTERSONE, M. and A. KRASTIŅŠ. Human resource management development at Latvian Customs Administration. *AD ALTA: Journal of Interdisciplinary Research.* 2014, **4**(1), 58–62. ISSN 1804-7890. Available from: http://www.magnanimitas.cz/ADALTA/0401/papers/A_petersone.pdf

18. SEROWICK, J.A. and A.J.F. CARDELLE. An assessment of an adult learning model: implications for replication. *1st International Conference on Higher Education Advances, HEAd'15.* Universitat Politècnica de València, València, Spain, 2015, pp. 442–450. Available from: http://dx.doi.org/10.4995/HEAd15.2015.359

19. WORLD CUSTOMS ORGANIZATION. *Professional standards 2019* [online]. 2019 [viewed 25 January 2021]. Available from http://www.wcoomd.org/-/media/wco/public/global/pdf/topics/capacity-building/activities-and-programmes/picard/professional-standards/omd-normes-prof-uk-basse-def.pdf?la=fr

HUMAN CAPITAL–GROWTH NEXUS: THE ROLE OF SKILL MISMATCH

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Abstract. *Economics is a branch of social science that touches upon many aspects of our lives and has important effects on the well-being of all people. Within economics, human well-being is significantly contingent on the process of growth. Production takes place via a combination of human and physical capital; therefore, human capital is expected to be a main contributor to economic growth. However, many studies have failed to uncover a significant association between human capital and growth, and others have found only marginal contributions therein. Several economists have tried to explain this paradox. This study brings forth skill mismatch as another potential explanation of the weak relationship between education and growth, and shows that skill mismatch can nullify the potential advantage of increased human capital. Most countries have failed to take skill mismatch seriously; therefore, there is no systematic data on the indicators that relate to it. This paper emphasizes the need for reliable and sufficient data on the indicators of skill mismatch, so that planning for the better utilization of human capital can take place.*

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1. Introduction

An increasing amount of literature is aimed at analyzing the relationship between education and economic development. Most of the theoretical literature assumes that there should be a very strong relationship between these two variables. However, on contrary, the empirical evidence of the relationship between these two variables does not support the existence of such a strong relationship. Several explanations of this paradox have been presented in the scholarly literature.

An important explanation in this regard can be traced to the analysis of Toprak (2006), a Turkish politician and political philosopher who compared the economic development of Japan to that of Turkey over the last six decades. The two countries were allies in World War II, and were in similar positions by the end of war with respect to their economic and social conditions. Both countries realized that education was a method of development, and decided to promote education accordingly. Turkey emphasized education on literature, art, music, and so forth, whereas Japan emphasized education on mathematics, technology, and engineering. The lack of a strong relationship between growth and education (or human capital in the broader sense)[1] could be a result of the incorrect choice of field of study, which is a particular kind of skill mismatch.

Every country needs a particular combination and level of skilled graduates in different subjects/professions, and this combination of skills depends on the country's physical and institutional infrastructure. The speed of economic development in an economy can be optimized if the supply of skilled graduates in different subjects matches with the respective demand of skills. Any mismatch between the supply and demand of skills results in inefficient – or even the complete lack of – utilization of resources, and the level of growth achievable for the same level of human capital (hereinafter HC) decreases.

Let us imagine a country where there is a need to construct roads and bridges to link various parts of the country so that producers can transport their goods to market. If the country's universities are producing enough engineers to meet demand, this will have a positive impact on the economy, not only because of the addition of the services of these engineers but also due to the increase in goods that would be traded via the infrastructure that they construct. On the other hand, if the country is producing literature graduates instead of engineers, the value added to the economy would be only in terms of the services of these graduates. This will cause a reduction in the achievable level of growth with same level of HC. Further, suppose that the number of literature graduates is so large that many of them are unable to secure a job in the market. The education of these unemployed graduates is still counted in the HC, but this HC does not contribute

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1 This paper uses the terms "education" and "human capital" interchangeably

to economic growth. Many of these unemployed graduates would take jobs in positions which are not a good match for their abilities, and this would again cause a reduction in the achievable level of growth with same amount of HC.

This example shows that the balance between the supply and demand of type and level of skills is an important determinant of growth. The larger the mismatch, the smaller the achievable level of growth. Therefore, this study argues that a potential explanation of the paradox of the growth–education relationship could be the mismatch between supply and demand of skills.

Despite very strong theoretical linkage between HC and economic growth, empirical results on the relationship between these two variables appear to be insignificant either theoretically or economically (having very small coefficients). The objective of this study is to present the case that skill mismatch offers a plausible explanation for this dilemma, and could be a potential reason for the discrepancy between theory and empirical results. This paper also aims to argue that incorporating a measure of skill mismatch into the typical production function would probably better explain economic growth. However, the data on skill mismatch is not available at regular frequencies for most countries; therefore, this paper also argues that systematic data on the indicators of skill mismatch should be collected to find a better explanation for economic growth.

The contribution of this study is to show that skill mismatch can be a potential explanation for the weak relationship between education and growth, and to extend the production function to include a measure of skill mismatch. Most countries have failed to take skill mismatch seriously; therefore, there is no systematic data on the indicators related to skill mismatch that might allow for regressions. This paper also makes the case for the collection of data on the indicators of skill mismatch to potentially motivate states to do so.

This article is organized as follows: after a brief introduction, the next section presents a comprehensive review of the relevant literature. Section three discusses methodology, including what skill mismatch is, the impact of skill mismatch on growth and development, and why the production function needs further modification. Section four presents results and discussions on measuring skill mismatch and skill mismatch in Pakistan. Section five concludes the study.

2. Literature Review

2.1 HC and Growth Nexus: Glimpses from the Literature

There is a large discrepancy between the theoretical and empirical literature regarding the relationship between HC and economic growth. This discrepancy and its potential explanations are summarized in this section.

2.2 HC in Production Theory

Consider the standard Cobb–Douglas Production function:
$$Y(t) = A(t)K(t)^\alpha L(t)^\beta \tag{1}$$

Here, represents the output, with referring to time. This function takes two inputs – i.e., physical capital and labor. Labor in the abovementioned production function refers to quantity of labor. However, it could be argued that, instead of only quantity, a "product of quantity and quality" of labor can give a better explanation of growth. Therefore, replacing labor with HC should give a better explanation of output. The production function will thus take the following form:

$$Y(t) = A(t)K(t)^{\alpha}H(t)^{\beta} \qquad\qquad (2)$$

Thus, the presence of HC in the production function makes good sense, and one would expect a significant contribution of HC towards aggregate production and growth. Thus, HC has been a part of aggregate production functions and growth regressions. Many versions of the production function that contain HC as a part of them have been proposed so far.

Contrary to the theoretical literature, growth regression estimates do not support such a strong relationship between production (GDP) and HC. There are a large number of studies that have found negative or non-existent relationships between growth and HC. Instead of citing all of these studies here, we report how other authors have summarized the literature on the relationship between HC and growth. Recent empirical investigations into the contribution of HC accumulation to economic growth have often produced discouraging results. Educational variables frequently turn out to be insignificant or to have the "wrong" sign in growth regressions, particularly when these are estimated using first-difference or panel specifications. The accumulation of such negative results in recent literature has fueled growing skepticism of the role of schooling in the growth process, and has even led some researchers to seriously consider possible reasons as to why the contribution of educational investment to the growth of productivity may actually be negative (Fuente and Doménech 2000).

Pritchett (2001) reported that cross-national data shows no association between the increases in HC attributable to the rising educational attainment of the labor force and the rate of growth of output per worker. There has been much dispute as to whether economies that are open or those with more HC grow faster (Soderbom and Teal 2001).

The literature on the determinants of economic development treats research on the relationship between HC and economic growth as one of the "big unknowns" (Leeuwen 2007), whilst investment and the welfare of the population are known to be drivers of economic growth (Mykytiuk et al. 2020). Despite the conventional view that HC is one of the main determinants of growth, the evidence for the effect of HC on growth is weak and controversial (Sunde and Vischer 2011). Despite enormous interest in the relationship between education and growth, the evidence is fragile at best (Aghion et al. 2009).

There is almost universal acceptance of microeconomic findings that suggest there are strong economic returns from education at the level of individuals. It is perhaps surprising, then, that the macro-evidence delivers such divergent results. While early cross-national studies showed a positive, statistically significant, and often strong impact to be exerted by school enrollment rates on economic growth, a second wave of studies, often focusing on stocks of HC rather than flows, reported empirical results that suggested that the impact of HC on growth was zero at best – potentially even negative (Fedderke 2005).

The abovementioned commentaries of various authors show that results on the relationship between these two variables are not very optimistic. However, there is no shortage of studies finding positive and significant coefficients of HC in growth regressions. Barro (1991), Benhabib and Spiegel (1994), Sala-i-Martin and Barro (1995), Sala-i-Martin (1997), and many others find schooling and/or some other proxy of HC to be significantly and positively correlated with reductions in the growth rate of per capita GDP across countries. However, in these regressions, the marginal contribution of HC appears to be very small compared to what one would expect. For example, consider Barro's famous study (1991), where he presents positive and significant coefficients of HC in growth regressions. In the logarithmic form of the production function, the coefficients represent elasticity. Thus, the elasticity of growth that Barro found with respect to education was 0.0044, whereas the elasticity of growth with respect to physical capital was 0.10. This implies that a 1% increase in physical capital could lead to a 0.1% change in growth. On the other hand, a 1% change in HC would bring only a 0.0044% change in growth. Thus, despite being statistically significant, the coefficient of HC was not promising. Therefore, even after accounting for HC accumulation, a growing body of research suggests that something other than capital, labor, or HC accounts for the bulk of the observed differences between countries in the level and growth rate of real gross domestic product (Limam and Miller 2004).

On the other hand, many authors have doubts as to the significance of HC coefficients in growth regressions, and they assume that this is because of methodological mistakes. For example, some claim that this effect is overstated due to methodological problems such as correlation with omitted variables and the imposition of restrictions that are rejected by the data (Sianesi and Reenen 2003). Therefore, this quick review reveals that the skepticism regarding the relationship between HC and growth is widely acknowledged and is based on empirical evidence that is not easily ignored.

2.3 Explaining the HC–Growth Paradox

Because of the disagreement between the theoretical and empirical literature, many researchers have started to explore the factors behind such a pessimistic relationship between economic growth and HC. Therefore, various scholars have offered various explanations, some of the most notable of which are discussed below.

Some researchers have questioned the proxies of HC being used in the regression. A large list of proxies is used that includes educational attainment, investment (Aghion et al. 2009), level of education, and quality of education (Barro 2001), and many authors have expressed concerns regarding the use of these kinds of proxies. Despite this, surprisingly, changing these proxies might not change the nature of the results.

Some authors have reservations regarding the specifications of models being used. For example, Sunde and Vischer (2015) asked for the use of both difference and lag of HC simultaneously in growth-accounting regressions.

Pissarides and Véganzonès-Varoudakis (2011) argued that it is very important to take into account the structure of the labor market, which may possibly explain the

dilemma reported in the growth–HC relationship. Aghion et al. (2009) also point out the importance of the structure of the labor market. Some authors (e.g., Fuente and Doménech 2000) suggest that it is the quality of data that has caused this paradox.

Arcand and d'Hombres (2007) considered the following reasons to explain the paradox:

i.   additional sources of unobserved heterogeneity stemming from country-specific rates of labor-augmenting technological change;
ii. measurement error in the HC series being used;
iii. lack of variability in the HC series once the usual covariance transformations are implemented.

Wider research suggested the lack of variability in the HC series to be reasonable in the context of the Solow model.

Pritchett (2001) suggests that the following three reasons could explain the paradox:

i.   the institutional/governance environment could have been sufficiently perverse that the accumulation of educational capital *lowered* economic growth;
ii. marginal returns to education fell rapidly as the supply expanded while demand for educated labor was stagnant;
iii. educational quality could have been so low that "years of schooling" created no HC.

However, there is no consensus that has yet emerged as to the most probable reason for this paradox.

2.4 Alternative Explanations of the HC–Growth Paradox

It is evident that a number of authors – e.g., Pissarides and Véganzonès-Varoudakis (2011) and Aghion et al. (2009) – point out the importance of the structure of the labor market while studying the relationship between HC and growth. As we shall demonstrate in this paper, one very important characteristic of the structure of the Labor market is the skill mismatch.

If we think back to the example of Toprak cited in the introduction, Japan and Turkey shared many socioeconomic characteristics at the end of WWII. The two countries tried to remedy their situations with education, with one focusing on science and technology and the other focusing on literature and the arts. After five decades, the two had substantial differences in their socioeconomic status. This implies that merely the presence of education/HC alone does not determine the speed of development. Perhaps the more important factor, which shapes the fate of nations, is the type of education obtained by graduates.

For Toprak (2006), the reason behind the differential development in Turkey and Japan is a particular kind of skill mismatch. A skill mismatch can have various forms, each having a different mechanism affecting the speed of development. A mismatch can occur when the skills that people possess do not match the skills that the market demands. Another kind of mismatch can occur when the supply of a particular kind of skill in a market exceeds the demand for that kind of skill. A skill mismatch can also occur when the level of skills possessed by a worker is not equal to the level of skills that the market demands. Every type of skill has a particular set of implications for the growth of the economy.

The mismatch of skills can have a large number of undesirable consequences, both for individuals and for society as a whole. For individuals, the mismatch of skills can result in lower job satisfaction, unemployment, and problems associated with unemployment including distress, hypertension, poverty, and crime. For society, skill mismatch can result in inefficient – or the complete lack of – utilization of resources, and in unemployment and the macroeconomic consequences thereof.

3. What is Skill Mismatch and What is the Impact of Skill Mismatch on Growth and Development?

The word "skill" has different meaning for different individuals. Within a profession, the word skill is used to denote the ability to perform a particular task. For example, for linguists, skill means the ability to listen, read, write, or understand; for engineers, it might mean the ability to fix problems in a machine. The problem with this kind of definition is that it is not very easy to judge these kinds of skills. Instead, a more general definition of skill is adapted by Infometrics and Department of Labour (2006), who use the word "skill" to denote "basic eligibility to work for a certain position in a profession." This definition of skill allows a single individual to compare the supply and demand of skills for different professions. Therefore, the phrase "skill mismatch" can also have different meanings. A skill mismatch can occur if the skills an employer demands are different from the skills a candidate has, if the number of available skilled graduates is more (or less) than the number of skilled persons demanded in the market, or if the level of skills required by an employer differs from the level of skills an employee possesses. Various kinds of skill mismatch are precisely defined in CEDEFOP (2012), which is reproduced in the manner below.

Table 1. *Categories of skill mismatch*

Type	Definition
Over-education	To have completed more years of education than the current job requires.
Under-education	To have completed fewer years of education than the current job requires.
Over-qualification	To hold a higher qualification than the current job requires.
Under-qualification	To hold a lower qualification than the current job requires.
Over-skilling	To be unable to fully use one's skills and abilities in the current job.
Under-skilling	To lack the skills and abilities necessary to perform the current job to acceptable standards.
Skill-shortage	Demand for a particular type of skill exceeds the supply of available people with that skill.
Skill-surplus	The supply of people with a particular skill exceeds the demand for it.
Skill-gap	The level of the employed person's skills is less than that required to perform the job adequately or the type of skill does not match the requirements of the job.

Type	Definition
Economic-skills obsolescence	Skills previously used in a job are no longer required or are less important.
Vertical-mismatch	The level of education or skills is less or more than the required level of education or skills.
Horizontal-mismatch	The level of education or skills matches the job requirements, but the type of education or skills is inappropriate for the current job.

Source: *CEDEFOP briefing note on skill mismatch in Europe, available online at www.cedefop.europa.eu/ files/5521_en.pdf*

Each type of skill mismatch has a particular but not disjointed set of implications for individuals and for growth, and each type of skill mismatch affects growth and development through a particular mechanism. This section discusses some selected types of skill mismatch and how they affect the economy. Instead of following the order given in the CEDEFOP report, we discuss these types according to their importance. Therefore, this discussion proceeds in the following order: (a) skill surplus; (b) skill shortage; (c) horizontal mismatch; (d) skill obsolesce; and (e) over education.

3.2 Skill Surplus

Skill surplus is defined as a situation when supply of people with respect to a particular skill exceeds demand. For example, a skill surplus would exist if 1,000 engineers per year were required in an economy, but universities were producing 4,000 engineers per year.

Consider, for example, a field of study where the number of graduates with skills in this field exceeds the market demand by a large number. This could have three results for a graduate:

a. The graduate does not find a job. In this case, the investment in their education would not be productive until they find a job, and the graduate would not be able to contribute to the growth of the economy. This is the worst-case scenario for both the graduate and the economy. Educating someone is an extremely costly investment, and a lot of time and physical resources are involved in producing a graduate. The cost of production of a graduate is in the millions, whether paid by individuals or by governments. With a huge surplus of graduates in one field, society's investment in them is non-productive, and the resources invested in the graduate by society will go astray or will remain idle until the person finds employment. On the other hand, the absence of reasonable employment and social security will create stress, hypertension, and can potentially lead to crime – which can affect development in other ways.

b. The graduate succeeds in finding a job in some other subject/profession with little relevance to their qualification. This would lead to lower productivity because the graduate would not have the skills required for the particular job. They would

be unable to exploit their actual skills because they would be working in an ir-relevant field. The field in which the graduate could achieve maximum produc-tivity would no longer be available, therefore they could not exhibit reasonable productivity. The implications of this will be elaborated on in the discussion of horizontal mismatch.

c. The graduate finds a job for which the actual required qualification is lower than the qualification of the graduate. This case will be elaborated on in the discussion of over-education.

3.3 Skill Shortage

This is defined as a situation where "demand for a particular type of skill exceeds the supply of available people with that skill." It is possible that there is a huge demand for graduates of a particular subject/profession, but the number of graduates available is smaller than the demand. For example, suppose there is a demand for 10 engineers in the market, but there are only four candidates. The consequences of this shortage can be summarized as follows:

a. Some of the vacancies for engineers would remain vacant, and the economic ac-tivity that the filling of these vacancies would enable would not happen.

b. Employers would be unable to initiate the projects that they want. The unskilled labor and the skills that were necessary from other professions would not be hired. This would again lead to inefficiency and lower productivity.

c. The shortage in strategic skills may lead to a sovereignty crisis.

Thus, the shortage of skills would put downward pressure on the overall level of employment in the economy. Crucially, the shortage of skills in necessary services like medicine would put the life of citizens at risks, and the shortage of skills in defense and security would create a threat for the sovereignty of the economy.

3.4 Over-education

Over-education is defined as the difference between the skills required for an em-ployee's current job and the skills possessed by the employee who has actually completed more years of education than are necessary. This means that an employee has a higher level of qualification than is needed for their current job.

In an ideal situation, the average productivity of a worker increases with their level of qualification – hence the positive relationship between salary and qualification. However, suppose that an employee with a master's degree is employed in a role that demands only a bachelor's degree. The salary that this employee would receive would be lower than the salary admissible to them if they were working on a job that demanded a master's degree. Since salaries are directly counted in GDP, a smaller salary will result in a reduction in the achievable level of GDP. If there were thousands of employees in such a situation, then the overall reduction in GDP would become a sizeable number.

Secondly, if a highly qualified employee occupies a low-level job, they will not have the opportunity to exploit their high-level skills, which would cause another reduction in the achievable level of GDP. Highly-qualified people have high levels of problem-solving ability, but they will not have the opportunity to exploit their ability if they are working in a job that does not require that level of ability. If we consider a software engineer hired in a data entry operator job, whilst the engineer could undoubtedly add more value to the economy than a data entry operator, this would only be possible if the software engineer were to be hired for programming. If they were hired as data entry operator, it is quite possible that their keystroke rate would be smaller than that of an ordinary data entry operator. Therefore, hiring a highly qualified graduate in a job that demands a lower level of skill is problematic for the individual, as they will not be satisfied with their job, and for society, as the resources available in the society are not being optimally utilized. Therefore, over-education can also result in productivity loss and a reduction in the level of growth.

3.5 Horizontal Skill Mismatch

Horizontal skill mismatch is defined in the CEDEFOP report as a situation where "the level of education or skills matches job requirements, but type of education or skill is inappropriate for the current job." Horizontal skill mismatch occurs when the level of skills required by the economy is the same as the level of skills that the candidate possesses, but the subjects/professions that are required by the economy don't match the profession of the potential candidate. Again, the example of Japan and Turkey is an elegant illustration of this kind of mismatch. It is quite obvious that if engineers are needed by the economy, doctors and poets cannot substitute. Therefore, it is extremely important to have the horizontal match of skills.

We can again consider a country where there is a need for roads and bridges to link various regions so that producers can transport their goods to market. If the country's universities were producing enough engineers to meet demand, this would have a positive impact on the economy – not only because of the addition of the services of those engineers, but also due to the goods that would be traded due to their efforts. On the other hand, if the country was producing graduates in literature instead of engineers, the value added to the economy would only be in the form of the services of those graduates. There would be no new bridges or roads; therefore, the effect of this HC would not transmit to other sectors of economy. This would cause a reduction in the achievable level of growth, and many graduates would fail to find jobs because they would not have the ability to serve the purposes of employers. This would result in unemployment and its associated problems.

3.6 The Need for Further Modification of Production Functions

The production function that was reshaped into a growth model by Solow (1956) changed shape continuously, until it became the augmented growth model proposed by Mankiw et al. (1992) in the following functional form:

$$Y(t) = K(t)^\alpha H(t)^\beta (A(t)L(t))^{1-\alpha-\beta} \qquad (3)$$

Where represents output, represents capital stock, represents HC stock, represents technology, and represents labor stock.

Let be the indicator of skill mismatch which takes the value zero when there is no mismatch, and takes a positive value when there is a mismatch. is taken such that:

$$S(t) = \begin{cases} 0 & \textit{no skill mismatch} \\ <0 & \textit{skill demand is higher than the skill supply} \\ >0 & \textit{skill demand is lower than the skill supply} \end{cases} \qquad (4)$$

We have shown that productivity/speed of growth is reduced in both cases – i.e., in case of surplus or in case of shortage. Therefore, HC must be discounted for the skill mismatch. Let us define functional HC as HC discounted for the amount of skill mismatch. Functional HC should have the following properties:

a. the amount of functional HC cannot exceed the amount of HC – i.e.,
b. functional HC becomes smaller with an increase in the amount of skill mismatch, and becomes zero when skill mismatch is infinite – i.e.,
c. functional HC is equal to HC when there is no skill mismatch – i.e.,

Therefore, the function suggested for measuring functional HC is as follows:

$$Hf(t) = \frac{1}{1+|S(t)|} H(t), \qquad (5)$$

where $\frac{1}{1+|S(t)|}$ may be treated as a discounting factor.

Therefore, the growth function will take following form:

$$Y(t) = K(t)^\alpha Hf(t)^\beta (A(t)L(t))^{1-\alpha-\beta} \qquad (2)$$

Replacing $Hf(t)$ with its value will yield following formula:

$$Y(t) = K(t)^\alpha \left(\frac{1}{1+|S(t)|} H(t) \right)^\beta \left(A(t)L(t) \right)^{1-\alpha-\beta} \qquad (7)$$

4. Measuring Skill Mismatch, and Skill Mismatch in Pakistan

Skill imbalances have emerged as an important concern of policy makers in advanced nations such as Canada, Australia, New Zealand, and the United Kingdom. However, in most of the countries of the world, little attention has been paid to this issue. Most nations around the globe have not yet recognized the need to measure skill mismatch, and skill-related data is not generally available. This data is used for designing immigration policy and for advisory career counseling. However, most of the available data on skill mismatch is presented in the form of survey reports collected at irregular intervals. Therefore, at present it is not possible to carry out a reasonable empirical study to quantify the impact of skill mismatch on economic development and growth.

The "indicators of skill mismatch comprise vacancy hiring and turnover rates, relative wage movements and employment and unemployment changes, etc." However, there is a serious need for a wide range of skill mismatch indicators collected from every

country in the world, so that each nation can optimize its growth by assuring greater harmony between supply and demand for skills.

Janjua and Rehman (2016) have collected some indicators of skill mismatch in Pakistan using a representative sample of various employment units. Some facts from this report are presented here to elaborate on how important the problem of skill mismatch is.

Table 2. *Estimates of vacancy fill rate*

Subjects	Private	Public	Overall	Subjects	Private	Public	Overall
Area Studies	53.9		53.9	Statistics	9.8	14.5	12.3
Business	48.6	35.4	44.9	Computer Sciences	9.7	41.2	33.9
Journalism	36.6	40.8	38.1	Life Sciences	9.6	30.3	24.1
Chemistry	22.6	20.7	21.3	Anthropology	9	59	9.8
Gender Studies	22.3		22.3	Political Science	8	58.9	52.3
Philosophy	16.5		16.5	Sociology	7.4	100	8.9
Physics	16.2	95.1	68.3	Health Science	7	15	12.2
Performing Arts	14.5		14.5	Agriculture	6.5	19.3	17.2
History	13.5	234.4	126.9	Systems Science	6		6
Engineering	13.5	76.5	58.1	Education	4.8	295	183.4
Mathematics	13	43	29.9	Linguistics	3.5	67	13.9
Literature	11.5	3.7	10				

Source: *Janjua and Rehman (2016)*

Table 2 presents vacancy fill rates (hereinafter – VFRs) separately for the public and private sectors. Public sector jobs in Pakistan offer more facilities, job security, and prestige than their private sector equivalents. Therefore, securing a job in the public sector is more competitive. As a result, the VFR for the public and private sectors reflect competition for an ordinary job and for a prestigious one.

It is evident from Table 2 that in the subject of area studies, a candidate would have to compete with 53 other candidates to secure their job, if they were willing to work in a private sector organization. Business administration is an area in which the private sector carries higher prestige, therefore this subject does not follow the common trend and competition is higher in private sector organizations than in public. Here, a candidate would have to compete with 49 other people to secure a private job, and 35 people to secure a job in the public sector. This also implies that the chance of employability per attempt is less than 1/35 for a candidate, whether they apply to a public or a private sector organization. This means that a candidate would have to wait for a long time before they got a job, as a result of which both the candidate and the economy as a whole would suffer. The candidate would suffer because they would have to face the problem of unem-

ployment, and the economy would suffer because the resources invested in the education of the candidate would remain idle until they began their job. This also implies that the proportion of candidates who remain unemployed after having attained the qualifications necessary for a job is very high, and unless they get a job they will contribute nothing to the economy.

The differences between VFRs in public and private sector organizations also suggest important information. Education, for example, has one of lowest VFRs in private sector organizations, and one of highest VFRs in public organizations. The low VFR in private sector organizations reflects the fact that it is not very difficult for a candidate to secure a job in an ordinary private school, and perhaps reflects the fact that private schools are the largest private sector employers in Rawalpindi and Islamabad, where the survey was carried out. However, as mentioned earlier, in the private sector there is no job security, and other facilities associated with the public sector are absent. In order to attain a prestigious job in a public sector organization, a candidate would have to compete with approximately 295 other candidates.

Table 3. *The lag between attaining a qualification and getting a job*

Major Areas	Time Lag (years)
Formal Sciences	1.17
Humanities	0.70
Management Sciences	1.72
Natural Sciences	1.23
Professions & Applied Sciences	1.51
Social Sciences	1.86

Source: *Janjua and Rehman (2016)*

Table 3 summarizes the results of time lag – the lag between completing education and securing a first job for employees in Rawalpindi and Islamabad. For most subjects, a candidate would have to wait for over 1.25 years before attaining their first job, and this lag period is one of no or very little economic activity. The contribution of the respondent to GDP and productivity would have been close to zero during this period, though they were highly educated and were highly qualified for the job that they were currently engaged in at the time of the survey. The average levels of income and economic activity in Rawalpindi and Islamabad are among the highest in the country. If the same survey was carried out in a low-income city of Pakistan, one would expect a longer lag period. One can suggest that the relationship between GDP and HC would be weaker if the lag between securing qualification for a job and beginning employment was longer. This might explain why regressions do not reveal a strong relationship between HC and growth.

5. Conclusion

This study has shown that skill mismatch can offer a plausible explanation of the HC–growth paradox. Skill mismatch reduces the achievable level of growth through various mechanisms, and growth is expected to have a strong and inverse relationship with skill mismatch.

This study, however, also notes that most countries have no record of the indicators of skill mismatch. Only very few countries have so far collected data on the various indicators of skill mismatch, but this data is not yet available at a frequency regular enough to enable the impact of skill mismatch on the economy to be quantified and generalized for other countries.

This study argues that skill mismatch can nullify the effects of an increase in HC – increased HC cannot increase growth if there is a proportional increase in skill mismatch. Therefore, this paper argues that there is a dire need to focus on the indicators of skill mismatch so that the effect of HC on growth can be materialized. Future research might focus on skill mismatch, intangible assets, and their appropriate recognition (Petryk et al. 2020), which can also contribute towards the growth of GDP.

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References

1. AGHION, P., BOUSTAN, L., HOXBY, C., and VANDENBUSSCHE, J. 2009. The causal impact of education on economic growth: evidence from US. *Brooking Papers on Economic Activity*.
2. ARCAND, J.L., and D'HOMBRES, B. 2007. Explaining the negative coefficient associated with HC in augmented solow growth regressions. *JRC/CRELL Scientific and Technical Reports*, 22733. https://core.ac.uk/download/pdf/38619374.pdf
3. BARRO, R.J. 1991. Economic growth in a cross section of countries. *The Quarterly Journal of Economics*, **106**(2), 407–443. https://doi.org/10.2307/2937943
4. BARRO, R.J. 2001. HC and growth. *The American Economic Review*, **91**(2), 12–17. https://doi.org/10.1257/aer.91.2.12
5. BENHABIB, J., and SPIEGEL, M.M. 1994. The role of HC in economic development evidence from aggregate cross-country data. *Journal of Monetary Economics*, **34**(2), 143–173. https://doi.org/10.1016/0304-3932(94)90047-7
6. CEDEFOP. 2012. *Skill mismatch: The role of the enterprise*. Luxembourg: Publications Office of the European Union.
7. FEDDERKE, J.W. 2005. Technology, HC and growth. *Working Papers 27, Economic Research Southern Africa*. https://ideas.repec.org/p/rza/wpaper/27.html

8. FUENTE, A., and DOMÉNECH, R. 2002. HC in growth regressions: how much difference does data quality make? An update and further results. *Journal of the European Economic Association*, **4**(1), 1–36. https://doi.org/10.1162/jeea.2006.4.1.1

9. INFOMETRICS, Ltd, and DEPARTMENT OF LABOUR. 2006. Indicators of skill shortage [online]. https://www.voced.edu.au/content/ngv:54299.

10. JANJUA, P.Z. and REHMAN, A. 2016. *Estimated labor market skill mismatch. Selected professions' unpublished survey report.* International Islamic University, Islamabad. https://www.iiu.edu.pk/?page_id=2494

11. LEEUWEN, B. 2007. *HC and economic growth in India, Indonesia, and Japan: a quantitative analysis, 1890–2000* [Doctoral dissertation]. http://cgeh.nl/human-capital-and-economic-growth-india-indonesia-and-japan-quantitative-analysis-1890-2000

12. LIMAM, Y.R., and MILLER, S.M. 2004. Explaining economic growth: Factor accumulation, total factor productivity growth, and production efficiency improvement. *Economics Working Papers*, 200420. https://opencommons.uconn.edu/econ_wpapers/200420/

13. MANKIW, N.G., ROMER, D., and WEIL, D.N. 1992. A contribution to the empirics of economic growth. *The Quarterly Journal of Economics*, **107**(2), 407–437. https://doi.org/10.2307/2118477

14. MYKYTIUK, O., VARNALII, Z., NIKYTENKO, D., GĘDEK, S., and PASHNYUK, L. 2020. Investment determinants of economic growth: world experience and Ukraine. *Intellectual Economics*, **14**(2), 106–123. https://doi.org/10.13165/IE-20-14-2-07

15. PETRYK, O., DIADIUN, O., SEMENYSHENA, N., KHORUNZHAK, N., and KALINICHENKO, S. 2020. Integrated Reporting in the conditions of sustainable development: institutionalization through standardization. *Intellectual Economics*, **14**(2), 67–86. https://doi.org/10.13165/IE-20-14-2-05

16. PISSARIDES, C.A., and VÉGANZONÈS-VAROUDAKIS, M.A. 2006. Labor markets and economic growth in the MENA region. *Contributions to Economic Analysis*, **278**, 137–157. https://doi.org/10.1016/S0573-8555(06)78005-1

17. PRITCHETT, L. 2001. Where has all the education gone? *The World Bank Economic Review*, **15**(3), 367–391. https://openknowledge.worldbank.org/handle/10986/17434

18. SALA-I-MARTIN, X., and BARRO, R.J. 1995. Technological diffusion, convergence and growth. Center Discussion Paper, No. 735. Yale University, Economic Growth Center, New Haven, CT. https://www.econstor.eu/bitstream/10419/160652/1/cdp735.pdf

19. SIANESI, B., and REENEN, J. V. 2003. The returns to education: Macroeconomics. *Journal of Economic Surveys*, **17**(2), 157–200. https://doi.org/10.1111/1467-6419.00192

20. SODERBOM, M. and TEAL, F. 2001. Trade and HC as determinants of growth. *CSAE Working Paper Series 2001-10*. Centre for the Study of African Economies, University of Oxford. https://ideas.repec.org/p/csa/wpaper/2001-10.html

21. SUNDE, U. and VISCHER, T. 2015. HC and growth: specification matters. *Economica*, **82**(326), 368–390. https://doi.org/10.1111/ecca.12116

22. TOPRAK, B. 2006. Economic development versus cultural transformation: projects of modernity in Japan and Turkey. *New Perspectives on Turkey*, **35**, 85–127. https://doi.org/10.1017/S0896634600004490

THE IMPACTS OF LEADER–MEMBER EXCHANGE, PSYCHOLOGICAL CAPITAL, AND JOB CRAFTING ON INNOVATIVE BEHAVIOR: EVIDENCE FROM THE PUBLIC SECTOR

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Abstract. *The public sector has begun to recruit employees with outstanding psychological capital (PsyCap) as a way to improve performance, expecting them to find unusual ways to correct errors in service delivery and redesign work processes. This study aims to examine the effect of leader–member exchange (LMX) and PsyCap on job crafting and innovative behavior, respectively. In addition, the effect of job crafting as a mediator between the interactions of LMX, innovative behavior, and PsyCap was also analyzed. This study surveyed 105 entry-level employees from a government office in Indonesia, and analyzed the data using Partial Least Squares. The results show that PsyCap has a positive and significant effect on job crafting and innovative behavior. LMX does not significantly affect either job crafting or innovative behavior; thus, job crafting does not have a significant mediatory effect. The limitations of this study include the fact that it was conducted in the governmental sector of a country, and the framing of LMX and PsyCap as the drivers of job crafting and innovative behavior. This study also suggests ways for the governmental sector to enhance the innovative behavior of their employees by focusing not only on personal resources but also on high-quality relationships with supervisors.*

Keywords: *innovative behavior, job crafting, leader–member exchange, psychological capital, government*

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1. Introduction

Since the 1980s, many researchers have studied innovation as a crucial element that stimulates an organization's effectiveness in dealing with its environment (Van de Ven 1986; Woodman, Sawyer, and Griggin 1993). An unpredictable environment – reflected in uncertain economic conditions, increased global competition, and the changing expectations of consumers – further forces organizations, including those of a public nature, to generate innovation as an existential resource for their own success (Schermuly, Meyer, and Dammer 2013). Among different levels of innovation, the innovative behavior of employees is a cornerstone of organizational innovation (Janssen, Van de Vliert, and West 2004) that involves opportunity exploration, generativity, formative investigation, championing, and application (Kleysen and Street 2001). It also involves the simultaneous exploration of issues, development, and the communication of ideas, as well as the implementation of solutions that meet the organization's practical and efficient goals.

Some researchers have suggested that innovative behavior might emerge from an individual in a circumstance that accommodates the complex interaction between a social work context and an employee's intrinsic motivation (Zhou 2003). Leader–member exchange (LMX) may capture and facilitate such behavior (Anderson, Potonik, and Zhou 2014), as it focuses on the dyadic relationship between supervisors and their respective subordinates (Wilson, Sin, and Conlon 2010). Such a relationship depicts the aforementioned interaction, with the supervisor serving as the social work context and the presence of the subordinate's intrinsic motivation to interact with their respective supervisors. LMX further contends that if employees are trusted by their respective supervisor, they will be given autonomy in carrying out their work, and hence they are more likely to contribute ideas to the organization and devote their time and energy to identifying and resolving problems (Volmer, Spurk, and Niessen 2012). Moreover, a good dyadic relationship empirically reinforces the innovation process of refining, promoting, and implementing ideas while seeking feedback regularly (Scott and Bruce 1994). Similarly, Kim and Koo (2017) found that LMX generates an employee's positive perception of their work environment – a perception which lays the foundation for innovative behavior. However, in one study, where 19.6% of the 240 respondents were employees in government and public services, Schermuly, Meyer, and Dämmer (2013) found no significant relationship between LMX and innovative behavior. The study presented in this paper involved solely government employees, in order to further explore the nature of such a relationship in the context of an exclusively public organization.

Additionally, innovation is a very complicated process that involves uncertainty, knowledge transfer, and teamwork (Scott and Bruce 1994). Generating innovation requires employees' willingness to propose and/or implement new ideas, as well as to develop new products, processes, and procedures to improve their performance, work unit, and/or organization. Yuan and Woodman (2010) found that employees were more innovative when they anticipated that such behavior would benefit their work. In reality, this

willingness cannot emerge unless employees have conviction in their ability to innovate, and have the capacity to "bounce back" from adversity and to overcome challenging, unpredictable, risky, often frustrating outcomes and immense psychological pressures (Hsu and Chen 2017). This willingness will also not emerge if employees are not optimistic and hopeful that such innovation can lead to better performance. Employees such as those discussed above demonstrate high motivation, and function professionally and ethically at work (Avey, Nimnicht, and Pigeon 2010; Luthans et al. 2007; Luthans, Youssef, and Avolio 2007). These high levels of motivation, professionalism, and ethics characterize psychological capital – in short, those who can generate innovation are those who possess psychological capital. However, previous studies have not paid sufficient attention to this relationship, and thus examining it in detail is one objective of this study. When considered together, studying both LMX exchange and psychological empowerment can also clarify the motivational mechanisms that lead to the innovative behavior of employees (Schermuly, Meyer, and Dammer 2013), and enrich our comprehension regarding innovative behavior at the micro-individual level.

Moreover, to enrich the unexplored context regarding employees autonomously changing their working methods, this study delineates and empirically tests the mediative effect of job crafting. Job crafting is an approach which entails the proactive behavior of employees in changing and reshaping the tasks or relationships that make up their job in order to keep it challenging, motivating, and healthy (Kim et al. 2018). This approach views employees as potentially active job designers capable of making job-related innovation which impacts their performance (Guan and Frenkel, 2018). Recent studies have shown that job crafting results in increased levels of work engagement, creativity, and job performance (Demerouti, Bakker, and Gevers 2015; Slemp and Vella-Brodrick 2014; Van Wingerden, Derks, and Bakker 2017). In addition, Tims, Bakker, and Derks (2012) found that a proactive personality positively affected job crafting. Employees with proactive personalities also tend to be active in managing their relationships with supervisors, and ultimately experience greater job satisfaction than their less proactive coworkers (Li, Liang, and Crant 2010). In other words, they are willing to take the initiative to explore and exploit whenever opportunities are presented to them. Those who take the initiative are those who have efficacy, resilience, hope, and optimism regarding such opportunities – a list of traits which characterize psychological capital (Avey, Nimnicht, and Pigeon 2010; Luthans et al. 2007; Luthans, Youssef, and Avolio 2007). Psychological capital may thus be positively related to job crafting. Meanwhile, employees will not take the initiative if they do not receive support from their immediate superior. This support can be in the form of tangible resources and/or professional help. The immediate supervisor will not provide such support to their subordinates unless they have a quality relationship with them (Sparrowe, Soetjipto, and Kraimer 2006). LMX may, therefore, also be positively related to job crafting. Despite the theoretical plausibility of job crafting as a mediator between LMX, psychological capital, and innovative behavior, there has been a lack of empirical examination of such a mediation process, and this study thus aims to address this absence. This objective complements and contributes to the existing literature, enriching the present understanding of job crafting which is still in its infancy (Wang, Demerouti, and Le Blanc 2017).

In summary, this study attempts to fill gaps in the scholarly understanding of the relationship between positive organizational behavior (including job crafting) and innovative behavior, along with analyzing the predicted role of LMX as a supplemental support mechanism. It analyzes the effects of LMX and psychological capital on job crafting and the innovative behavior of employees, respectively. In addition, this research also examines the mediative effects of job crafting on the relationship between LMX and the innovative behavior of employees, and on the relationship between psychological capital and the innovative behavior of employees. This study took place in a government institution with a number of unique roles. Unlike other government institutions that concern a specific sector – for example, energy, health, or finance – this government institution serves the various needs of the president, from daily activities to policymaking, including coordination with multiple stakeholders. It could be said, therefore, that the effectiveness of this institution determines the president's success in running the country. Consequently, the institution's employees have complicated and demanding tasks. To continuously improve their performance, they must be innovative in carrying out their roles and in dealing with unexpected issues. On the other hand, as a part of the government, this institution has a hierarchical structure (Shepsle 2019), and must follow the relevant rules, procedures, and regulations (Fernandez and Moldogaziev 2012). This institution is hence rigid, and suffers from inertia. It is then interesting to understand how innovative behavior is developed and enhanced in an inflexible organization such as this.

2. Literature Review

2.1. Innovative Behavior

West and Farr (1989), two prominent researchers who are widely known for their study of innovation, defined innovative behavior as an individual's intention to create, introduce, and apply new ideas aimed at improving work relations and work processes that eventually enhance the productivity of the organization. From this perspective, the stages of innovation that individuals must go through begin with problem recognition, then move to the generation of ideas or solutions, then involve seeking sponsorship or endorsement, and finally end with the implementation of the initial solution (Scott and Bruce 1994). The key to initiating the innovation process, then, is essentially the generation of an idea – and to generate ideas, creativity is needed. In other words, creativity is a prerequisite for innovative behavior (West 2002).

LMX depicts the quality of the relationship between a leader and their immediate subordinates (Nugroho, Hendrawidjaja, and Soetjipto 2020; Sparrowe, Soetjipto, and Kraimer 2006). Higher relationship quality is indicated by more support, help, and/or resources exchanged between two parties (Wang et al. 2015). Through social exchange, leaders can offer relational support or resources to facilitate an employee's proactive attempts to bring positive change or novel ideas (creativity) and innovative behavior to their workplace (Carnevale et al. 2017). Time flexibility and work freedom are crucial factors for the generation of new ideas. Furthermore, emotional support from a leader

helps subordinates in implementing their ideas, especially in risky situations (Schermuly, Meyer, and Dämmer 2013). In line with the above discussions, this study hypothesizes the following:

Hypothesis 1 (H1): Quality of leader–member exchange will be positively related to the innovative behavior of an employee.

Numerous researchers have divided the factors that influence innovative behavior into three levels: individual, workgroup, and organization (Randall 2005; West 2001). At the individual level, as previously discussed, creativity is an essential factor in developing innovative behavior (Avey et al. 2012; West 2002). Creativity is characterized by an individual's proactivity, self-confidence, originality, motivation, and cognitive ability (Anderson, De Dreu, and Nijstad 2004). An abundance of these traits is often referred to as a positive psychological state. The aim of positive psychology is to begin to catalyze a change in focus from preoccupation only with repairing the worst things in life to also building positive qualities (Seligman and Csikszentmihalyi 2014). Over time, this positive psychology has developed into and become psychological capital, which is a personal resource that can improve an individual's performance in an organization (Luthans et al. 2010). Psychological capital consists of: (i) self-efficacy (the self-confidence to take on and succeed at a challenging task); (ii) optimism (the desire to be successful now and in the future); (iii) hope (diligence towards goals and, if required, the capacity to make uncommon life decisions in order to succeed); and (iv) resilience (the capability to bounce back and present a never-give-up attitude when faced by problems and impediment) (Luthans, Youssef, and Avolio 2007).

Psychological capital not only promotes an employee's creativity, but is also relevant to the implementation of ideas (Hsu and Chen 2017). Other research has also found that the many dimensions of psychological capital influence innovative behavior in different ways, such as: high self-efficacy being associated with the tendency of an employee to undertake challenging tasks (Bandura 2012); resilience being correlated with an employee's persistence in the implementation of innovative behavior; and hope and optimism relating to positive expectations in the accomplishment of an innovative task (Michael, Hou, and Fan 2011). Consequently, the following hypothesis is proposed:

Hypothesis 2 (H2): Psychological capital will be positively related to the innovative behavior of an employee.

2. Job Crafting

Job crafting involves the possibility of an employee to take a self-starting approach to their work and to proactively mobilize their own job resources to stay engaged in the task given to them, in order to improve both person-job fit and work motivation (Radstaak and Hennes 2017). It relates to the active actions of employees in re-composing and redefining their job – whether physically (by modifying its task boundaries), cognitively (by modifying its mental boundaries), or relationally (by modifying its social boundaries) (Wrzesniewski and Dutton 2001). Other researchers have identified job crafting through the JD-R model approach (Bakker and Demerouti 2007), through which job crafting was

seen a way to balance the demands and resources of an employee's job with their personal abilities and needs (Tims and Bakker 2010). This is achieved by increasing job resources, increasing job demands (so that demands are considered challenging), or decreasing job demands (by receiving help and support from both supervisors and colleagues).

Looking at its full scope, job crafting requires the proactive behavior of employees in mobilizing their job resources, seeking help and support from their supervisor and colleagues, and modifying their job boundaries to create more a favorable working environment. Job crafting, however, may be difficult to perform when employees do not have the efficacy to perform it nor the resilience to cope with adversities. Job crafting may also be difficult to perform when employees are not hopeful or optimistic regarding its effectiveness. These dimensions of psychological capital tend to be invested, demonstrated, and expressed through actions that lead employees to modify their working conditions to be favorable for them (Hobfoll 2011a, 2011b; Luthans and Youssef 2004). Another correlation between psychological capital and job crafting can be found in research by Xanthopoulou, Bakker, Demerouti, and Schaufeli (2009), and Tims, Bakker, and Derks (2014). For these reasons, this study formulates another hypothesis as follows:

Hypothesis 3 (H3): Psychological capital will be positively related to job crafting.

In addition to their psychological capital, employees may still need help, support, and resources from their immediate supervisor in order to craft their job. As explained above, this can help employees to balance the demands and resources of their job with their personal abilities and needs (Tims and Bakker, 2010) by increasing job resources and decreasing job demands. This assistance is made possible when employees have a high-quality relationship with their respective leader (Carnevale et al. 2017). A good relationship then engages employees in their work, and motivates them to demonstrate proactive behavior (Li 2015) – two fundamental conditions for job crafting. In addition, a good relationship leads to employees having freedom in the method of their work – including the freedom, that they have been given by their respective leader, to craft their job (Volmer, Spurk, and Niessen 2012). Additionally, employees who have high-quality LMX always have direct access to their leader in case they need advice on how to craft their job as effectively and efficiently as possible (Berg, Wrzesniewski, and Dutton 2010). Correspondingly, this study hypothesizes that:

Hypothesis 4 (H4): Leader–member exchange will be positively related to job crafting.

Employees who are avid job crafters have both balanced job resources and job demands. Such resources are crucial for them to create, introduce, and apply new ideas aimed at improving work relations and work processes that eventually enhance the productivity of the organization (West and Farr 1989), while such demands provide challenges to create, introduce, and apply those ideas (Tims and Bakker 2010). In other words, the availability of balanced job resources and job demands may foster employees' motivation and their commitment to pursuing innovation (Demerouti, Baker, and Gevers 2015). In addition, as resources and demands increase, employees feel more energetic and enthusiastic in introducing new methods, and in modifying how they conduct their work as part of implementing new ideas within their organization. The more they are energetic and enthusiastic, the more they demonstrate innovative behavior (Afsar,

Masood, and Umrani 2019). As well as requiring innovative behavior, job crafting itself fosters innovative behavior, as re-composing and re-defining a job is a creative process that results in improved work relations, better work processes, and enhanced productivity. Based on these discussions, the following hypothesis is presented:

Hypothesis 5 (H5): Job crafting will be positively related to the innovative behavior of an employee.

As consequences of H3, H4, and H5, two further hypotheses follow:

Hypothesis 6 (H6): Job crafting mediates the effect of leader–member exchange on innovative work behavior.

Hypothesis 7 (H7): Job crafting mediates the effect of psychological capital on innovative work behavior.

Figure 1 depicts all of the hypotheses examined in this study.
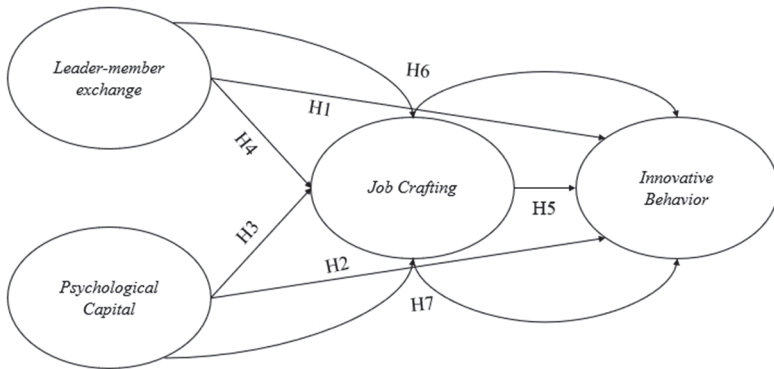
Figure 1. *Research model*

3. Methodology

1. Data Collection

A set of questionnaires was distributed via an online portal to ease the process of data gathering, with anonymity and confidentiality being assured and emphasized. This sampling method was used to limit the distribution of the survey, which targeted employees with a maximum of two years' experience working at a government institution with the crucial function of serving the president directly. These employees were targeted because they are at the frontline of such an institution. Their roles involve dealing with the fundamental detail of complicated and demanding tasks. Despite strict procedures, rules, and regulations, they have to be innovative in solving day-to-day problems. The respondents were also largely young adults who possessed a familiarity with technology (Deal, Altman, and Rogelberg 2010; Hershatter and Epstein 2010) that could support and help them in their innovation.

Respondents were first sent a message via social media with a link to the online survey which invited them to participate. It took approximately 10–15 minutes to complete the survey, with 115 targeted employees being invited to participate. As a precaution, to ensure that only targeted employees participated in the survey, a preliminary question was used. As such, only 111 employees eventually completed the questionnaire. Of the responses returned, 6 were considered invalid, thereby resulting in the use of 105 valid responses for this study (a 91.3% effective response rate). Among the respondents, there were more females (64%) than males (36%), while the age of participants ranged from 22–32 years old, with the majority being 25–27 (49%). All of the participants had higher education degrees, the majority had stopped after undergraduate study (75%), and the rest had associate degrees (14%) or master's degrees (10%)

2. Measures

The variables tested in the hypothesis were measured on a five-point Likert scale (1 – *strongly disagree* – to 5 – *strongly agree*). The details of the measurement of each variable follows.

Innovative Behavior

Innovative behavior was measured using Kleysen and Street's (2001) questionnaire. This is a 14-item self-rated questionnaire regarding the innovative behavior of employees in their work setting. Kleysen and Street found that the Cronbach alpha of this measure is 0.945.

Leader–Member Exchange (LMX)

LMX was measured using the self-assessment scale developed by Liden and Maslyn (1998). This 12-item scale can estimate the quality of the relationship between subordinates and superiors in four dimensions: affect, loyalty, contribution, and professional respect. The internal consistency of this measure is 0.770.

Psychological capital

To assess the psychological capital of respondents, a short version of the psychological capital questionnaire (PSQ) developed by Luthans et al. (2007) was used. This version consisted of 12 items, with a Cronbach alpha between 0.850 to 0.930 – similar values to those of the full-version of the PSQ (León-Pérez, Antino, and León-Rubio 2016). There were four dimensions of the PSQ that were assessed: hope, resilience, optimism, and self-efficacy.

Job Crafting

The questionnaire developed by Tim, Bakker, and Derks (2012) to measure job crafting using the JD-R approach was used. A 21-item construct was divided into four dimen-

sions: increasing structural job resources, decreasing hindersome job demands, increasing social job resources, and increasing challenging job demands. The Cronbach alphas of each dimension were above 0.70, and ranged from 0.750 to 0.820.

4. Analysis and Discussion

4. 1. Analysis

This study used partial least-square structural equation modeling (PLS-SEM) to analyze the data. Although PLS-SEM is not considered the primary choice for the statistical method used in this research, the PLS-SEM method is appealing as it enables the estimation of complex models with many constructs, indicator variables, and structural paths without imposing distributional assumptions on the data (Hair et al. 2019). There were two stages of data analysis. The first stage involved evaluating the validity and reliability of each measurement. Validity was evaluated using the standardized factor loading (SFL) of each indicator. If the SFL was ≥ 0.70, the indicator was considered valid and was hence retained (Hair et al. 2019). The SFL of indicators ranged from 0.60 to 0.93, which meant that some of the indicators were discarded to achieve the desired calculation. Whether or not to drop an indicator was carefully considered, as Hair et al. (2017) suggested that an SFL ranging from 0.40 to 0.70 could still be retained as long as it increased the average variance extracted (AVE). Eight items were dropped, consisting of one item from the measurement of LMX, one item from the measurement of PSQ, and six items from the measurement of job crafting. Reliability was evaluated by calculating Cronbach's alpha and construct reliability (CR). The only consideration was that CR was ³ 0.70, as CR was considered reliable – unlike Cronbach's alpha which is a less precise measure of reliability and differs from CR as items are unweighted (Hair et al. 2019). CR ranged from 0.80 to 0.94. Next, the AVE was evaluated to addresses the convergent validity of each construct measure. An AVE of ≥0.50 was acceptable, indicating that the construct explained at least 50% of the variance of its items (Hair et al. 2019). The results ranged from 0.55 to 0.86, and thus all met the criterion of being ≥0.50. In general, the evaluations of validity and reliability upheld the model.

The second stage involved evaluating the structural model and thus the proposed hypotheses. Table 1 shows the coefficient and *t*-value of each hypothesis. A hypothesis was accepted or supported if its *t*-value ≥ 1.96 or £−1.96. Of the seven hypotheses, four were accepted. This means that psychological capital positively and significantly affected both innovative behavior and job crafting (H2 and H3 were supported), while LMX had no significant effect on either innovative behavior or job crafting (H1 and H4 were not supported). Job crafting, however, both positively and significantly affected innovative behavior (H5 was supported). As a consequence of support for H2, H3, and H5, H7 was also supported. To test the mediative effect of job crafting, it is necessary to compare its direct and the indirect effects (Hair at al. 2017). The result of this comparison is that job crafting partially mediates psychological capital and innovative behavior, and Table 1 shows that its direct effect is stronger than its indirect effect (0.392>0.257). As a consequence of no

support for H1 and H4, H6 was not supported. This means that there is no significant empirical evidence for the LMX-job crafting-innovative behavior link.

Table 1. *The effect of LMX and psychological capital via job crafting*

	Coefficient	*t*-value
Direct effect		
H1: LMX à Innovative Behavior	−0.094	1.353
H2: Psychological Capital à Innovative Behavior	0.392***	3.734
H3: Psychological Capital à Job Crafting	0.572***	8.680
H4: LMX à Job Crafting	0.145	1.538
H5: Job Crafting àInnovative Behavior	0.448***	4.757
Indirect effect		
H6: LMX à Job Crafting à Innovative Behavior	0.065	1.492
H7: Psychological Capital à Job Crafting à Innovative Behavior	0.257***	4.231
Notes: *$p < 0.05$; ** $p < 0.01$; *** $p < 0.001$		

2. Discussion

The purpose of this study is to increase our understanding of the predictors of innovative behavior in the workplace. More specifically, this study aimed to enhance our comprehension of internal (psychological capital) and social (LMX and job crafting) resources as predictors of innovative behavior, and of job crafting as a mediator connecting LMX and psychological capital with innovative behavior. As it transpires, this study finds that both internal (psychological capital) and social (job crafting) resources matter with regard to innovative behavior. These findings are consistent with the findings of Sameer (2018) and Wojtczuk-Tureks (2012): that psychological capital relates to innovative behavior. Dimensions of psychological capital can be partially related to dimensions of innovative behavior. The exploration of problems, the investigation of problems, and the generation of ideas can, for example, be related to efficacy, optimism, and hope. To explore and investigate problems and to generate ideas require the efficacy of employees, but these things also require employees to have hope and optimism toward the future. Meanwhile, resiliency helps employees in championing and implementing ideas. These last two steps present employees with many difficulties, such as rejection from colleagues, challenges from supervisors, and a large amount of trial and error; thus the ability to "bounce back" and not easily give up are crucial for employees to succeed.

The findings mentioned above are also consistent with those of Demerouti, Baker, and Gevers (2015), who suggested that a balance between a job's resources and demands may foster employees' motivation and commitment to pursuing innovation. In addition, these findings show that job crafting – involving the re-composition and re-definition of a job – is a creative process that leads employees to the first stage of innovative behav-

ior. This stage involves exploring and investigating whether there are any problems in an employee's job that impede them from carrying it out effectively and efficiently, and generating ideas to solve or overcome these problems to improve their job's effectiveness and efficiency. Job crafting could also lead employees to championing and implementing stages of innovative behavior, where they convince their superiors of their ideas for improvement so that those ideas can be successfully implemented.

Furthermore, this study finds that psychological capital significantly and positively affects job crafting. This finding enriches our understanding of job crafting as a creative process and an example of proactive conduct, highlighting the fact that it requires efficacy: to increase a job's social and structural resources; to increase a job's challenging demands; and to decrease a job's hindersome demands to align it with an employee's internal capability and resources. This finding also enlightens us as to the idea that the processes of increasing a job's social and structural resources, increasing it's challenging demands, and decreasing it's hindersome demands are not always as smooth as expected, and thus require employees to be resilient in overcoming possible obstacles and rejections. In addition, this finding also highlights the need for employees to have hope and optimism that job crafting will succeed and improve their performance in order to be able to see this process through until its conclusion. Referring to the literature, this finding is consistent with those of Xanthopoulou et al. (2009) and Tims, Bakker, and Derks (2014) – that psychological capital is positively correlated to job crafting.

To define the mediative effect of job crafting, Hair et al. (2017) suggested comparing the direct and indirect effects of psychological capital on innovative behavior. The findings of this study show that job crafting is a partial mediator for psychological capital and innovative behavior. This is because the (direct) effect of psychological capital on innovative behavior is still significant. Such a direct effect is also stronger than the indirect effect via job crafting (0.392 > 0.572 x 0.448 = 0.256), which indicates the strength of psychological capital in directly driving young-adult frontline governmental employees to exhibit innovative behavior despite working in a rigid hierarchical organization. The indirect effect via job crafting actually further adds to that strength, yielding a total effect of 0.392 + 0.256 = 0.648. This behavior can help to ease the inertia of the governmental institution. Having psychological capital may therefore be crucial for young adults who work in frontline positions to spark innovation in public organizations.

It is noteworthy that all of the hypotheses that related to LMX were not accepted, in contrast to the previous literature regarding the benefits of having a high-quality LMX. This kind of exchange provides employees with an abundance of help, support, and resources to, for instance, craft their job and behave innovatively. This finding may be due to the prevalence of young adults as respondents. This age group is known to have unique characteristics (Gardner and Eng 2005), such as the capability to perform tasks effectively and efficiently, and high levels of confidence (Lancaster and Stillman 2002) that make them less dependent on their immediate supervisor. Additionally, these young adults were positioned at the bottom of a hierarchy, meaning that their direct superior was only one level above them – still a relatively low position. Consequently, this superior was not able to offer significant help, support, or resources to their subordinates that might

enable them to craft their job and/or to behave innovatively. Moreover, job crafting and innovative behavior require the willingness of subordinates to involve their immediate supervisor by first proposing ideas. These findings demonstrate that such a willingness might not exist, perhaps because voicing those ideas might raise concerns related to the hierarchical relationships that employees have with their immediate supervisors. In a public organization, a supervisor is highly respected when they effectively maintain the status quo, and thus they focus less on encouraging the innovative behavior of their subordinates (Park and Jo 2018).

5. Conclusion and Implications

Overall, the fact that, in the proposed model, value exchange was only proved in the links between psychological capital and innovative behavior and psychological capital and job crafting, means that an employee's own resources of internal psychology or positive attitude are a crucial predictor of positive work-related behavior. Moreover, in this organization the quality of the relationship between supervisor and subordinate seemed to not have reached a "mature" stage, which may explain the insignificance of relationships found in the concept of leader–member exchange. Lastly, people may use job crafting for reasons other than psychological capital and leader–member exchange, and at different times, because no mediative effect was found on innovative behavior.

This paper contributes to the wider literature in a number of specific ways. First, we examined the importance of the social and internal resources targeted at innovative workplace behavior, thus giving an organization the potential to enhance innovative behavior in the work environment. Second, using the job crafting theory formed in the middle of this research model, we acknowledged the triggers and benefits of job crafting, which should be encouraged in organizations in order to achieve positive change. Despite the notion that job crafting is argued as bringing positive impact, our study found a unique phenomenon – that job crafting triggered less of an effect between psychological capital and innovative behavior. This may broaden previous studies regarding the existence of empirical evidence on job crafting – that not only does job crafting lead to affirmative action, but it also comes with negative results depending on the environment. Third, we tested our suggested framework in a developing country (Indonesia), which significantly differs from previous studies that have mostly been conducted in western or developed countries. This circumstance deepens the current understanding of leader–member exchange, psychological capital, job crafting, and innovative behavior, as it is presented in a different culture with attributes unique to Asian countries.

There were some limitations of this study. First, the proposed model was applied to only one element of the public sector in Indonesia, and thus cannot be generalized to represent the condition of the public sector across government. Second, the respondents of this study were all subordinates with limited working experience. Third, the use of self-reporting is a potential limitation, as it may result in bias, although this should not represent a significant limitation. In line with the suggestion of Conway and Lance (2010), self-reporting is ideal for assessing psychological concepts discussed in private events,

needs, or perceived job characteristics and methods. As a result of these limitations, we suggest that future research: (i) involves more respondents across multiple aspects of the public sector, to have a broader view of public sector working environments; and (ii) uses alternative variables to supplement and cross-validate our findings concerning the mediative effect of job crafting between leader–member exchange and innovative behavior.

References

1. AFSAR, B., MASOOD, M., and UMRANI, W.A. 2019. The role of job crafting and knowledge sharing on the effect of transformational leadership on innovative work behavior. *Personnel Review*, **48**(5), 1186–1208. https://doi.org/10.1108/PR-04-2018-0133

2. ANDERSON, N., DE DREU, C.K.W., and NIJSTAD, B.A. 2004. The routinization of innovation research: A constructively critical review of the state-of-the-science. *Journal of Organizational Behavior*, **25**(2), 147–173. https://psycnet.apa.org/doi/10.1002/job.236

3. ANDERSON, N., POTONIK, K., and ZHOU, J. 2014. Innovation and creativity in organizations: A state-of-the-science review, prospective commentary, and guiding framework. *Journal of Management*, **40**(5), 1297–1333. https://doi.org/10.1177%2F0149206314527128

4. AVEY, J.B., LUTHANS, F., HANNAH, S.T., SWEETMAN, D., and PETERSON, C. 2012. Impact of employees' character strengths of wisdom on stress and creative performance. *Human Resource Management Journal*, **22**(2), 165–181. https://doi.org/10.1111/j.1748-8583.2010.00157.x

5. AVEY, J.B., NIMNICHT, J.L., and PIGEON, N.G. 2010. Two field studies examining the association between positive psychological capital and employee performance. *Leadership & Organization Development Journal*, **31**(5), 384–401. https://doi.org/10.1108/01437731011056425

6. BAKKER, A.B., and DEMEROUTI, E. 2007. The job-demands resources model: State of the art. *Journal of Managerial Psychology*, **22**(3), 309–328. https://doi.org/10.1108/02683940710733115

7. BANDURA, A. 2012. On the functional properties of perceived self-efficacy revisited. *Journal of Management*, **48**(1), 9–44. https://doi.org/10.1177%2F0149206311410606

8. BERG, J.M., WRZESNIEWSKI, A. and DUTTON, J.E. 2010. Perceiving and responding to challenges in job crafting at different ranks: When proactivity requires adaptivity. *Journal of Organizational Behavior*, **31**(2–3), 158–186. https://doi.org/10.1002/job.645

9. CARNEVALE, J. B., HUANG, L., CREDE, M., HARMS, P., and UHL-BIEN, M. 2017. Leading to stimulate employees' ideas: A quantitative review of leader–member exchange, employee voice, creativity, and innovative behavior. *Applied Psychology*, **66**(4), 517–552. https://doi.org/10.1111/apps.12102

10. CENCIOTTI, R., ALESSANDRI, G., and BORGOGNI, L. 2017. Psychological capital and career success over time: The mediating role of job crafting.

Journal of Leadership & Organizational Studies, **24**(3), 372–384. http://dx.doi.org/10.1177/1548051816680558

11. CONWAY, J.M., and LANCE, C.E. 2010. What reviewers should expect from authors regarding common method bias in organizational research. *Journal of Business and Psychology*, **25**, 325–334. https://doi.org/10.1007/S10869-010-9181-6

12. DEAL, J.J., ALTMAN, D.G., and ROGELBERG, S.G. 2010. Millennials at work: What we know and what we need to do (if anything). *Journal of Business and Psychology*, **25**(2), 191–199. https://doi.org/10.1007/s10869-010-9177-2

13. DEMEROUTI, E., BAKKER, A.B. AND GEVERS, J.M. 2015. Job crafting and extra-role behavior: The role of work engagement and flourishing. *Journal of Vocational Behavior*, **91**, 87–96. https://doi.org/10.1016/j.jvb.2015.09.001

14. FERNANDEZ, S., and MOLDOGAZIEV, T. 2013. Using employee empowerment to encourage innovative behavior in the public sector. *Journal of Public Administration Research and Theory*, **23**(1), 155–187. https://doi.org/10.1093/jopart/mus008

15. GARDNER, S., and ENG, S. 2005. What students want: Generation Y and the changing function of the academic library. *portal: Libraries and the Academy*, **5**(3), 405–420. https://doi.org/10.1353/PLA.2005.0034

16. GUAN, X., and FRENKEL, S. 2018. How HR practice, work engagement and job crafting influence employee performance. *Chinese Management Studies*, **12**(3), 591–607. https://doi.org/10.1108/CMS-11-2017-0328

17. HAIR, J., HULT, T., RINGLE, C., and SARTSTEDT, M. 2017. *A primer on partial least squares structural equation modeling (PLS-SEM)*. 2nd ed. Los Angeles: Sage.

18. HAIR, J.F., RISHER, J.J., SARSTEDT, M., and RINGLE, C.M. 2019. When to use and how to report the results of PLS-SEM. *European Business Review*, **31**(1), 2–24. http://dx.doi.org/10.1108/EBR-11-2018-0203

19. HERSHATTER, A., and EPSTEIN, M. 2010. Millennials and the world of work: An organization and management perspective. *Journal of Business and Psychology*, **25**(2), 211–223. https://doi.org/10.1007/s10869-010-9160-y

20. HOBFOLL, S.E. 2011a. Conservation of resource caravans and engaged settings. *Journal of Occupational and Organizational Psychology*, **84**(1), 116–122. https://doi.org/10.1111/j.2044-8325.2010.02016.x

21. HOBFOLL, S.E. 2011b. Conservation of resources theory: Its implication for stress, health, and resilience. In S. FOLKMAN, ed. *Oxford library of psychology. The Oxford handbook of stress, health, and coping*. Oxford University Press, pp. 127–147.

22. HSU, M. L., and CHEN, F. H. 2017. The cross-level mediating effect of psychological capital on the organizational innovation climate–employee innovative behavior relationship. *The Journal of Creative Behavior*, **51**(2), 128–139. https://doi.org/10.1002/jocb.90

23. JANSSEN, O., VAN DE VLIERT, E., and WEST, M. 2004. The bright and dark sides of individual and group innovation: A special issue introduction. *Journal of Organizational Behavior*, **25**(2), 129–145. https://doi.org/10.1002/job.242

24. LEÓN-PÉREZ, J.M., ANTINO, M., and LEÓN-RUBIO, J.M. 2016. Adaptación al español de la versión reducida del Cuestionario de Capital Psicológico (PCQ-

12) [Adaptation of the short version of the Psychological Capital Questionnaire (PCQ-12) into Spanish]. *Revista de Psicología Social* [International Journal of Social Psychology], **32**(1), 196–213. https://doi.org/10.1080/02134748.2016.1248024

25. KIM, H., IM, J., QU, H. and NAMKOONG, J. 2018. Antecedent and consequences of job crafting: an organizational level approach. *International Journal of Contemporary Hospitality Management*, **30**(3), 1863–1881. https://doi.org/10.1108/IJCHM-01-2017-0040

26. KIM, M.S., and KOO, D.W. 2017. Linking LMX, engagement, innovative behavior, and job performance in hotel employees. *International Journal of Contemporary Hospitality Management*, **29**(12), 3044–3062. https://doi.org/10.1108/IJCHM-06-2016-0319

27. KLEYSEN, R.F., and STREET, C.T. 2001. Toward a multi-dimensional measure of individual innovative behavior. *Journal of Intellectual Capital*, **2**, 284–296. https://doi.org/10.1108/EUM000000000566

28. LANCASTER, L.C., and STILLMAN, D. 2002. *When generations collide. Who they are. Why they clash. How to solve the generational puzzle at work.* New York: Collins Business.

29. LI, J. 2015. The mediating roles of job crafting and thriving in the LMX–employee outcomes relationship. *Japanese Journal of Administrative Science*, **28**(1), 39–51. https://doi.org/10.5651/jaas.28.39

30. LI, N., LIANG, J., and CRANT, J.M. 2010. The role of proactive personality in job satisfaction and organizational citizenship behavior: A relational perspective. *Journal of Applied Psychology*, **95**(2), 395–404. https://doi.org/10.1037/a0018079

31. LIDEN, R.C., and MASLYN, J.M. 1998. Multidimensionality of leader–member exchange: An empirical assessment through scale development. *Journal of Management*, **24**(1), 43–72. https://doi.org/10.1177/014920639802400105

32. LUTHANS, F., AVEY, J.B., AVOLIO, B.J., and PETERSON, S.J. 2010. The development and resulting performance impact of positive psychological capital. *Human Resource Development Quarterly*, **21**, 41–67. https://doi.org/10.1002/HRDQ.20034

33. LUTHANS, F., AVOLIO, B. J., AVEY, J. B., and NORMAN, S. M. 2007. Positive psychological capital: Measurement and relationship with performance and satisfaction. *Personnel psychology*, **60**(3), 541–572. https://doi.org/10.1111/j.1744-6570.2007.00083.x

34. LUTHANS, F., and YOUSSEF, C.M. 2004. Human, social, and now positive psychological capital management: Investing in people for competitive advantage. *Organizational Dynamics*, **33**(2), 143–160. https://doi.org/10.1016/j.orgdyn.2004.01.003

35. LUTHANS, F., YOUSSEF, C. M., and AVOLIO, B. J. 2007. *Psychological capital: Developing the human competitive edge.* Oxford: Oxford University Press.

36. MICHAEL, L.H., HOU, S.T., and FAN, H.L. 2011. Creative self-efficacy and innovative behavior in a service setting: Optimism as a moderator. *The Journal of Creative Behavior*, **45**(4), 258–272. https://doi.org/10.1002/j.2162-6057.2011.tb01430.x

37. NUGROHO, A., HENDRAWIDJAJA, J.B., and SOETJIPTO, B.W. 2020. LMX, POS, and task environment as antecedents of entrepreneurial orientation in family business. *International Journal of Learning and Change*, **12**(4), 395–415. https://doi.org/10.1504/IJLC.2020.110892

38. PARK, S., and JO, S.J. 2018. The impact of proactivity, leader–member exchange, and climate for innovation on innovative behavior in the Korean government sector. *Leadership & Organization Development Journal*, **39**(1), 130–149. https://doi.org/10.1108/LODJ-09-2016-0216

39. RADSTAAK, M., and HENNES, A. 2017. Leader–member exchange fosters work engagement: The mediating role of job crafting. *SA Journal of Industrial Psychology/SA Tydskrif vir Bedryfsielkunde*, **43**, a1458.

40. RANDALL, R. 2005. *Innovation. Strategy and leadership*. Emerald Group Publishing.

41. SAMEER, Y.M. 2018. Innovative behavior and psychological capital: Does positivity make any difference? *Journal of Economics & Management*, **32**, 75–101. http://dx.doi.org/10.22367/jem.2018.32.06

42. SCHERMULY, C.C., MEYER, B., and DÄMMER, L. 2013. Leader–member exchange and innovative behavior: The mediating role of psychological empowerment. *Journal of Personnel Psychology*, **12**(3), 132–142. https://doi.org/10.1027/1866-5888/a000093

43. SCOTT, S.G., and BRUCE, R.A. 1994 Determinants of innovative behavior: A path model of individual innovation in the workplace. *Academy of Management Journal*, **37**(3), 580–607. https://doi.org/10.2307/256701

44. SELIGMAN, M. E., and CSIKSZENTMIHALYI, M. 2014. Positive psychology: An introduction. In: M. CSIKSZENTMIHALYI. *Flow and the foundations of positive psychology*. Dordrecht: Springer, pp. 279–298.

45. SHEPSLE, K.A. 2019. Discretion, institutions, and the problem of government commitment. In: P. BOURDIEU and J.S. COLEMAN, eds. *Social theory for a changing society*. Routledge, pp. 245–265.

46. SLEMP, G.R. and VELLA-BRODRICK, D.A. 2014. Optimising employee mental health: The relationship between intrinsic need satisfaction, job crafting, and employee well-being. *Journal of Happiness*, **5,** 957–977. https://doi.org/10.1007/s10902-013-9458-3

47. SPARROWE, R.T., SOETJIPTO, B.W., and KRAIMER, M.L. 2006. Do leaders' influence tactics relate to members' helping behavior? It depends on the quality of the relationship. *Academy of Management Journal*, **49**(6), 1194–1208. http://dx.doi.org/10.5465/AMJ.2006.23478645

48. TIMS, M., and BAKKER, A.B. 2010. Job crafting: Towards a new model of individual job redesign. *South African Journal of Industrial Psychology*, **36**(2), a841. https://doi.org/10.4102/sajip.v36i2.841

49. TIMS, M., BAKKER, A.B., and DERKS, D. 2012. Development and validation of the job crafting scale. *Journal of Vocational Behavior*, **80**(1), 173–186. https://doi.org/10.1016/j.jvb.2011.05.009

50. TIMS, M., BAKKER, A.B., and DERKS, D. 2014. Daily job crafting and the self-efficacy–performance relationship. *Journal of Managerial Psychology*, **29**(5), 490–507. https://doi.org/10.1108/JMP-05-2012-0148

51. VAN DE VEN, A.H. 1986. Central problems in the management of innovation. *Management Science*, **32**(5), 590–607. https://doi.org/10.1287/mnsc.32.5.590

52. VAN WINGERDEN, J., DERKS, D. and BAKKER, A.B. 2017. The impact of personal resources and job crafting interventions on work engagement and performance. *Human Resource Management*, **56**(1), 51–67. https://doi.org/10.1002/hrm.21758

53. VOLMER, J., SPURK, D., and NIESSEN, C. 2012. Leader–member exchange (LMX), job autonomy, and creative work involvement. *The Leadership Quarterly*, **23**(3), 456–465. https://doi.org/10.1016/j.leaqua.2011.10.005

54. WANG, X.H., FANG, Y., QURESHI, I., and JANSSEN, O. 2015. Understanding employee innovative behavior: Integrating the social network and leader–member exchange perspectives. *Journal of Organizational Behavior*, **36**(3), 403–420. https://doi.org/10.1002/job.1994

55. WANG, H.J., DEMEROUTI, E., and LE BLANC, P. 2017. Transformational leadership, adaptability, and job crafting: The moderating role of organizational identification. *Journal of Vocational Behavior*, **100**, 185–195. https://doi.org/10.1016/j.jvb.2017.03.009

56. WEST, M.A. 2001. The human team: Basic motivations and innovations. In: N. ANDERSON, D.S. ONES, H.K. SINANGIL, and C. VISWESVARAN, eds. *Handbook of industrial, work and organizational psychology*, Vol. 2. London/New York: Sage, pp. 270–288.

57. WEST, M.A. 2002. Sparkling fountains or stagnant ponds: An Integrative model of creativity and innovation implementation in work groups. *Applied Psychology: An International Review*, **51**(3), 355–87. https://doi.org/10.1111/1464-0597.00951

58. WEST, M., and FARR, J. 1989. Innovation at work: psychological perspective. *Social Behavior*, **4**(1), 15–30.

59. WILSON, K.S., SIN, H., and CONLON, D.E. 2010. What about the leader in leader–member exchange? The impact of resource exchanges and substitutability on the leader. *Academy of Management Review*, **35**(3), 358–372. https://doi.org/10.5465/amr.35.3.zok358

60. WOJTCZUK-TUREK, A. 2012. Innovative work behavior and psychological capital–analysis of relationships. *Organizacja i Zarządzanie: kwartalnik naukowy*, (3), 71–88.

61. WOODMAN, R.W., SAWYER, J.E., and GRIFFIN, R.W. 1993. Toward a theory of organizational creativity. *Academy of Management Review*, 18: 293–321.

62. WRZESNIEWSKI, A., and DUTTON, J.E. 2001. Crafting a job: Revisioning employees as active crafters of their work. *Academy of Management Review*, **26**(2), 179–201. http://dx.doi.org/10.2307/259118

63. XANTHOPOULOU, D., BAKKER, A.B., DEMEROUTI, E., and SCHAUFELI, W.B. 2009. Reciprocal relationships between job resources, personal resources,

and work engagement. *Journal of Vocational Behavior*, **74**(3), 235–244. https://doi.org/10.1016/j.jvb.2008.11.003

64. YUAN, F., and WOODMAN, R.W. 2010. Innovative behavior in the workplace: The role of performance and image outcome expectations. *Academy of Management Journal*, **53**(2), 323–342. https://doi.org/10.5465/AMJ.2010.49388995

65. ZHOU, J. 2003. When the presence of creative coworkers is related to creativity: role of supervisor close monitoring, developmental feedback, and creative personality. *Journal of Applied Psychology*, **88**(3), 413–422. https://doi.org/10.1037/0021-9010.88.3.413

THE INSTITUTIONAL TRANSFORMATION OF THE DIGITAL VALUES OF UKRAINIAN SOCIETY

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Abstract. *This article examines the impact of digitalization on the values of Ukrainian youth as a driving force of Ukrainian society. The method of social research was used alongside econometric models to test the hypotheses. An online survey was conducted from November 2020 to January 2021, in which 115 young people took part. The results showed that traditional values (absolute and family) have a high level of priority for Ukrainian youth. The importance of social values is differentiated and heterogeneous, and digital values are*

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also becoming increasingly important. However, at present they occupy the lowest position in the structure of values. The results of this study can be useful for the development of public institutions, building a modern youth regional policy, and in the formation and adaptation of development strategies for universities, public institutions, and non-governmental organizations.

Keywords: *values, institutional transformation, social research, digitalization of society, traditional values*

JEL Classification: *A14, D46, J17, O15.*

Introduction

In the modern world, the aggravation of information confrontation in various spheres of public life actualizes the study of problems of interdisciplinary forms of the manifestation and influence of information as an institution of public administration. The active institutional and informational transformation of society in the 21st century has radically changed the traditional systems of production and exchange of goods, the relationship (interaction) between hierarchical structures, network systems in public administration and the management of corporations, employment and consumption, and economic and social organization. The theory of information asymmetry and the practice of information speculation in the policies of governments, political institutions, NGOs, legal entities, and individuals raises the question of the genesis of the identification of the political and socio-economic essence, and the verification of information in the development of society. Making effective management decisions in the public sphere requires adequate scientific perception and the monitoring of the institutional role of information in terms of an ecumenical (interdisciplinary) approach, involving the synthesis of logical and historical perspectives.

The logical and historical development of information as a factor in the progress of society and the institution of public administration is substantiated by communications, the destruction of organizational hierarchy, and economic forms of coexistence between citizens, companies, and state.

The results of an empirical study on the values of the youth of Ukrainian society in the context of global change are presented. The results of this study revealed a gradual transformation of the value orientation of Ukrainian youth under the influence of the challenges of the 21st century.

Literature Review

The study of the genesis of the institutional role of information in public administration involves the use of retrospective interdisciplinary analysis of the evolution of economic and institutional factors in society. As a theoretical and methodological basis for the study of information as an economic factor of development and as an institu-

tion of public administration, the works of scholars on the theory of the socio-economic factors of production (Smith 2007; Ricardo 2007; Mill 2007; Marx 1961; Polanyi 2014) and the theory of the post-industrial society (Bell 1986 – pre-industrial, industrial, and post-industrial society; Toffler 1982 – "first", "second", and "third" wave of civilization; Castells 2000 – information society) are relevant. The starting point in the analysis of the genesis of information is the work of representatives of institutional theory, and the work of scientists on the modern digital economy. Information asymmetry theory (Akerlof and Schiller 2010), North's theory of institutional change, and social choice theory (North 1990; Dijck 2020) are used as theoretical and methodological foundations for the evolution of the institutional environment in which information is identified as a factor of the transformation of public administration. The theory of the new institutional role of the state in the era of the information society and the theory of digital transformation (Dunleavy et al. 2006) form an important theoretical basis for the transformation of society. The works of international scholars such as D. Waldo, M. Wilber (1927), W. Wilson, P. Drucker, G. Wright, F. Taylor, and A. Faiol, who laid the basic components of a systematic interpretation of management processes, are devoted to the fundamental theoretical foundations of public administration.

Scholars pay attention to various aspects of the transformation of society's values, in particular: the relationship between the dominant system of values and the transformational potential of communities, and the system of values as a factor of transformation in societies (Meteleva 2016); the change of educational values in the conditions of transformation between the industrial society and the ensuing society (Manzelli 2004); and the possibilities and limits of determining the processes of values transformation in a transitional society (Matusevych 2018). Artjukhovich (2015) considers the transformation of moral values in the information society, and notes that the "consistent and correct use of modern achievements of the information society will not only improve the intellectual level and creativity of the individual but also contribute to the moral development and improvement".

A retrospective analysis of surrounding theory and global historical experience allows for the conclusion that at each stage of social progress (Fig. 1) each factor of production was given a decisive role.
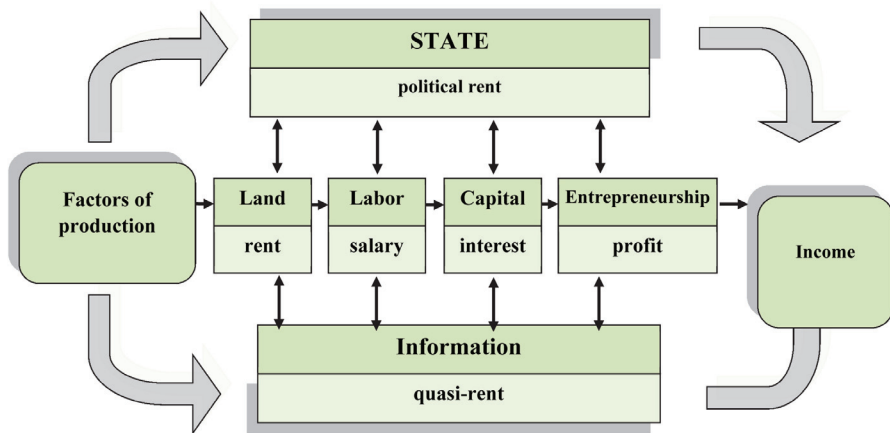
Figure 1. *The modern system of factors of production and income (Malyi 2020)*

At present, the impetus for radical change in all spheres of human activity is information, and it occupies a leading role in comparison with such economic factors of production as land, labour, capital, and entrepreneurship. At each historical stage of the development of modern society, the role of the leading factor of production was performed by land (18th century – teachings of physiocrats), labour (18th century – labour theory of value), capital (19th century – Marxism and marginalism), organization/entrepreneurship (Schumpeter 1934), the state (second half of the 20th century – Keynesianism), or information (21st century).

The information revolution and the technologies of its delivery to the consumer have made radical changes in the system of relations between people and companies, between different levels of hierarchical management structure, between consumers and producers, and between managers and subordinates. They have also revolutionized the system of education and the affirmation of values. The results of this research demonstrate that there is a close link between a country's socio-political attractiveness and the level of their information and communication development. However, this is not equal for different countries, which are grouped by their level of ICT, human development, and democracy. Additionally, a country's level of information and communication technology has a significant effect on social and political development (Gavkalova et al. 2020). Human awareness of the dangers of the challenges of the 21st century has led to the emergence of concepts such as social entrepreneurship (Schumpeter 1934), environmental economics (Daly and Farley 2004), and cyclical economics (Geissdoerfer et al. 2017).

Over the last decade, the processes of the introduction of digital transformation and new innovative products into the economy have become widespread, which have radically changed the format of interaction with the consumer towards focusing on the needs and interests of each individual. These processes are superimposed on the need to address issues of energy and financial security. Changing human values and novel technological ways of communicating with each other, with companies, and with pub-

lic authorities make fresh demands on the institutional provision of new "rules of the game". The provision of these rules is impossible without a critical rethinking of the informatisation of society and the development of new approaches to localization and the economic and informational security of the country. The dynamics of online digital platforms have influenced the very essence of democratic processes and political communication, and there are numerous breaches of privacy and security threats caused by social networks (Dijck 2020). Support for sustainable societal values such as tolerance, democracy, and transparency is increasingly undermined by the global "exports" of US technology companies that dominate Internet infrastructure to distribute cultural online goods such as: news, videos, social conversations, and private communication (Geltzer and Gosh 2018).

Methodology

Global civilizational development acquires new features, values in society change, the environment changes, natural reserves of energy resources and minerals are depleted, the population on earth grows, and both short- and long-term changes occur in various spheres of human activity. This cannot affect qualitative and quantitative indicators of economic development, the evolution of organizational and economic forms, and the means of exchange of goods and information. That is, there is an evolutionary change of the paradigm of social existence on a planetary scale, along with which there is a gradual change of values and social relations in developed countries and a radical (revolutionary) transformation of economic and other spheres in post-socialist countries.

The study of the genesis of the institutional role of information in society and its impact on the development of mankind, along with its accompanying system of values, allowed us to put forward the following hypotheses.

Hypothesis 1. Digital transformations in all spheres of human life lead to changes in the values of society, and of youth in particular.

Hypothesis 2. There is heterogeneity of priorities in the value orientations of youth in Ukraine.

Consider a complex, interdisciplinary, multidimensional category of "values". Human values are studied by an entire field of philosophy – axiology – and in social science, there is a direction of study dedicated to the sociology of values. In sociology, values are considered as norms or regulators of activity, highlighting values-norms, values-ideals, and values-goals links. In psychology, the concept of a value is equivalent to a set of mental phenomena, including life position (L. Bozhovich), personal meaning (O. Leontiev), and psychological relations (V. Myasishchev). In pedagogy, the study of the problem of values is carried out in conjunction with other important areas of education and upbringing in the system of civic, national, moral, aesthetic, labour, and family education (Kremin 2008).

Values play the role of integrating, socializing, and communicating foundations in the life of a society, providing it with spiritual-volitional unity, a high level of self-awareness, and the organization of its members. Social values are formed gradually as a set of

habits, methods of human life, and specific forms of behaviour passed down from generation to generation (Radula 2004).

Value – the property of a social object to meet certain needs of the social subject (person, group of people, or society) – represents the concept by which the socio-historical significance for society and the personal meaning for a person of certain real phenomena are characterized (Radula 2004). Value is the significance of certain realities in terms of meeting material and spiritual needs and human interests; it is something that a person can value that is meaningful and important to them (Kremin 2008).

Among the more stable values, three groups can be distinguished: 1) traditional values – absolute and family (these are the basis of the spiritual sphere of man); 2) social values – civic and national (these reflect the social significance of man, and his inclusion in the social community); and 3) digital values – new values that have emerged under the influence of the technological revolution, technological development, and digitization.

Since young people have a much greater ability to adapt to the processes of digitalization, the tendency to change values is particularly noticeable in this category of society. Youth is an important component of modern Ukrainian society, the bearer of intellectual potential, and a determining factor of socio-economic progress (Ministry of Justice, n.d.).

A sociological survey conducted in Ukraine among young people aged 14–34 – "Digital technologies in youth work" – indicated that almost all young people use the Internet every day. Most young people use a mobile phone/smartphone (93.8%) or a personal computer/laptop (65.9%) to access the Internet. On the Internet, respondents usually communicate on social networks (92.8%), search for information for study and work (86.2%), use e-mail (82.2%), and use messenger services such as Skype, Viber, Messenger, etc. (82.2%) (State Institute of Family and Youth Policy, 2020).

The entry of digital technologies into all spheres of life affects the overall picture of the value orientations of young people. To identify the values of the youth of Ukrainian society and their respective transformation, the authors conducted a sociological study. The organization and conduct of the study included the following stages:

1) preparatory (the development of the program and research tools);
2) field (the collection of primary sociological information);
3) information processing;
4) analysis of the received information, and the preparation of the final documents containing conclusions and recommendations.

An appropriate program was developed to prepare a sociological study (Table 1).

Table 1. *Program of sociological research into the values of the youth of Ukrainian society*

	Methodological section	
1.	Research problem	The challenges of the 21st century affect all spheres of society, the state, and the value orientations of young persons
2.	Object of study	Youth as a socio-demographic group of Ukrainian society and the driving force of its development
3.	Subject of study	The values of the youth of Ukrainian society
4.	Aim of the study	Identifying the values of young people as a result of the challenges of the 21st century
5.	Objectives of the study	Defining the manifestation of a group of youth values: absolute (traditional), family, public, national, and digital. Comparison of the results of the value orientations of youth with the results of previous research.
	Procedural (methodical) section	
1.	Determination of the sample	Sample population: 115 respondents mostly aged 17–25 who, according to the UN and UNESCO, are classified as young persons
2.	Term	November 2020–December 2021
3.	Definition of methods of collecting sociological information	Method: online survey
4.	The structure of tools for collecting sociological information	The questionnaire consisted of 2 blocks, which included 5 questions. In the first block, each respondent was asked to select 2 to 6 values that were most important to them from a from a list of absolute human, national, social, family, and digital values. In the second block, it was necessary to assess the significance of these groups of values on a 5-point scale (where 1 was least significant, 3 average significance, and 5 most significant) The information was collected via the Internet, using the Google Forms tool.
5.	Logical scheme of primary socio-logical information processing	Processing of primary data; Analysis and interpretation of the obtained data; Comparison of survey results with previous studies; Generalization of conclusions

Results

The results of the first block (the online youth survey) allowed for primary data on the value orientations of young people to be obtained. This was then summarized based on groups of values:

- absolute (honesty, love, justice, truth, kindness, freedom, dignity, faith, generosity, forgiveness, etc.);

- family (care for children, care for parents, family loyalty, consent and trust in the family, the mutual love of parents, respect for ancestors, etc.);
- civil (equality of citizens before the law, right to life and self-worth, right to freedom of thought, tolerance of other people's views, respect for the law, etc.)
- national (attention to the ecological state of the region, state of independence of Ukraine, the desire to build a just system of government, love for native culture, language, and traditions, historical memory, etc.);
- digital (digital technologies, energy efficiency, digital public services, the ability to use the latest technologies, remote monitoring, remote work, communication on social networks, e-market, etc.).

The results of the second block of the study revealed the significance of each group of values for modern youth. These results were then processed, and are presented in Figures 2–6.
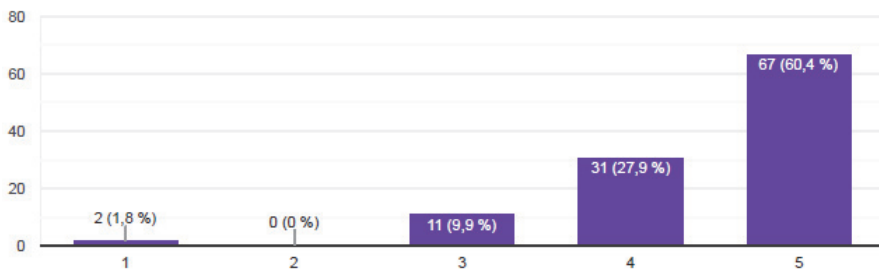
Figure 2. *The importance of absolute values for young persons*
(developed by the authors based on their research)

As can be seen in Fig. 2, 60% of young people believed that absolute values were of paramount importance, 28% attached a fairly high significance, and a small percentage (1.8%) considered this category of values not to be significant. The results of the survey showed that in 2020 honesty became an important value of life for 79% of young people surveyed, while in 2014 this value was identified as important by only 26% of respondents.
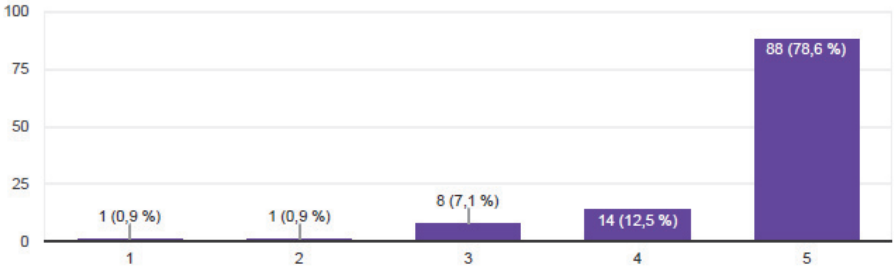
Figure 3. *The importance of family values for young persons*
(developed by the authors based on their research)

As can be seen in Fig. 3, family values had the highest significance for the majority of young people (78.6%), 12.5% believed that they had a fairly high significance, and a small percentage (1.8%) considered this category of values not significant at all. This indicates that family values are of the greatest importance in Ukrainian society for most young people – an idea reinforced by the fact that 70% of respondents identified caring for children and parents as having the greatest value in their lives.
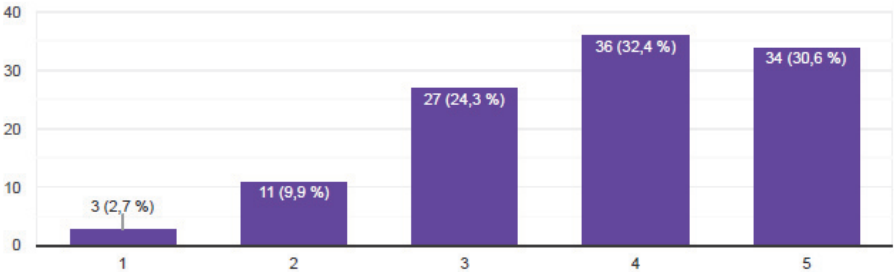
Figure 4. *The importance of national values for young persons*
(developed by the authors based on their research)

As can be seen in Fig. 4, the significance of this group of values had a completely different distribution than absolute and family values. National values were not high-priority for all young people, which confirms hypothesis 2. However, 30.6% of respondents still gave this block of values the maximum significance, these values were fairly significant for 32.4% of respondents, and only 12.6% considered this category of values not significant. The group of national values includes attention to the ecological situation, which had a significance of 61.9% – the highest in this group. These results also suggest that the desire of Ukrainians to build a just state structure has sharply increased, as the importance of this value has increased from 4.9% to 45.1%.
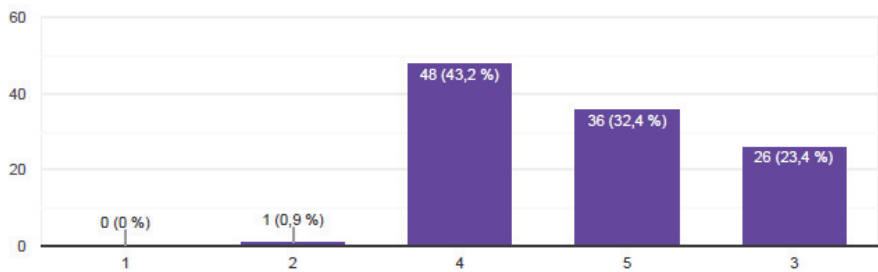
Figure 5. *The importance of public values for young persons
(developed by the authors based on their research)*

Public values were characterized by the fact that a large proportion of young people (43.2%) attached average importance to them in their lives. In the group of public values, the importance of equality of citizens before the law increased from 46.1% in 2014 to 78.1% in 2020, and tolerance for other people's views increased from 26.9% to 56.1% in the same period.
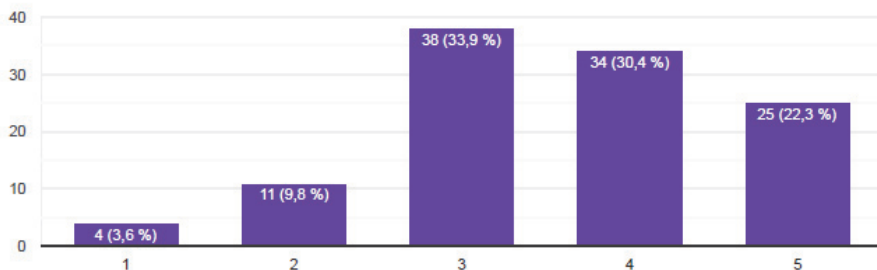
Figure 6. *The importance of digital values for young persons
(developed by the authors based on their research)*

A similar situation was observed with digital values. Again, the most frequent response of young people (33.9%) was to attach average importance to them in their lives. Only 13.4% did not feel that these values were significant in their lives, and 22.3% considered them highly significant.

The analysis of the results of the social survey of the values of the youth of Ukrainian society was carried out based on descriptive statistics using the STATISTICA program package (Table 2).

Table 2. *The descriptive statistics of the results of the social study of the values of the youth of Ukrainian society*

Variable	Valid N	Mean	Me-dian	Mode	Fre-quency of Mode	Mini-mum	Maxi-mum	Std.Dev.	Skew-ness	Kurtosis
National values	111	3.783784	4.0000	4.0000	36	1.0000	5.0000	1.073697	−0.58804	−0.366037
Absolute values	111	4.450450	5.0000	5.0000	67	1.0000	5.0000	0.817299	−1.82190	4.2222614
Public values	111	4.072072	4.0000	4.0000	48	2.0000	5.0000	0.771206	−0.24598	−0.926699
Family values	112	4.669643	5.0000	5.0000	88	1.0000	5.0000	0.727682	−2.54029	7.029489
Digital values	112	3.580357	4.0000	3.0000	38	1.0000	5.0000	1.053851	−0.35680	−0.362429

As can be seen from Table 2, on average, the values given most priority among young people were absolute and family values. The distribution of the survey results for all blocks of values had a right-hand bias, as evidenced by the asymmetry coefficient. This was largest for family and absolute values, at −2.54 and −1.2, respectively.

Interestingly, there was no relationship between the significance of the proposed value blocks for young people, except for between digital and public values. The correlation coefficient between these blocks was 0.53, and the regression equation was:

$$y = 2.46 + 0.45x \tag{1},$$

where x represents public values, and y represents digital values.

The analysis of the obtained results in comparison with previous research on the value orientations of youth in Ukraine testifies to their gradual transformation. In particular, while family and absolute values have maintained their leading positions, the manifestation of public and national values has increased. Besides this development, digital values have become more important, which confirms hypothesis 1.

Transformation of values is an important factor in the development of society as a whole, and specifically in the main areas of cultural, economic, political, and social change.

In this regard, it is worthwhile highlighting some important aspects.

1. Recently, increasing attention is being paid to the knowledge economy, the innovation economy, the circular economy, and economic culture, which are related to the human factor. Therefore, "it is necessary to identify those attitudes, values, beliefs that support economic development, prosperity and prosperity of the nation. Determinants here are the dominant values of the basis of well-being. Prosperous societies that are supporters of the future, education, success, and skill, supporters of the ideals of freedom, community, and justice. The greatest engine

of progress is human creativity. The fastest-growing society, which most success-fully helps its people to realize their creative potential" (Harech 2018).

2. The concept of the circular economy is aimed at decoupling economic growth and development from the consumption of finite resources, which is gaining popularity due to the problems faced by humanity in the 21st century. However, the introduction of this economic concept in different countries around the world is occurring at different rates, which is associated not only with the economic and technological level of development but also with the values in each society regarding the ecological condition of its regions. In Ukraine, this value is growing stronger. According to the social survey conducted in this paper, 61.9 % of young people consider this value a priority.

3. The digitalization of society leads to the development of the digital economy and the corresponding requirements for labour resources, the availability of digital skills, and the values of employees. It should be noted that "a new generation has already emerged, which plays a key role in the success of digital economy companies due to their technological skills. This generation is characterized by the rejection of useless work, titles, bureaucracy, with an inherent desire to work in cross-functional teams, continuous development, and self-expression" (Ustenko and Ruskykh 2019).

4. The development of society and the economic growth of the state is associated with a number of factors, among which a significant place is occupied by the transformation of values, the changing of consciousness of people, their priorities, their life goals, and the direction of their activity. Such a transformation is not rapid and must take a certain evolutionary path. At the same time, in crisis conditions (during internal and external threats) these processes can be accelerated due to the development of civil society, reforms in all its main areas, and the interpenetration of cultural, economic, and social factors.

The results of this empirical study can be used to shape youth policy and educational work in higher education institutions in Ukraine.

Conclusions

The studies presented in this paper allow us to draw the following conclusions.

1. The driving force behind the development of society is youth. The analysis of the results of the empirical study of the value orientations of young people in Ukraine revealed the largest support for the group of traditional values in 2020. This group contained family values and absolute values. At the same time, there is increasing growth and attention towards public and national values. The proposed new group of digital values occupied the middle position. The results of the research testify to the gradual transformation of the value orientation of the youth of Ukrainian society under the influence of the challenges of the 21st century. Hypotheses 2 is accepted;

2. Digital values are becoming increasingly important. However, whether this affects the priority of other values in society has not been established in this study. This is a direction for the further research of the authors.

Thus, like all global processes currently taking place, the process of digitalization will have positive and negative effects on the future of society. On the one hand, it provides endless opportunities in some areas of human existence. However, it also poses global challenges in others. New systems of human life change the system of values, culture, and traditions. They can also lead to psycho-emotional devastation, and can significantly deepen inequality in society based on the different levels of availability of new technologies for different groups. Such inequality can differentiate countries as a whole based on the level of use of advanced technologies, which will lead to a polarization of priorities in the values of the societies in these countries. At the same time, the latest technologies provide ample opportunities in the single-world space for communication, training, and employment, and allow for the solving of global economic problems by:

*   creating new solutions to economic crises by increasing the intensity of scaling the introduction of cryptocurrency systems and the use of other new technologies which provide significant advantages in the international market;
*   overcoming the problem of overproduction by personalizing interaction with clients, virtual logistics, and personal unmanned delivery;
*   creating and providing smart cities and smart settlements, which will increase the economic efficiency of their operation and reduce negative impacts on the environment;
*   improving the quality of life of the elderly population through advances in medicine;
*   solving energy saving problems;
*   providing access to lifelong learning for all segments of the population without spatial and temporal constraints.

It is important to have a global vision of society, to take measures to prepare humanity for change, to develop strategies for information and technological development, and to establish common moral and ethical norms of human existence.

References

1. AKERLOF, J., and SCHILLER, R. 2010. *Animal spirits: how human psychology drives the economy, and why it matters for global capitalism*. Princeton University Press.
2. ARROW, K. 1962. The economic implications of learning by doing. *Review of Economic Studies*, **29**(3), 155–173. https://doi.org/10.2307/2295952
3. ARTJUKHOVICH, J.V. 2015. Transformation of moral values in the information society in the world of scientific discoveries. *V Mire Nauchnykh Otkrytiy*, **65**(5.8), 2925–2943.
4. BELL, D. 1986. Sotsial'nyye ramki informatsionnogo obshchestva [Social framework of the information society]. In: P.S. GUREVICH, ed. *Novaya tekhnokraticheskaya*

volna na Zapade [New technocratic wave in the West]. Moscow: Progress, pp. 330–342.

5. CASTELLS, M. 2000. *Informatsionnaya epokha: ekonomika, obshchestvo i kul'tura* [The age of information: economy, society and culture]. Moscow: GU VSHE.

6. DALY, H., and FARLEY, J. 2004. *Ecological economics: principles and applications*. Washington: Island Press.

7. DIJCK, J. 2020. Governing digital societies: private platforms, public values. *Computer Law & Security Review*, **36**, 105377. https://doi.org/10.1016/j.clsr.2019.105377

8. DUNLEAVY, P., MARGETTS, H., BASTOW, S., and TINKLER, J. 2006. *Digital era governance: IT corporations, the state and e-government*. Oxford: Oxford University Press.

9. GAVKALOVA, N., LOLA, Y., PROKOPOVYCH, S., and ZILINSKA, A. 2020. Socio-political development of countries in information society. Countries of the EU. *E3S Web of Conferences*, **166**, 13015. https://doi.org/10.1051/e3sconf/202016613015

10. GEISSDOERFER, M., SAVAGET, P., BOCKEN, N.M.P., and HULTINK, E.J. 2017. The circular economy – a new sustainability paradigm? *Journal of Cleaner Production*, **143**, 757–768. https://doi.org/10.1016/j.jclepro.2016.12.048

11. GELTZER, J., and GHOSH, D. 14 May 2018. Tech companies are ruining America's image [online]. *Foreign Policy*. Available from: https://foreignpolicy.com/2018/05/14/tech-companies-are-ruining-americas-image/

12. HARECH, V.M. 2018. Kultura, tsinnosti ta ekonomichnyi rozvytok: analiz deiakykh kontseptsii [Culture, values, and economic development: an analysis of the concept's actions]. *Naukovi pratsi*, **56**(1), 144–153.

13. KREMIN, V.H. 2008. *Entsyklopediya osvity* [Encyclopedia of Education]. Kyiv: Yurinkom Inter.

14. MALYI, I.Y. 2020. Teoriya rozpodilu suspil'noho produktu: Monohrafiya [Theory of social product sharing: A monograph]. Kyiv: KNEU.

15. MANZELLI, P. 2004. The changing of values of education in the transformation between industrial society and the world wide incoming knowledge society. *Encuentro Internacional de Educación en Valores*. Available at: https://www.edscuola.it/archivio/lre/changing.htm

16. MARX, K. 1961. Kapital [Capital]. Moscow: Gospolitizdat.

17. MATUSEVYCH, T. Values transformation in transitional societies:revolution or eclecticism? Available at: https://www.academia.edu/33700533/VALUES_TRANSFORMATION_IN_TRANSITIONAL_SOCIETIES_REVOLUTION_OR_ECLECTICISM

18. METELEVA, T.O. 2016. System of values as a factor of society transformation: fundamental values and existential values. Гілея: науковий вісник [Gilea: Scientific Bulletin], **115**(12), 210–215.

19. MILL, J.S. 2007. Osnovy politicheskoy ekonomii s nekotorymi prilozhenimi k sotsialnoy filisofii [Principles of political economy: with some of their applications to social philosophy]. Moscow: Eksmo.

20. MINISTRY OF JUSTICE. n.d. Molod': yiyi prava ta sotsial'ne stanovlennya v su-chasniy Ukrayini [Youth: rights and social formation in modern Ukraine]. *Minis-terstvo Yustytsiyi* [online]. Available at: https://minjust.gov.ua/m/str_41555

21. NORTH, D. K. 1990. Instituty, institutsional'nyye izmeneniya i funktsionirovani-ye ekonomiki [Institutions, institutional change and economic performance]. Translated by A. N. Nesterenko. Moscow: Fond ekonomicheskoy knigi Nachala.

22. POLANYI, K. 2014. Velikaya transformatsiya: Politicheskiye i ekonomicheskiye istoki nashego vremeni [The great transformation: the political and economic origins of our time]. Originally published in 1944. St Petersburg: Aleteyya.

23. RADULA, V., ed. 2004. Sotsioloho-pedahohichnyy slovnyk [Sociological and pedagogical dictionary]. Kyiv: EksOb.

24. RIKARDO, D. 2007. *Nachala politicheskoy ekonomii i nalogovogo oblozheniya* [The beginning of political economy and taxation]. Moscow: Eksmo.

25. SCHUMPETER, J. 1934. *The theory of economic development*. Harvard Economic Studies.

26. SMITH, A. 2007. *Issledovaniye o prirode i prichinakh bogatstva narodov* [An in-quiry into the nature and causes of the wealth of nations]. Moscow: Eksmo.

27. STATE INSTITUTE OF FAMILY AND YOUTH POLICY. 2020. *Report on the results of an online survey among young people aged 14–34 "Digital technologies in youth work"* [report]. Available at: https://dismp.gov.ua/zvit-za-rezultatamy-onlajn-opytuvannia-sered-molodi-vikom-14-34-roky-tsyfrovi-tekhnolohii-v-molodizhnij-roboti/

28. TOFFLER, O. 1982. *The third wave*, 7th edition. Bantam books.

29. USTENKO, M.O., and RUSKYKH, A.O. 2019. Didzhytalizatsiia: osnova konkurentospromozhnosti pidpryiemstva v realiiakh tsyfrovoi ekonomiky. *Vis-nyk ekonomiky transportu i promyslovosti*, **68**, 118–192.

30. WILBER, J.J. 1927. *James B. Duke: master builder*. New York: George H. Doran Company.

FINANCIAL DEVELOPMENT AND BANK RISK-TAKING: EMPIRICAL EVIDENCE FROM THE USA

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Abstract. *This study explores the impact of financial development on the risk-taking of large commercial banks over the prolonged period from 2002 to 2019 by using a two-step system GMM method. The findings confirm that financial development has a significant and positive relationship with bank risk-taking when measured by capital ratio or Z-score. In contrast, the impact of financial development on risk is negative when measured by risk-weighted assets. The empirical results explore the idea that financial development significantly impacts the risk-taking of adequately-capitalized, under-capitalized, significantly under-capitalized, high, and low liquid banks in the USA. These findings show that the impact of financial development on banks' risk-taking was higher in the pre-crisis era than during and after the financial crisis. These results remain robust in view of different proxies and methodologies. The heterogeneous outcomes for different categories of bank in present economic conditions and in pre-, amid-, and post-crisis eras have practical implications for regulators, policymakers, investors, managers, and economists.*

Keywords*: financial development, risk-taking, capital ratio, z-score*

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JEL: *G21, E22, O16*

1. Introduction

Financial development is a multidisciplinary term that encompasses a potentially significant framework for long-term financial and economic development (Hussain and Kumar Chakraborty 2012). It plays a vital role in the stability and growth of the banking sector (Demirgüç-Kunt and Huizinga 2000). Financial development not only increases the volume of financial services provided by financial institutions, but also significantly influences the severity of financial or economic crises. Financial development also increases the demand for funds in the financial system. Therefore, higher financial development imparts higher competition in financial markets. Higher competition eradicates abnormal profit, and encourages financial organizations toward higher risk-taking to sustain their profits.

The literature on bank risk-taking and financial performance is voluminous, but it has failed to investigate the impact of financial development, particularly in US banking from 2002 to 2019. Therefore, the partial nature of the literature in this field motivates the authors to explore the following questions regarding the impact of financial development on the risk-taking behavior of the large insured commercial banks of the USA. How does financial development influence the risk-taking behavior of large insured commercial banks in the USA? Is the relationship similar in the pre, amid, and post-crisis periods? Is the influence of financial development identical for well-capitalized, adequately capitalized, under-capitalized, significantly under-capitalized, high, and low liquid large insured commercial banks?

This study explores the influence of financial development on bank risk-taking, measured as the capitalization, risk-weighted assets, and Z-score of the large insured commercial banks in the USA from 2002 to 2019. The role of economic activities simultaneously remains significant in influencing the development, progress, and stability of financial institutions. This research is motivated by a number of recent studies, including: Shahbaz, Bhattacharya, and Mahalik 2018; Tran and Nguyen 2020; Vithessonthi 2014a; and Vithessonthi and Tongurai 2016. Currently, the relationship between financial development and bank risk-taking is an emerging debate among policymakers, researchers, decision-makers, regulators, and economists. For example, Vithessonthi's (2014a) was the first study that attempted to explore the impact of financial development on the risk-taking behavior of banks in Southeast Asian Economies. Recently, this work was extended by Tran and Nguyen (2020), who studied similar economies in Asia. Vithessonthi (2014b) also provided evidence for the influence of financial development on the risk-taking of Thai banks. However, as yet there has been no work studying the impact of financial development on the risk-taking of commercial banks in the USA. To the best of our knowledge, in the specific context of the USA, the only relevant study is from Vithessonthi and Tongurai (2016), who investigated the role of financial development on the risk-taking of 37 commercial banks in seven South American states from 1991 to 2012.

Our study contributes to the existing literature on the impact of financial development on the risk-taking behavior of commercial banks in many ways. First, this research systematically explores the impact of financial development on banks' risk-taking in the USA, which has received scant attention thus far. Second, this study examines the relationship between financial development and risk-taking in various market conditions (pre, amid, and post-crisis periods). Third, this study adds to the current literature by looking into the impact of financial development on risk-taking for well-capitalized, adequately capitalized, under-capitalized, significantly under-capitalized, high-, and low-liquid major insured commercial banks. Lastly, from a policy perspective, the empirical predictions of this study are unique because they shed light on the links between various proxies of bank risk-taking and financial development for appropriate decision-making and regulation in banking.

This study provides various insights that should be considered when dealing with the risk-taking and stability of commercial banks in the US. For example, the results confirm a significant relationship between financial development, risk-taking, and the stability of commercial banks. The impact of financial development on risk-taking is not identical across various categories of banks in the US. The results in this paper show that financial development increases the risk-taking of commercial banks when risk is measured as capital ratio. These results explore the notion that financial development is critical for adequately capitalized, under-capitalized, significantly under-capitalized, high, and low liquid major insured commercial banks. The outcomes of this paper also conclude that the impact of financial development on the risk-taking of commercial banks is not identical in pre-, amid, and post-crisis eras.

This study is organized as follows: the subsequent Section briefly discusses surrounding literature and the development of the hypotheses; the third Section contains the data and the econometric model; the fourth Part consists of the discussion of results; and the final Section provides conclusions and policy recommendations.

2. Review of Literature

2.1. Theoretical Framework

Theories linking bank risk-taking to economic indicators are not scarce in the banking literature. Banking literature studying the correlation between macroeconomic activities and their basis in the financial system goes back to the theories presented by Bernanke, Gertler, and Gilchrist (1998), and King and Plosser (1982). Pesaran, Schuermann, Treutler, and Weiner (2006), for example, presented a model that linked the business cycle and the credit portfolios of banks. The countercyclical hypothesis suggests that banks take on higher risk in poor economic conditions to sustain their returns, whereas the pro-cyclical hypothesis suggests that banks take on higher risk in good economic conditions (Jokipii and Milne 2008). Rapid growth in the financial system motivates financial institutions to take on higher risk at a lower capital basis, which is in line with the moral hazard hypothesis (Espenlaub, Khurshed, and Sitthipongpanich 2012). Higher financial

development increases the competition among firms to sustain their market value, in line with the financial fragility hypothesis and the financial stability hypothesis in banking (Beck 2008; Marcus 1984). In boom economic conditions, the regulatory hypothesis suggests that financial firms increase their capital base with increased risk (Shrieves and Dahl 1992). Finally, yet importantly, through various channels, the agency theory always remains critical in financial literature. Higher risk-taking may become beneficial for management in the shape of higher compensation in terms of wages, and for shareholders in terms of higher returns.

2.2. Hypotheses Development

Financial development has a positive influence on economic activities (Guiso, Sapienza, and Zingales 2004; Ndikumana 2005); simultaneously, it increases the risk-taking of financial institutions. Because financial development creates demand for loans and financial institutions lend more to earn higher profits, the risk of financial firms is increased (Foos, Norden, and Weber 2010). Gimet and Lagoarde-Segot (2012) argue in their study that a boost in the stock market increases the demand for loans, which lead banks to take higher risks. Theoretically, the idea of a positive relationship between financial development and bank risk-taking is in line with the competition fragility hypothesis (Beck 2008; Marcus 1984). Conversely, higher financial development may decrease a financial institutions' risk-taking (Vithessonthi and Tongurai 2016). This notion is consistent with the argument of Vithessonthi and Tongurai (2016), who suggest that when financial markets further develop commercial banks face higher competition, which increases the risk-taking of banks seeking to achieve higher profits. In the case of increased financial development, more opportunities are created for investors to secure higher profits that improve the repaying ability of investors to financial institutions. This suggests that an increase in financial development decreases the default risk of commercial banks.

Moreover, financial development influences risk-taking arising from bank lending. Therefore, this phenomenon is significant for policymakers and regulators in understanding the effect of financial development on bank risk-taking. A workaround towards regulation that incorporates the impact of financial development and commercial bank risk-taking is lacking. The existing literature provides evidence that the growth of financial markets and other economic activities contributes to the stability, progress, and development of the financial system. The relationship between economic activities and financial institutions is obvious, and is mandatory in propagating the economic cycle (Hussain and Kumar Chakraborty 2012). The literature supports the positive effect of financial development on economic activities (Levine and Zervos 1998; Merton 1995). Fundamentally, the development of financial markets affects the efficiency of financial services, the distribution of funds, risk management, and the economical flow of money. Improvements in the financial system (e.g., improvements in bank guidelines) may also affect how banks operate and behave. These improvements can have either a positive or a detrimental effect on the soundness of the financial structure and the stability of the monetary framework (Vithessonthi and Tongurai 2016). Theoretically,

financial development may positively or negatively influence the risk-taking of commercial banks. The empirical literature provides evidence that financial development creates opportunities to efficiently allocate funds and to optimize investment portfolios at lower risk (Beck 2008; Law, Tan, and Azman-Saini 2015).

Tran and Nguyen (2020) examined the impact of financial market development on risk-taking in six Southeast Asian economies. Their study concluded that the effect of financial development on the Z-score index was positive and significant, and that the impact of financial development was negative on non-performing loans. Vithessonthi (2014a) explored the influence of financial development on the risk-taking of banks in Asian countries. Their study found that an increase in financial development increased the risk-taking of banks. Vithessonthi (2014b) also conducted a study in Thailand, which confirmed that there was a negative and significant relationship between stock market development and bank risk-taking. This study also suggested that an increase in financial market development decreased the risk-taking of Thai banks. Despite the gainful impacts of financial development on the risk-taking of banks, there has been limited exploration of its conceivable detrimental impacts on banks and financial frameworks. In light of the ambiguous and inconclusive nature of the surrounding literature, we have developed the following hypothesis:

Hypothesis 1: Financial development positively affects the risk-taking of large commercial banks in the USA.

Bikker and Metzemakers (2005) provided evidence to suggest that economic activities/business cycles significantly influence bank risk-taking. According to their findings, banks lend more in expansionary economic conditions and decrease lending during contractionary economic conditions. Their study also documented banks experiencing an abnormal rise in non-performing loans under weak economic conditions (such as the financial crisis). To extend the debate surrounding economic activities to their influence on the risk-taking of commercial banks, Abbas and Masood (2020) concluded that the adjustment of bank capital ratios was not similar in pre, amid, and post-crisis eras. Claessens, Kose, and Terrones (2012) discussed and compared the business cycle and bank risk-taking in emerging and developed economies. They concluded that the impact of the business recession on decreasing output was doubled in emerging economies compared to in developed countries. Abbas, Ali, and Rubbaniy (2021) documented that the speed of regulatory capital ratio adjustment varies across different market conditions (pre, amid, and post-crisis periods). Williams and Nguyen (2005) argued that financial liberalization in Southeast Asian economies boosts the performance of commercial banks. Espenlaub et al. (2012) provided evidence in favor of moral hazard issues due to financial reforms in Asian countries after the financial crisis.

Hypothesis 2: The impact of financial development on banks' risk-taking varies with market conditions (pre, amid, and post-crisis periods).

Abbas, Batool, and Sulehri (2020) recently investigated the impact of trade, investment, and financial freedom on the risk-taking of well-capitalized, under-capitalized, high, and low liquid US banks. Their study concluded that their findings were not identical for all categories of banks. Abbas, Yousaf, Ali, and Wong (2021) investigated the

role of economic growth on risk-taking and bank capital ratios based on the characteristics of banks regarding liquidity and capitalization. Their study explored heterogeneous findings for well-capitalized, under-capitalized, high, and low liquid banks in the US. Vithessonthi and Tongurai (2016) conducted a study in South America to assess the impact of financial development on risk-taking, and in their analysis proved that financial market development boosts bank capitalization and decreases the dependence of banks on non-traditional banking activities. Their study concluded that financial development, on average, reduces bank risk-taking. Abbas and Masood (2020) concluded in their study that the adjustment of well-capitalized, under-capitalized, high, and low-liquid banks is not similar. Abdul Hamid, Azmi, and Ali (2020) explored the impact of financial development on bank capitalization, noting that it is not similar between Islamic and conventional banks. Abbas and Ali (2020) reported on the differences between state-charter member and non-member banks in their study. In light of the ambiguous and inconclusive nature of the literature, we have developed the following hypothesis:

Hypothesis 3: The impact of financial development on risk-taking varies across the characteristics of banks.

3. Data and Methodology

3.1 Data and Sample Selection

To obtain results on how financial development influences the risk-taking of major US commercial banks, bank-specific data for 2002–2019 were collected from the balance sheets and the income statements of commercial banks available at the Federal Deposit Insurance Corporation (FDIC).[1] The data for financial development indicators, trade openness, real gross domestic products, and inflation rate were taken from the World Bank[2] indicators database. The study sample comprises US-insured commercial banks as defined in FDIC reports and, further, involves assets on a consolidated basis. In nearly 1806, several banks were listed as on dated 31 December 2019.[3] For definitions of variables and details of proxy measurement, see Table 1.

Nevertheless, for sufficient and reliable data analysis, the criteria for inclusion into the study sample were as follows: on the stated date, the status of the listed bank must be active; there must be no missing data for dependent variables for any period; and the bank's assets must total at least $300 million as of 31 December 2019. After filtering based on the above parameters, 945 banks were selected for the study. If the overall risk-based capital ratio of a bank was 10% or above, it was characterized as well-capitalized, if the ratio was between 8% and 10% it was graded as adequately-capitalized, and if the ratio was less than 8% it was considered under-capitalized. This study also classified the sample into high- and low-liquid banks based on the average liquidity ratio.

1 https://www7.fdic.gov/idasp/advSearchLanding.asp
2 https://data.worldbank.org/indicator
3 https://www.federalreserve.gov/releases/lbr/current/

Table 1. *Variables measurement*

Variables Names	Measurements
Capital ratio	Total equity/Total assets (Abbas, Rubbaniy and Ali 2021; Tongurai and Vithessonthi 2020)
Risk-based capital ratio	Tier-I plus Tier-II/risk-weighted assets (Vithessonthi 2014b)
Bank Risk-taking (RWA)	Risk-weighted assets/total assets (Abbas and Masood 2020)
Z-score Index	Equity/ta Plus ROA/σ of ROA (Jiang, Levine, and Lin 2017; Tran and Nguyen 2020)
Financial Development (SMC)	Market Capitalization to GDP ratio (Abdul Hamid et al. 2020)
Financial Development (DCB)	Domestic credit to the private sector by banks to GDP ratio (Abdul Hamid et al. 2020)
Financial Development (BSD)	Banking industry assets to GDP ratio (Demirgüç-Kunt and Huizinga 2000)
Liquidity	Liquid assets/total assets (Yousaf, Ali and Hassan 2019a)
Profitability	Net income/total assets (Yagli 2020)
Loans ratio	Net loans/total assets (Ali, Shah and Chughtai 2019)
Deposits ratio	Deposits/total assets (Vithessonthi 2014b)
Bank size	Natural log of total assets (Yousaf, Ali and Hassan 2019b)
Business trend	Real gross demotic product (Tran and Nguyen 2020)
Trade Openness	Import plus exports/GDP ratio (Tran and Nguyen 2020)
Inflation rate	Consumer Price Index

3.2 Econometric Model

The primary purpose of this study is to highlight the impact of financial development on bank risk-taking. This econometric relationship can be shown in the following equations:

$$Y_{i,t} = \alpha + \beta_1 X_{i,t} + \beta_2 Z_{i,t} + \eta_t + \upsilon_t + \varepsilon_{i,t} \qquad (1)$$

Here, Y represents the dependent variable of risk-taking (bank capitalization, RWA, and Z-score index), α is a constant, i is a cross-section which is a bank, t is time in the form of a year, X represents the independent variable of financial development (DCB, SMC, and BSD), Z represents control variables that include liquidity, profitability, loan growth, deposit ratio, bank size, trade openness, real gross domestic product, and inflation rate. The symbol represents bank-fixed effects, represents period-fixed effects, and

represents the zero-mean disturbance term. The above equation (1) represents the static form of the regression model. The results of a static econometric model of linear regression do not incorporate various issues of autocorrelation, heteroscedasticity of model parameters, or data simultaneity, and hence lead to a biased result. In order to avoid issues of endogeneity (mainly taken as the correlation of several explanatory variables with their error terms in the respective model) and a dependence on lagged information from such endogenous variables, this study demonstrates a dynamic panel dataset methodology for the estimation of unbiased, precise, and consistent estimators (Arellano and Bond 1991; Roodman 2009; Vithessonthi and Tongurai 2016). Further, the widely used technique of the two-step linear GMM estimator model is used in the analysis, as it is considered to be more suitable and reliable than the panel estimators described in one-step GMM linear models (Windmeijer (2005). The model equation below shows the dynamic nature of the two-step panel dataset approach:

$$Y_{i,t} = \alpha + \beta_1 Y_{i,t-1} + \beta_2 X_{i,t} + \beta_3 Z_{i,t} + \varepsilon_{i,t} \tag{2}$$

Here, represents the lagged values of dependent variables in bank risk-taking. The coefficient concerning the economic variables of the study exerts a short-term impact on a bank's risk-taking exposure in the econometric models described above. This study highlights the influence of financial development on the bank's risk-taking conditions for the three proxies of pre-crisis, amid-crisis, and post-crisis periods. The following model equation shows the inclusion of dummies () of explanatory variables for the description of the crisis period:

$$Y_{i,t} = \alpha + \beta_1 Y_{i,t-1} + \beta_2 X_{i,t} + \beta_3 TD_{i,t} + \beta_4 Z_{i,t} + \varepsilon_{i,t} \tag{3}$$

4. Empirical Analysis

4.1 Descriptive Statistics

Table 2 contains information on the proxies used to investigate the impact of financial development on risk-taking. The statistics indicate that the average ratio of capital was 10.2%, with a standard deviation of 1.8%. The average percentage of risk-weighted assets was 72.5%, with a standard deviation of 11%. The average financial development (SMC) was 7.8%, with a standard deviation of 0.8%. The mean value of financial development (DCB) was 53%, with a standard deviation of 3%. No abnormality was found in the descriptive statistics, and these values are in line with previous studies in a similar context.

Table 2. *Descriptive statistics*

Variable	Obs	Mean	Std. dev.	Min	Max
Risk-based capital	16,065	0.141	0.027	0.024	0.275
Capital	16,065	0.102	0.018	0.065	0.173
Risk-taking (RWA)	16,065	0.725	0.110	0.360	1.154
Z-score index	16,065	0.269	0.173	−0.125	0.720
Financial Development (SMC)	16,065	0.078	0.008	0.061	0.088
Financial development (DCB)	16,065	0.530	0.030	0.494	0.598
Financial development (BSD)	16,065	0.137	0.027	0.097	0.184
Liquidity	16,065	0.048	0.027	−0.054	0.156
Profitability	16,065	0.009	0.005	−0.051	0.027
Loans	16,065	0.714	0.148	0.044	1.185
Deposits	16,065	0.139	0.271	−0.171	2.909
Size	16,065	13.58	0.950	12.259	15.538
Trade openness	16,065	0.154	0.012	0.130	0.174
Business trend	16,065	0.020	0.014	−0.025	0.038
Inflation rate	16,065	1.934	0.649	0.759	3.218

Source: *authors' calculation using Stata.*

Table 3. *Pairwise correlations*

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Capital	1												
RWA	0.039*	1											
Z-score index	0.163*	-0.107*	1										
SMC	-0.064*	0.038*	-0.005	1									
DCB	-0.130*	0.121*	-0.030*	0.144*	1								
Liquidity	0.036*	-0.150*	-0.081*	-0.176*	-0.207*	1							
Profitability	0.062*	0.026*	0.105*	0.253*	0.012	-0.074*	1						
Loan	-0.084*	0.648*	-0.109*	0.090*	0.148*	-0.151*	0.034*	1					
Deposit	0.010	0.019*	0.071*	-0.004	-0.005	0.032*	0.025*	-0.073*	1				
Size	0.134*	0.112*	0.133*	-0.109*	-0.096*	-0.064*	-0.040*	-0.038*	0.101*	1			
Trade openness	0.070*	-0.009	0.021*	-0.140*	0.253*	0.042*	0.001	-0.011	0.001	0.086*	1		
Business trend	0.018*	-0.011	0.012	0.638*	-0.211*	-0.061*	0.166*	0.005	-0.000	-0.024*	0.062*	1	
Inflation	-0.097*	0.035*	-0.018*	0.543*	0.465*	-0.193*	0.132*	0.083*	-0.005	-0.127*	0.277*	0.546*	1

* shows significance at the .05 level. Here, due to issues of space, we use the following acronyms for financial development: stock market development (SMC), domestic credit provided by banks to the private sector (DCB), and risk-weighted assets to total assets (RWA).

Table 3 reports the correlation results among the proxies used in the analysis. These findings confirm that there was no problem with the high correlation between explanatory variables. Moreover, it was also found that the relationship among variables was as per

the economic theory. The low correlation between explanatory variables also indicated that there was no problem with high multicollinearity. The findings of the correlation matrix are in line with those of previous studies.

4.2 Base model results for the full sample of banks

Table 4. *The results of the impact of financial development on bank risk-taking for the full sample of banks*

VARIABLES	(1) Capital ratio	(2) RWA	(3) Z-Score	(4) Capital ratio	(5) RWA	(6) Z-Score
Lagged risk-taking	0.805***	0.797***	0.960***	0.791***	0.833***	0.996***
	(0.040)	(0.030)	(0.034)	(0.042)	(0.030)	(0.031)
SMC	−0.089**	−1.188***	0.998***			
	(0.035)	(0.369)	(0.259)			
DCB				−0.017**	−0.146***	0.237***
				(0.007)	(0.044)	(0.059)
Liquidity	−0.014***	−0.509***	−0.030*	−0.014***	−0.504***	−0.008
	(0.004)	(0.022)	(0.016)	(0.004)	(0.021)	(0.017)
Profitability	0.281***	0.661***		0.269***	0.492***	
	(0.026)	(0.130)		(0.024)	(0.100)	
Loans	−0.009***	0.082***	−0.031***	−0.009***	0.067***	−0.029***
	(0.001)	(0.014)	(0.004)	(0.001)	(0.013)	(0.004)
Deposits	−0.001	0.004**	0.001	−0.001	0.003*	−0.001
	(0.000)	(0.002)	(0.002)	(0.000)	(0.002)	(0.001)
Size	0.001***	−0.001*	0.001	0.001***	−0.002***	0.001
	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
Business trend	0.004	0.520***	−0.169**	−0.028***	0.166***	0.222***
	(0.010)	(0.088)	(0.068)	(0.009)	(0.050)	(0.044)
Trade openness	0.001***	0.001***	−0.001	0.001***	0.001***	−0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Inflation	0.001**	0.002	−0.003***	0.001**	0.001	−0.005***
	(0.000)	(0.002)	(0.001)	(0.000)	(0.001)	(0.001)
Constant	0.020***	0.181***	−0.043**	0.024***	0.169***	−0.100***
	(0.005)	(0.028)	(0.019)	(0.006)	(0.024)	(0.032)
Observations	16,065	16,065	16,065	16,065	16,065	16,065
Number of id	945	945	945	945	945	945
No. of instruments	12	12	11	12	12	11
AR (2)	0.188	0.069	0.729	0.183	0.159	0.578
Hansen values	0.102	0.304	0.169	0.094	0.366	0.422

Robust standard errors are reported in parenthesis (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$)

Table 4 contains the findings of a two-step GMM system framework. Table 4, column 1, reports the impact of stock market capitalization (SMC) on bank capitalization. These findings reject hypothesis 1 of the study. The results show that SMC and domestic credit provided by banks to the private sector (DCB) increase the risk-taking of commercial banks by lowering their capitalization, which is in line with the moral hazard hypothesis (Jacques and Nigro 1997)1997. The negative relationship between bank capitalization and the business cycle is also consistent with the findings of other authors (Ayuso, Pérez, and Saurina 2004; Lindquist 2004; Stolz and Wedow 2011), and contradicts (Abdul Hamid et al. 2020; Vithessonthi 2014b). In line with the findings of other authors, (Williams and Nguyen 2005) financial development decreases risk-taking by reducing investment in risk-weighted assets. However, SMC and DCB are better for the stability of large commercial banks.

These findings show a negative and statistically significant relationship between SMC and bank capitalization. The negative impact of SMC indicates that an increase in stock market business tends to decrease bank capitalization. Because of the rise in SMC, the demand for loans increases, boosting risk-taking behavior among banks. This argument is in line with the hypothesis of competition fragility in banking. Table 4, column 2 contains the results for the impact of SMC on bank risk-taking when measuring the ratio of risk-weighted assets to total assets. These findings reveal that there is a negative relationship between bank risk-taking and SMC. Development in the stock market decreases the investment of commercial banks in risky assets as it motivates banks to invest in the stock market, which represents a better opportunity than lending to risky borrowers. SMC reduces the dependence of commercial banks on investing in risky assets, because SMC provides opportunities to invest in the stock market and attain higher profits at a lower risk than risky assets in a shorter period. In banking literature, this justification is consistent with the competition stability hypothesis. The third proxy of bank risk-taking is the Z-score index. The results of Table 4, column 3, provide robust evidence in favor of the competition stability hypothesis. These findings allow us to explore the idea that a positive change in SMC contributes to stabilizing commercial banks in the USA. According to our empirical predictions, stock market development is favorable for the stability of the financial system in the USA.

The second proxy of financial development is DCB. This proxy is more specific to banking operations than the measurement of SMC. Table 4, columns 4, 5, and 6, contain the impact of DCB on bank capitalization, ratio of risk-weighted assets to total assets, and Z-score index. Surprisingly, concerning the sign and significance, these findings are in line with the proxy of SMC. The impact of DCB on bank capitalization and risk-weighted asset ratio is significant and negative.

On the contrary, the impact on Z-score is significant and positive. These findings confirm that financial development increases the stability of commercial banks. The role of the control variables is significant and in line with the outcomes of prior studies (Abdul Hamid et al. 2020; Tran and Nguyen 2020; Vithessonthi 2014b; Vithessonthi and Tongurai 2016) which have concluded, for example, that profitability has a positive and significant influence on bank capitalization and risk-weighted asset ratio. The roles of liquidity, bank size, loan ratio, business trend, trade openness, and the inflation rate are

decisive and significant. The sign and significance of control variables remained consistent throughout this analysis.

Table 5. *The results of the impact of financial development on bank risk-taking for well-capitalized, adequately capitalized, under-capitalized, and significantly under-capitalized banks*

	(1)	(2)	(3)	(4)	(5)	(6)
Panel-A: Well-capitalized banks						
VARIABLES	Capital ratio	RWA	Z-Score	Capital ratio	RWA	Z-Score
Lagged risk-taking	0.769***	1.016***	0.850***	0.671***	0.848***	0.738***
	(0.057)	(0.100)	(0.087)	(0.070)	(0.068)	(0.110)
SMC	−0.259**	−2.075**	−0.959			
	(0.126)	(0.897)	(1.035)			
DCB				−0.018	−0.595***	0.494
				(0.032)	(0.179)	(0.446)
Panel-B: Adequately-capitalized banks						
Lagged risk-taking	0.797***	0.841***	0.717***	0.504***	0.870***	0.959***
	(0.127)	(0.122)	(0.138)	(0.061)	(0.081)	(0.213)
SMC	−0.212***	1.279**	3.220***			
	(0.062)	(0.498)	(0.943)			
DCB				−0.022*	−0.058	0.179**
				(0.013)	(0.183)	(0.084)
Panel-C: Under-capitalized banks						
Lagged risk-taking	0.803***	0.770***	0.925***	0.805***	0.816***	0.922***
	(0.056)	(0.039)	(0.039)	(0.056)	(0.037)	(0.040)
SMC	−0.217***	−1.233*	0.967***			
	(0.080)	(0.704)	(0.328)			
DCB				−0.045**	−0.157*	0.235***
				(0.020)	(0.087)	(0.080)
Panel-D: Significantly Under-capitalized banks						
Lagged risk-taking	0.819***	0.740***	0.847***	0.831***	0.596***	0.846***
	(0.029)	(0.033)	(0.038)	(0.031)	(0.042)	(0.037)
SMC	−0.295***	0.474**	0.619***			
	(0.050)	(0.199)	(0.170)			
DCB				0.133***	0.182***	−0.228**
				(0.024)	(0.036)	(0.094)

Robust standard errors are reported in parenthesis (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$)

Table 5 reports the results for well, adequately, under, and significantly under-capitalized large commercial banks. Table 5, Panel-A contains the results for well-capitalized banks. These findings confirm that an increase in financial development decreases the risk of well-capitalized banks when risk is measured by risk-weighted assets, whereas it i

ncreases the risk when measured by bank capital ratio findings that are in line with those of other scholars (Ayuso et al. 2004; Espenlaub et al. 2012). On the contrary, the relationships between financial development, bank capitalization, and the Z-score index are insignificant. In the interpretation of the authors, well-capitalized banks are already at their optimal business level, as a result of which financial development has no impact on their operations. Table 5, Panel-B, columns 1 to 6 consist of the findings of adequately-capitalized banks. This empirical output shows that financial development increases the risk-taking of adequately-capitalized banks by lowering bank capitalization (Lindquist 2004; Stolz and Wedow 2011) and increasing risk-weighted assets. However, positive changes in SMC and DCB increase the stability of adequately capitalized banks. Table 5, Panel-C, columns 1 to 6 report the findings of under-capitalized banks. These empirical results show that these findings are in line with the baseline model. Financial development increases the risk-taking of under-capitalized banks by lowering capitalization (Espenlaub et al. 2012; Stolz and Wedow 2011), and decreases risk-taking by reducing investment in risk-weighted assets and contributing to the stability of under-capitalized banks (Williams and Nguyen 2005). These results remain robust for under-capitalized banks in view of SMC and DCB. Table 5, Panel-D contains the findings for significantly under-capitalized large commercial banks. These results show that SMC increases the risk-taking of significantly under-capitalized banks by lowering capitalization and increasing investment in risk-weighted assets. However, SMC is better for the stability of significantly under-capitalized banks.

On the other hand, an increase in DCB has a positive impact on bank capitalization and an increase in risk-weighted assets. According to the banking literature, this argument aligns with the regulatory hypothesis (Ding and Sickles 2018; Jokipii and Milne 2011; Shrieves and Dahl 1992). However, excessive credit to the private sector has a negative impact on the stability of significantly under-capitalized banks.

Table 6. *The impact of financial development on bank risk-taking –*
results for high and low-liquid banks

	(1)	(2)	(3)	(4)	(5)	(6)
Panel-A: High-Liquid Banks						
VARIABLES	Capital ratio	RWA	Z-Score	Capital ratio	RWA	Z-Score
Lagged risk-taking	0.748***	0.932***	0.808***	0.676***	0.938***	0.839***
	(0.037)	(0.052)	(0.061)	(0.033)	(0.051)	(0.061)
SMC	−0.203***	−0.440*	1.254***			
	(0.027)	(0.246)	(0.462)			
DCB				−0.019***	−0.089**	0.182***
				(0.006)	(0.039)	(0.037)
Constant	0.042***	0.058**	−0.068*	0.047***	0.072***	−0.072**
	(0.006)	(0.025)	(0.039)	(0.007)	(0.026)	(0.033)
AR (2)	0.657	0.086	0.236	0.654	0.110	0.177
Hansen value	0.567	0.302	0.936	0.773	0.562	0.068
Panel-B: Low-Liquid banks						

	(1)	(2)	(3)	(4)	(5)	(6)
Lagged risk-taking	0.776***	0.779***	0.904***	0.737***	0.668***	0.907***
	(0.041)	(0.035)	(0.023)	(0.044)	(0.048)	(0.022)
SMC	−0.674***	0.390	0.589***			
	(0.112)	(0.403)	(0.165)			
DCB				−0.203***	0.122***	0.120***
				(0.042)	(0.034)	(0.031)
Constant	0.062***	0.157***	0.001	0.122***	0.132***	−0.019
	(0.008)	(0.029)	(0.018)	(0.022)	(0.029)	(0.021)
AR (2)	0.436	0.826	0.435	0.137	0.598	0.504
Hansen value	687	0.637	0.165	0.123	0.119	0.317

Robust standard errors are reported in parenthesis (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$)

Table 6 contains the results for high and low liquid large commercial banks by using two-step GMM methods. In Table 6, Panel-A and Panel-B report the results for the impact of SMC on the risk-taking of high and low-liquid large commercial banks, respectively. Consistent with our baseline predictions, financial development increases the risk-taking of high and low-liquid large commercial banks by lowering capitalization, in line with other studies (Espenlaub et al. 2012). However, the impact of SMC is more significant in influencing low liquid than high-liquidity large commercial banks. These findings confirm that the effect of SMC is weak in reducing the risk-weighted assets of high-liquid banks.

In contrast, the coefficient of SMC is positive but insignificant in influencing the risk-weighted assets of low-liquid banks. The above results show that SMC is beneficial for the stability of commercial banks. However, SMC more significantly influences the stability of high liquid than low-liquid commercial banks. Table 6, Panel-A, columns 4 to 6 and Table 6, Panel-B, columns 4 to 6 report the results of the impact of DCB on the risk-taking of high and low-liquid large commercial banks, respectively. These findings show that an increase in the credit supplied to the private sector increases the risk-taking of high-liquid banks by lowering capitalization (Espenlaub et al. 2012; Lindquist 2004).

In contrast, an increase in DCB decreases risky assets (Williams and Nguyen 2005). These findings are different for low-liquid banks. For example, financial development increases low-liquid banks' risk-taking by lowering capitalization ratios and increasing investment in risk-weighted assets. This argument is in line with the moral hazard hypothesis in banking. However, financial development, when measured as DCB, is beneficial for the stability of high- and low-liquid large commercial banks.

4.3 The results of the pre, amid, and post-crisis periods

Table 7. *The impact of financial development on bank risk-taking results for the pre, amid, and post-crisis periods*

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Capital ratio	RWA	Z-Score	Capital ratio	RWA	Z-Score
Lagged risk-taking	0.763***	0.814***	0.892***	0.831***	0.842***	0.822***
	(0.028)	(0.034)	(0.025)	(0.050)	(0.035)	(0.030)
SMC	−0.076**	0.929***	0.671***			
	(0.033)	(0.155)	(0.157)			
SMC*BCD	−0.072***	0.452***	0.243**			
	(0.012)	(0.064)	(0.103)			
SMC*DCD	−0.048***	0.265***	0.166**			
	(0.010)	(0.049)	(0.074)			
DCB				0.150***	−0.354***	0.270***
				(0.055)	(0.055)	(0.041)
DCB*BCD				−0.050***	0.104***	−0.057***
				(0.013)	(0.010)	(0.008)
DCB*DCD				−0.050***	0.101***	−0.060***
				(0.014)	(0.010)	(0.008)
Constant	0.031***	−0.018	−0.047**	−0.019	0.165***	−0.048**
	(0.003)	(0.018)	(0.019)	(0.019)	(0.023)	(0.023)
Observations	16,065	16,065	16,065	16,065	16,065	16,065
Number of id	945	945	945	945	945	945
No. of instruments	18	18	14	14	18	17
AR (2)	0.223	0.172	0.767	0.390	0.203	0.711
Hansen value	0.559	0.905	0.239	0.613	0.109	0.474

Robust standard errors are reported in parenthesis (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$). Here an interactive term (SMC*BCD) represents a pre-crisis dummy; SMC*DCD is during crisis dummy. For the second proxy, DCB*BCD is a pre-crisis dummy, and DCB*DCD represents during crisis dummy.

Table 7, columns 1 to 6 contain the comparative findings for the pre, amid, and post-crisis periods using the two-step GMM method. Columns 1 to 3 report the effect of SMC on risk-taking for the pre (2002–2006), amid (2007–2010), and post-crisis (2010–2019) periods of large commercial banks in the USA. These findings show that SMC increases the risk-taking of large commercial banks by lowering capitalization (Abdul Hamid et al. 2020; Ayuso et al. 2004; Espenlaub et al. 2012). This impact on increasing the risk-taking of commercial banks remains higher in the pre-crisis period than during the peri-crisis and post-crisis periods. Theoretically, it is more difficult for commercial banks to boost their capitalization in a period of crisis than in normal economic conditions.

Table 7, column 2 contains the findings for the effect of SMC on the risk-weighted assets of banks. SMC increases the investment of commercial banks in risk-weighted assets. However, this impact is more significant before and during a crisis than in the post-crisis era. The positive relationship between stock market capitalization and Z-score indicates that financial development is beneficial for bank stability. These empirical results prove that the impact of SMC remains more significant before and during the crisis period than in the post-crisis era. Columns 4 to 6 contain results on the effect of DCB on the risk-taking of large commercial banks. Positive change in domestic credit reduces the risk-taking of commercial banks, and this impact remains consistent in the pre-crisis and peri-crisis periods. This effect of influencing the capitalization of commercial banks is more significant in the post-crisis period than in the pre- and peri-crisis periods. The development of domestic credit decreases the investment of commercial banks in risky assets, and remains beneficial for the stability of banks.

4.4 Robustness checks

Table 8 contains the results of the effect of financial development (stock market capitalization and domestic credit provided by banks to the private sector) on the risk-taking of large commercial banks. For the robustness check, we replaced the total equity to total assets ratio of capitalization with tier-I and tier-II capital to risk-weighted asset ratio. Risk-based capital ratio is a more conservative measure of bank capitalization than the traditional leverage ratio, because risk-based capital ratio is directly aligned with the risk-taking of commercial banks. Table 8, columns 1 to 5 report the results for the full sample of banks: well-, under-capitalized, high-, and low-liquidity large commercial banks, respectively. In line with our baseline model results, these findings show that financial development – either measured in stock market capitalization or domestic credit provided by banks to private sectors – increases risk-taking by lowering capital ratios. There is a negative relationship between risk-based capital ratio and financial development (DCB – Table 8 Panel-A, and SMC – Table 8 Panel-B). These findings are robust for the overall sample of well-, under-capitalized, high-, and low- liquidity large commercial banks in the USA.

Table 8. *The results of the robustness of the impact of financial development on bank risk-taking*

	Overall sample	Well-capital- ized	Under-capi- talized	High-liquidity	Low-liquidity
Panel: A the Effect of Domestic Credit Provided by Banks to Private Sectors on Risk-taking					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
VARIABLES	Capitalization	Capitalization	Capitalization	Capitalization	Capitalization
Lagged risk-taking	0.637***	0.670***	0.735***	0.680***	0.567***
	(0.029)	(0.060)	(0.050)	(0.036)	(0.045)
DCB	−0.091***	−0.077**	−0.144***	−0.089***	−0.100***
	(0.010)	(0.031)	(0.021)	(0.014)	(0.014)

	(1)	(2)	(3)	(4)	(5)
Panel-B: The Effect of Stock Market Development on Risk-taking					
Lagged risk-taking	0.642***	0.672***	0.675***	0.667***	0.609***
	(0.035)	(0.063)	(0.042)	(0.042)	(0.058)
SMC	−0.858***	−0.533***	−0.686***	−0.656***	−0.855***
	(0.131)	(0.264)	(0.135)	(0.100)	(0.129)
Constant	0.140***	0.105***	0.148***	0.144***	0.140***
	(0.010)	(0.024)	(0.017)	(0.014)	(0.013)
Observations	16,065	2,482	4,265	7,973	8,092
Number of id	945	146	251	469	476
No. of instruments	15	15	15	15	15
AR (2)	0.602	0.684	0.517	0.944	0.518
Hansen value	0.771	0.666	0.686	0.946	0.912

Robust standard errors are reported in parenthesis (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$)

For the robustness check, we also used an alternative proxy of financial development mainly linked with the banking industry – the measure of banking industry assets to gross domestic product ratio (BSD). Table 9 reports the findings for the impact of financial development on the risk-taking of large commercial banks as shown in banking industry assets to gross domestic product. Table 9, Panel-A contains results for the effect of financial development (BSD) on the bank capitalization of the overall sample of well-, adequately-, under-, significantly under-capitalized, high-, and low-liquidity large commercial banks. These outcomes confirm that the development of the banking industry increases risk-taking by lowering the capitalization of banks. These findings are robust alongside the baseline model results, and remain robust for the overall sample of well-, adequately-, under-, significantly under-capitalized, high-, and low-liquidity large commercial banks. Table 9, Panel-B contains the outputs for the impact of financial development on risk-weighted assets. These results show a negative relationship between the development of the banking industry and the risk-weighted assets of large commercial banks. These findings are in line with the baseline model, except for under-capitalized and low-liquidity banks. Table 9, Panel-C reports the impact of financial development (BSD) on the Z-score of large commercial banks. It was found that an increase in industry assets decreases the level of stability of large commercial banks, which is not robust alongside the baseline model. However, it could be argued that an increase in assets may lead to an inflationary boost that remains harmful for the stability of banks.

Table 9. *The results of the robustness of the impact of financial development on bank risk-taking*

	Overall sample	Well-cap-italized	Ade-quately-capital-ized	Under-capital-ized	Sig. under-capital-ized	High-liquid	Low-liquid
Panel-A: Effect of Banking Sector Development on Capitalization							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	Capitali-zation	Capitali-zation	Capitali-zation	Capitali-zation	Capitali-zation	Capitali-zation	Capitali-zation
Lagged risk-taking	0.785***	0.702***	0.593***	0.839***	0.853***	0.793***	0.756***
	(0.027)	(0.070)	(0.078)	(0.056)	(0.032)	(0.034)	(0.041)
BSD	−0.146***	−0.122*	0.014	−0.135***	−0.166***	−0.024	−0.141***
	(0.024)	(0.071)	(0.059)	(0.044)	(0.029)	(0.023)	(0.027)
Panel-B: Effect of Banking Sector Development on Risk-weighted Assets							
	RWA	RWA	RWA	RWA	RWA	RWA	RWA
Lagged risk-taking	0.770***	0.836***	0.721***	0.951***	0.896***	0.874***	0.812***
	(0.046)	(0.123)	(0.136)	(0.056)	(0.072)	(0.086)	(0.047)
BSD	−0.265**	−0.700*	−0.042	−0.041	0.835***	−0.228	0.103
	(0.122)	(0.417)	(0.460)	(0.191)	(0.316)	(0.245)	(0.158)
Panel-C: Effect of Banking Sector Development on Z-score Index							
	Z-score	Z-score	Z-score	Z-score	Z-score	Z-score	Z-score
Lagged risk-taking	0.803***	0.710***	0.667***	0.904***	0.815***	0.761***	0.854***
	(0.034)	(0.079)	(0.222)	(0.041)	(0.039)	(0.062)	(0.026)
BSD	−0.490***	−0.698**	0.109	−0.407**	−0.646***	−0.313**	−0.584***
	(0.097)	(0.300)	(0.327)	(0.199)	(0.148)	(0.148)	(0.111)
Constant	0.049***	0.054***	0.044**	0.043***	0.042***	0.027***	0.052***
	(0.007)	(0.018)	(0.018)	(0.012)	(0.008)	(0.007)	(0.007)
Observations	16,065	2,482	1,819	4,265	7,412	7,973	8,092
Number of id	945	146	107	251	436	469	476
No. of instruments	12	12	13	13	13	14	13
AR (2)	0.287	0.765	0.069	0.343	0.762	0.510	0.244
Hansen value	0.165	0.315	0.565	0.559	0.135	0.054	0.084

Robust standard errors are reported in parentheses (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$)

In Appendix 1, an alternative econometric technique to validate the study pre-dictions is outlined. In the appendices, Table 10 contains the results of the impact of financial development on bank risk-taking using panel OLS regression, in a way similar to that used in other studies (Vithessonthi and Tongurai 2016). These findings confirm that financial development increases the risk-taking of banks by reducing

their capitalization, which is in line with the baseline predictions. This study provides results on the full sample of banks to save space.

5. Conclusion and Policy implications

The purpose of this study was to investigate the effect of financial development on the risk-taking of US commercial banks from 2002 to 2019. Risk-taking is a significant determinant of bank stability, growth, and performance. It was necessary to investigate the impact of financial development on bank risk-taking in the USA. We used the two-step GMM method to test the hypotheses because it enabled control over the problems of autocorrelation, cross-sectional heteroscedasticity, and endogeneity.

We use agency theory, regulatory theory, the competition fragility hypothesis, and the competition stability hypothesis to link financial development to bank risk-taking. Based on these theories, we set three hypotheses to assess the impact of financial development on the risk-taking of large commercial banks in the USA. The results show that financial development increases risk-taking by lowering bank equity ratio. In contrast, the impact of financial development on the risk-weighted assets of commercial banks is negative. The overall sample confirms that financial development has a positive impact on the stability of banks. These findings provide evidence that financial development does not influence the stability of well-capitalized banks. Financial development (SMC) increases the risk of adequately-capitalized banks by lowering the capital ratio and increasing these banks' investment in risk-weighted assets. However, the impact of financial development (DCB) on influencing the risk-taking of adequately-capitalized banks is weak. Financial development increases the risk of under-, significantly under-capitalized, and low-liquidity banks by increasing investment in risk-weighted assets. These results show that the impact of financial development on the risk-taking of banks is higher in pre-crisis than in peri- and post-crisis eras.

Regulators and policymakers should consider trends in financial development along with bank capital for the stability of banks. The heterogeneity of these findings has implications on the improvement of the financial system for policymakers in commercial banking. These results can help regulators to observe commercial banks' regulatory capital ratios by considering the impact of the financial development movement. Finally, our heterogeneous study results have implications for well-, adequately-, under-, significantly under-capitalized, high-, and low-liquidity banks in pre-, peri-, and post-crisis periods.

This study remains limited to the analysis of quantitative information for large commercial banks listed in the FDIC on 31 December 2019. As such, we are still unable to collect data from a more extended period and from smaller commercial banks, investment banks, saving banks, and other financial firms. Future research could be conducted to study the financial development and risk-taking of banking industries by incorporating the mediating/moderating role of different economic variables and regulations to achieve more in-depth insights.

References

1. ABBAS, F., and ALI, S. 2020. Dynamics of bank capital ratios and risk-taking: Evidence from US commercial banks. *Cogent Economics & Finance*, **8**(1), 1838693. https://doi.org/10.1080/23322039.2020.1838693

2. ABBAS, F., ALI, S., and RUBBANIY, G. 2021. Economics of capital adjustment in the US commercial banks: empirical analysis. *Journal of Applied Economics*, **24**(1), 71–90. https://doi.org/10.1080/15140326.2021.1881877

3. ABBAS, F., BATOOL, N., and SULEHRI, F. A. 2020. Investment, financial, trade freedom and risk-taking: Empirical evidence from USA. *Studies of Applied Economics*, **39**(2).

4. ABBAS, F., and MASOOD, O. 2020. How do large commercial banks adjust capital ratios: empirical evidence from the US? *Economic Research-Ekonomska Istraživanja*, **33**(1), 1849–1866. https://doi.org/10.1080/1331677X.2020.1763823

5. ABBAS, F., YOUSAF, I., ALI, S., and WONG, W.-K. 2021. Bank capital buffer and economic growth: New insights from the US banking sector. *Journal of Risk and Financial Management*, **14**(4), 142. http://dx.doi.org/10.3390/jrfm14040142

6. ABDUL HAMID, B., AZMI, W., and ALI, M. 2020. Bank risk and financial development: Evidence from dual banking countries. *Emerging Markets Finance and Trade*, **56**(2), 286–304. https://doi.org/10.1080/1540496X.2019.1669445

7. ARELLANO, M., and BOND, S. 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies*, **58**(2), 277–297. https://doi.org/10.2307/2297968

8. AYUSO, J., PÉREZ, D., and SAURINA, J. 2004. Are capital buffers pro-cyclical?: Evidence from Spanish panel data. *Journal of Financial Intermediation*, **13**(2), 249–264. https://doi.org/10.1016/S1042-9573(03)00044-5

9. BECK, T. 2008. *Bank competition and financial stability: friends or foes?* Washington, DC: The World Bank.

10. BERNANKE, B., GERTLER, M., and GILCHRIST, S. 1998. The financial accelerator in a quantitative business cycle framework. *NBER Working Paper 6455*.

11. BIKKER, J. A., and METZEMAKERS, P. A. 2005. Bank provisioning behaviour and procyclicality. *Journal of International Financial Markets, Institutions and Money*, **15**(2), 141–157. https://doi.org/10.1016/j.intfin.2004.03.004

12. CLAESSENS, S., KOSE, M. A., and TERRONES, M. E. 2012. How do business and financial cycles interact? *Journal of International Economics*, **87**(1), 178–190. https://doi.org/10.1016/j.jinteco.2011.11.008

13. DEMIRGÜÇ-KUNT, A., and HUIZINGA, H. 2000. Financial structure and bank profitability. P*olicy Research Working Paper, No. WPS2430*. Washington, DC: The World Bank. http://documents.worldbank.org/curated/en/364151468749353823/Financial-structure-and-bank-profitability

14. DING, D., and SICKLES, R. C. 2018. Frontier efficiency, capital structure, and portfolio risk: An empirical analysis of US banks. *BRQ Business Research Quarterly*, **21**(4), 262–277. https://doi.org/10.1016/j.brq.2018.09.002

15. ESPENLAUB, S., KHURSHED, A., and SITTHIPONGPANICH, T. 2012. Bank connections, corporate investment and crisis. *Journal of Banking & Finance*, **36**(5), 1336–1353. https://doi.org/10.1016/j.jbankfin.2011.11.024

16. FOOS, D., NORDEN, L., and WEBER, M. 2010. Loan growth and riskiness of banks. *Journal of Banking & Finance*, **34**(12), 2929–2940. http://dx.doi.org/10.1016/j.jbankfin.2010.06.007

17. GIMET, C., and LAGOARDE-SEGOT, T. 2012. Financial sector development and access to finance. Does size say it all? *Emerging Markets Review*, **13**(3), 316–337. https://doi.org/10.1016/j.ememar.2011.11.002

18. GUISO, L., SAPIENZA, P., and ZINGALES, L. 2004. Does local financial development matter? *The Quarterly Journal of Economics*, **119**(3), 929–969.

19. HUSSAIN, F., and KUMAR CHAKRABORTY, D. 2012. Causality between financial development and economic growth: Evidence from an Indian State. *Romanian Economic Journal*, **15**(45).

20. JACQUES, K., and NIGRO, P. 1997. Risk-based capital, portfolio risk, and bank capital: A simultaneous equations approach. *Journal of Economics and business*, **49**(6), 533–547.

21. JIANG, L., LEVINE, R., and LIN, C. 2017. Does competition affect bank risk? *NBER Working Paper No. 23080*. https://doi.org/10.3386/w23080

22. JOKIPII, T., and MILNE, A. 2008. The cyclical behaviour of European bank capital buffers. *Journal of Banking & Finance*, **32**(8), 1440–1451.

23. JOKIPII, T., and MILNE, A. 2011. Bank capital buffer and risk adjustment decisions. *Journal of Financial Stability*, **7**(3), 165–178.

24. KING, R. G., and PLOSSER, C. I. 1982. The behavior of money, credit, and prices in a real business cycle. *NBER Working Paper No. 0853*. https://doi.org/10.3386/w0853

25. LAW, S. H., TAN, H. B., and AZMAN-SAINI, W. 2015. Globalisation, institutional reforms and financial development in East Asian economies. *The World Economy*, **38**(2), 379–398. https://doi.org/10.1111/twec.12168

26. LEVINE, R., and ZERVOS, S. 1998. Stock markets, banks, and economic growth. *American Economic Review*, **88**(3), 537–558.

27. LINDQUIST, K.-G. 2004. Banks' buffer capital: How important is risk. *Journal of International Money and Finance*, **23**(3), 493–513. https://doi.org/10.1016/j.jimonfin.2004.01.006

28. MARCUS, A. J. 1984. Deregulation and bank financial policy. *Journal of Banking & Finance*, **8**(4), 557–565. https://doi.org/10.1016/S0378-4266(84)80046-1

29. MERTON, R. C. 1995. A functional perspective of financial intermediation. *Financial Management*, **24**(2), 23–41.

30. NDIKUMANA, L. 2005. Financial development, financial structure, and domestic investment: International evidence. *Journal of International Money and Finance*, **24**(4), 651–673. https://doi.org/10.1016/j.jimonfin.2005.03.006

31. PESARAN, M. H., SCHUERMANN, T., TREUTLER, B.-J., and WEINER, S. M. 2006. Macroeconomic dynamics and credit risk: a global perspective. *Jour-*

nal of Money, Credit and Banking, **38**(5), 1211–1261. http://dx.doi.org/10.1353/mcb.2006.0074

32. ROODMAN, D. 2009. A note on the theme of too many instruments. *Oxford Bulletin of Economics and Statistics*, **71**(1), 135–158. https://doi.org/10.1111/j.1468-0084.2008.00542.x

33. SHAHBAZ, M., BHATTACHARYA, M., and MAHALIK, M. K. 2018. Financial development, industrialization, the role of institutions and government: a comparative analysis between India and China. *Applied Economics*, **50**(17), 1952–1977. https://doi.org/10.1080/00036846.2017.1383595

34. SHRIEVES, R. E., and DAHL, D. 1992. The relationship between risk and capital in commercial banks. *Journal of Banking & Finance*, **16**(2), 439–457. https://doi.org/10.1016/0378-4266(92)90024-T

35. STOLZ, S., and WEDOW, M. 2011. Banks' regulatory capital buffer and the business cycle: Evidence for Germany. *Journal of Financial Stability*, **7**(2), 98–110. https://doi.org/10.1016/j.jfs.2009.09.001

36. TONGURAI, J., and VITHESSONTHI, C. 2020. Bank regulations, bank competition and bank risk-taking: Evidence from Japan. *Journal of Multinational Financial Management*, **56**, 100638. https://doi.org/10.1016/j.mulfin.2020.100638

37. TRAN, S. H., and NGUYEN, L. T. 2020. Financial development, business cycle and bank risk in Southeast Asian countries. *The Journal of Asian Finance, Economics, and Business*, **7**(3), 127–135. http://dx.doi.org/10.13106/jafeb.2020.vol7.no3.127

38. VITHESSONTHI, C. 2014a. The effect of financial market development on bank risk: evidence from Southeast Asian countries. *International Review of Financial Analysis*, **35**, 249–260. https://doi.org/10.1016/j.irfa.2014.10.005

39. VITHESSONTHI, C. 2014b. Financial markets development and bank risk: Experience from Thailand during 1990–2012. *Journal of Multinational Financial Management*, **27**, 67–88. https://doi.org/10.1016/j.mulfin.2014.05.003

40. VITHESSONTHI, C., and TONGURAI, J. 2016. Financial markets development, business cycles, and bank risk in South America. *Research in International Business and Finance*, **36**, 472–484. https://doi.org/10.1016/j.ribaf.2015.10.012

41. WILLIAMS, J., and NGUYEN, N. 2005. Financial liberalisation, crisis, and restructuring: A comparative study of bank performance and bank governance in South East Asia. *Journal of Banking & Finance*, **29**(8–9), 2119–2154. https://doi.org/10.1016/j.jbankfin.2005.03.011

42. WINDMEIJER, F. 2005. A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of Econometrics*, **126**(1), 25–51. https://doi.org/10.1016/j.jeconom.2004.02.005

43. YAGLI, I. 2020. Bank competition, concentration and credit risk. *Intellectual Economics*, **14**(2), 17–35. https://doi.org/10.13165/IE-20-14-2-02

Appendix 1

Panel OLS Prediction Framework: The Effect of Financial Development on Bank Risk-taking

In line with the research of Vithessonthi and Tongurai (2016), this study uses panel OLS to consider the effect of financial market development on the risk-taking of large commercial banks. To keep in mind the criteria of the OLS panel hypotheses, this analysis considers cross-section fixed-effects (bank dummies) to handle possible unobserved time-invariant bank effects, time-fixed effects (year dummies) to handle possible unobserved time-variant effects, or both. (Vithessonthi and Tongurai 2016). To control the potential problem of endogeneity, we take the one-period lagging value for explanatory variables that is appropriate to address the reverse-causality issue, as argued for by Vithessonthi and Tongurai (2016). This study estimates the following baseline regression for results:

$$BR_{i,t} = \alpha + \beta_1 FMD_{i,t-1} + \delta CV_{i,t-1} + \eta_i + \nu_t + \varepsilon_{i,t} \qquad (1)$$

Where represents a dependent proxy for bank risk-taking (bank capitalization, RWATA, and Z-score index) concerning the time and cross-section. refers to the independent proxies for financial market development (domestic credit provided by banks to the private sector to GDP ratio, stock market capitalization to GDP ratio, and banking industry assets to GDP ratio), time, and cross-sections. Shows the list of control variables that include liquidity, profitability, loan growth, deposits ratio, bank size, trade openness, real gross domestic product, and inflation rate. The symbol represents bank-fixed effects; period-fixed effects, and the zero-mean disturbance term. The problem of heteroscedasticity and autocorrelation is clustered at the cross-section level for consistent standard errors. We apply this model both overall and for well-, adequately-, under-, significantly under-capitalized, high-, and low-liquidity large commercial banks separately.

Base model results for the full sample using the Panel OLS method.

Table 10. *The robustness of the results of the impact of financial development on bank risk-taking for the full sample of banks*

VARIABLES	(1) Capital ratio	(2) RWA	(3) Z-Score	(4) Capital ratio	(5) RWA	(6) Z-Score
Lagged risk-taking	0.880***	0.881***	0.991***	0.880***	0.887***	0.991***
	(0.004)	(0.004)	(0.001)	(0.004)	(0.004)	(0.001)
SMC $_{t-1}$	−0.049***	−0.824***	0.141***			
	(0.012)	(0.061)	(0.040)			
DCB $_{t-1}$				−0.001	−0.221***	0.032***
				(0.003)	(0.016)	(0.011)
Liquidity $_{t-1}$	0.005*	0.094***	0.016*	0.006**	0.053***	0.015*
	(0.003)	(0.014)	(0.009)	(0.003)	(0.014)	(0.009)

	(1)	(2)	(3)	(4)	(5)	(6)
Profitability $_{t-1}$	0.013	0.123*	−0.469***	0.007	0.180***	−0.490***
	(0.013)	(0.067)	(0.045)	(0.013)	(0.066)	(0.045)
Loan ratio $_{t-1}$	−0.001***	0.039***	−0.003**	−0.001***	0.042***	−0.003**
	(0.000)	(0.003)	(0.002)	(0.000)	(0.003)	(0.002)
Deposit ratio $_{t-1}$	−0.000	−0.001	0.000	−0.000	−0.001	0.000
	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
Bank size $_{t-1}$	0.001***	0.002***	0.002***	0.001***	0.001***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Business trend $_{t-1}$	0.004	0.370***	0.028	−0.011	0.301***	−0.060**
	(0.007)	(0.034)	(0.023)	(0.007)	(0.038)	(0.025)
Trade openness $_{t-1}$	0.000	0.000***	−0.000***	0.000	0.000***	−0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Inflation rate $_{t-1}$	−0.000**	−0.002***	−0.001***	−0.000**	0.009***	−0.000
	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)
Constant	0.008***	−0.042***	0.015***	0.005**	0.123***	0.020***
	(0.001)	(0.007)	(0.005)	(0.002)	(0.010)	(0.006)
Observations	16,065	16,065	16,065	16,065	16,065	16,065
Number of id	945	945	945	945	945	945
R-square	0.55	0.59	0.56	0.55	0.59	0.56

Robust standard errors are reported in parenthesis (*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$)

MODELING THE OPTIONS FOR ACCOUNTING FOR THE INNOVATION COSTS OF INDUSTRIAL ENTERPRISES IN UKRAINE

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Abstract. *In this article, the methodology and organization of accounting for innovation costs are considered, and directions for their improvement are suggested. This is accompanied by an analysis of the modern economic literature on the reflection of the costs of innovation in accounts, which allows for the identification of several options.*

The purpose of this study is to identify the main problems of accounting for the cost of innovation and to develop recommendations for their solution for effective enterprise management. The object of the study is the process of formation of costs for innovations to be reflected in the accounting system.

The complexity of reflecting the cost of innovation in accounts necessitates the creation of appropriate approaches and methodologies. It was found that businesses account for the costs of innovation on different balance sheets, which indicates the absence of a rational method of accounting. To meet the information needs of the data management system, a tailored accounting approach is proposed, which combines the process of financing and using the costs of innovation. It was determined that, when modelling this system, it is important to take into account the factors that influence the formation of the methodological

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principles of accounting for innovation costs. It is established that the accounting method may be influenced by the following factors: forms and sources of financing the costs of innovation (factor F); the procedure for writing off the cost of capital investment (factor K); and the procedure for writing off current operating costs (factor O). It is determined that the use of the proposed approach will improve the quality of accounting and information support of the enterprise management system.

Keywords: *accounting, innovation, costs of innovation, capital investment*

JEL*: M41, O32*

1. Introduction

In order to set Ukraine on a trajectory towards sustainable development with increasing welfare and quality of life for all segments of the population, the Ministry of Economy of Ukraine – with the participation of central executive bodies and the Institute of Economics and Forecasting of the National Academy of Sciences of Ukraine – has prepared a strategy for development: "Ukraine 2020: A Strategy for National Modernization". The main problem to be solved by this strategy is the lack of preparation present in the Ukrainian economy in responding to global challenges associated with global crisis processes. One of these processes is the transition to fundamentally new resource-saving technologies, including the use of production waste, the development and implementation of new products (goods, works, services), the overhaul and modernization of fixed assets, and the introduction of advanced integrated mechanization and automation. At the same time, there is a need to form a system of accounting for the costs of innovation and the operational control of these costs, which would provide information to each company in particular and the state innovation policy in general in conditions of uncertainty and in the globalization of the economy.

Recently, developments aimed at improving the organizational and methodological aspects of accounting for innovation costs are becoming increasingly interesting. Therefore, in the process of managing innovation, one of the main tasks is to build an effective organizational method of accounting for innovation costs. Unlike other aspects of accounting, which are the subject of constant research on improvement, the methodology and organization of accounting for innovation processes are poorly developed.

The organization of accounting involves the use of a unified approach to the reflection of business transactions in accounting. However, the current state of accounting is characterized by a lack of clear recommendations for reflecting the costs of innovation processes, which leads to the scattering of costs in different accounts and complicates the determination of the cost of each stage of work and the formation of the total cost.

Analysing the current state of accounting for the costs of innovation in the enterprises of Ukraine under study allows the authors to comment on a certain episodicity, which is due to the lack of appropriate legal regulation. Some aspects of accounting for the cost

of innovation, given the current development of the economy – especially in terms of innovation – require additional research to improve them. In particular, this concerns the clarification of the conceptual apparatus, the classification of costs for innovations, and methods of organization for their accounting and internal control.

The generalization of theoretical and practical experience at the domestic enterprises under study on the accounting of expenses for innovation provides the opportunity to establish that the available technique is carried out in an unsystematic order and does not correspond to the modern requirements of these businesses. Current accounting models do not correspond to adequate types of innovation processes, and do not provide sufficiently reliable data for economic analysis and regulation in the field of innovation. The debatable nature of these issues, the need to address them, and the insufficient level of regulatory and methodological support for the cost of innovation led to the focus of this paper, and determined both its relevance and main areas of research.

2. Literature review: theoretical and methodological concepts

A significant contribution to the study of the theory and formation of the concept of accounting for innovation was made by domestic economists and practitioners such as Borodkin (1999), Kantaeva (2010), Krupka (2006), Lehenchuk et al. (2020), and Ozeran (2013). Although there are significant achievements in the works of these researchers, the issues of structuring the accounting of innovation, which is relevant in the transition to intensive and dynamic development, remain unresolved.

The issue of financing innovation in the scientific literature is considered in terms of sources of funding for enterprises (Davydenko, Buriak, and Titenko 2019; Ilchenko 2009; Kucherenko, Ratushna, and Melnyk 2019; Lehenchuk et al. 2020). However, the order of accounting for such financial income is given little attention. Problematic issues of accounting and analytical support for innovation management were cited in the works of Basova (2017); Bondar, Iershova, and Chaika (2019); Chursin and Strenalyuk (2018); Plaskova et al. (2020); Resler (2017); and Smokvina and Popovych (2020).

In solving the main tasks of accounting for the cost of innovation, scientists focus on the following vectors of research: 1) the variety of ways to reflect the cost of innovation in the accounting system (Koval 2019; Plaskova et al. 2020); 2) gaps in the development of criteria for the recognition of objects of innovative origin as part of assets, which prevents the adequate disclosure of information about them in the reporting (Ax and Greveb 2017; Druzhynina et al. 2020); 3) the lack of a single method of accounting for the costs of innovation that is able to ensure their adequate reflection in the information system of the enterprise (Bondar, Iershova, and Chaika 2019); and 4) the absence or inadequacy of accounting records in accounting for the cost of innovation (Chursin and Strenalyuk 2018).

The level of theoretical research of accounting problems lags far behind the needs of the practice of business entities, and includes a lack of methodological support for the accounting of objects related to innovation, which requires, in turn, their identification and appropriate classification. With this in mind, the existing accounting system should

disclose information about the impact of economic activity on the objects of the innovation process to meet the information needs of internal and external users. This function can be implemented through the reflection in the accounting of objects related to innovation. Therefore, we consider the identification of related objects to be an important task in accounting for the costs of innovation.

Thus, Sidorenko (2011) divides the objects to be managed in the accounting of innovations into those that provide innovative activities (the resources and property of the enterprise involved in creating innovation) and those that constitute innovative activities (the development, testing, and implementation of innovations). Yezhakova (2011) refers to the objects of innovation as innovations which, from the moment of their acceptance for distribution, receive a new quality – i.e., become innovations (innovative products). Kantaeva (2010) distinguishes two groups of objects of accounting for innovation: the assessed and legalized intangible assets of the enterprise (in the understanding of the author's intellectual capital); and the cost of research and development. According to Zhuk (2011), the main objects of accounting for innovation are: estimates for its creation; costs of investment in new technologies and research activities; innovative products; and the processes of the commercial use of products (or their use for further innovation).

Krupka (2006) takes a slightly different position, arguing that the methodology and organization of accounting depend on the type of innovative product. They can have a material content (machines, equipment, experimental samples of products), be expressed in the intangible form (new technologies, projects and design solutions for new products, software materials), or be presented in the form of intellectual property (industrial property rights, copyright and other rights).

Stolyarchuk (2018) systematized the composition of objects of accounting and the internal audit of innovation and identified several groups: classic objects of accounting, objects of internal (management) accounting, and non-systemic objects of accounting.

The economically justified classification of costs is the basis of accounting and control of the economic activity of the enterprise, and is necessary for a correct understanding of the purpose of costs and their economic role in the management process. Classification is a necessary prerequisite for the rational organization of the analytical accounting of innovation costs and their management in making managerial decisions.

A critical analysis of the existing features of the classification of costs for innovation has revealed several approaches. Kuzminsky and Voronova (2006) propose grouping the costs of the research and development of innovative products according to stages, by standard items of cost of research and development, and by costs of preparation for production in the industry. A similar point of view is held by Saenko (1991), who divides the costs of innovation into three stages: 1) costs for research (science) related to theoretical research, which is further materialized in technical solutions; 2) costs for the creation and development of new equipment, which, in turn, is divided into costs for the development of technical and technological documentation and costs associated with the implementation of production works; and 3) costs for the introduction of new equipment (costs at the stage of preparation for implementation, costs during implementation, costs during operation).

Efremov (2006) notes that the costs of innovation include 3 groups of costs: 1) marketing costs – identification of market opportunities (for new products and services), testing of new products (services), preparation of sales channels, advertising activity, training (education) of sales staff; 2) costs for technological preparation of innovations – implementation of R&D (own forces and/or with the involvement of third-party organizations), purchase of technical documentation (know-how) or licenses for the use of research and development results, costs of licensing (certification) of new products (services), purchase of new equipment, materials, components, and semi-finished products, retraining (or training) of production staff; and 3) production costs of development – use of new equipment, materials, components, and semi-finished products, release of new (modernized) products.

To organize the accounting of costs for innovation, Avilkina (2009) offers the following grouping: 1) the cost of marketing research; 2) research and development costs; 3) costs of innovative design; 4) costs of innovative production; 5) the cost of commercializing the product; and 6) other costs.

Pylypenko et al. (2011) propose to divide the costs of innovation into three groups: 1) costs associated with forecasting and planning the implementation of innovations; 2) fixing the actual costs incurred for the implementation of the innovation project and its support; and 3) costs for the accounting, analysis, and evaluation of results from the implementation of innovations. In this case, the most important and significant group of costs, in view of the authors, is the first, because the quality of implementation of the preparatory stage directly affects the correct choice of innovative development strategy and becomes the key to achieving goals.

The study of the above approaches to accounting for the cost of innovation has identified a key area that is supported by most authors: Abubakirova (2012); Borodkin (1999); Valuev and Kantaeva (2009); Hrytsay (2010); Hyk (2021); Ilchenko (2009); Kantaeva (2010); Korzhavina (2009); Ozeran (2013); and Siryk et al. (2021) all consider a reflection of the cost of innovation as a separate accounting object. An assessment of the nature and content of the considered approaches shows that the vast majority of them are reflected in the system of accounts as independent objects of accounting as part of costs and capital investments.

Despite the significant achievements of Ukrainian and international scholars, it should be noted that – given the radical change in the vector of Ukraine's economy with regards to the European Union, the country's existing military and political instability, rapid global growth and quality of investment in innovation, and the digitalization and globalization of public relations – accounting and analytical support for the management of innovation activities of enterprises of the national economy has been partially or completely ignored, and most of the existing approaches should be considered obsolete. There is a need, then, for a comprehensive study of the methodological development and the improvement of the current methodology and organization of accounting for innovation costs in the current conditions of economic development in Ukraine. This need determined the direction of our study:

RQ: To identify problematic issues of accounting for innovation costs and to develop recommendations for their solution for the effective management of the innovation activities of the enterprise.

3. Research Methodology

An important indicator of innovation activity in economic entities is the amount of costs for innovation, which can be carried out in the direction of research and development, the acquisition of new technologies, machinery and equipment, etc. Indicators of the dynamics of spending on innovation for 2010–2018 and their structure in terms of key components are summarized in Table 1.

Table 1. *Indicators of dynamics and the structure of innovation expenditures in Ukraine for 2010–2018*

Year	The cost of innovation	Including by areas					
		Research and development	Including		Acquisition of other external knowledge	Purchase of machinery equipment and software	Other expenses
			Internal GDR	External GDR			
			UAH million				
2010	8045.5	996.4	818.5	177.9	141.6	5051.7	1855.8
2011	14333.9	1079.9	833.3	246.6	324.7	10489.1	2440.2
2012	11480.6	1196.3	965.2	231.1	47.0	8051.8	2185.5
2013	9562.6	1638.5	1312.1	326.4	87.0	5546.3	2290.9
2014	7695.9	1754.6	1221.5	533.1	47.2	5115.3	778.8
2015	13813.7	2039.5	1834.1	205.4	84.9	11141.3	548.0
2016	23229.5	2457.8	2063.8	394.0	64.2	19829.0	878.4
2017	9117.5	2169.8	1941.3	228.5	21.8	5898.8	1027.1
2018	12180.1	3208.8	2706.2	502.6	46.1	8291.3	633.9

Source: *Compiled on the basis of data from the State Statistics Service of Ukraine (http://www.ukrstat.gov. ua/druk/publicat/Arhiv_u/16/Arch_nay_zb.htm)*

Analysis of the level and dynamics of the indicators listed in Table 1 shows that the total expenditure on innovation between the years 2010 and 2016 showed a galloping trend, but suffered a decline 2017 which may be due to the decline in innovation activity of enterprises and the effects of the economic crisis. Analyzing the dynamics of the main components of innovation costs, it should be noted that the reduction in the overall level of innovation costs in recent years is primarily due to lower costs for the purchase of machinery and equipment associated with the implementation of innovations.

These statistics correlate with the information of the provisions (standards) of accounting, which provide some ways to keep track of innovation costs. In addition, this study will use other accounting methods proposed by the authors.

This study uses a modelling method to develop a model of accounting for innovation costs, utilizing tabular and graphical methods to develop a conceptual framework for accounting for the targeted funding of innovation projects. Methods of comparison and grouping, tabular representation, and graphical representation were used in the analytical research. The information base of the study was formed from the scientific works and publications of domestic and international scientists on these issues, current domestic legislation on accounting for innovation, professional scientific periodicals, and statistical information.

The generalization of theoretical and practical experience in accounting for the cost of innovation in domestic enterprises made it possible to establish that their existing methodology is carried out chaotically and does not meet modern business requirements. It was found that businesses account for the cost of innovation on different balance sheets, which indicates the imperfection of the current method of accounting. In practice, the so-called impersonal (boiler) method is used to reflect the costs of innovation in accounts, the essence of which is to keep records of costs in general, and this approach therefore does not provide for constant operational control. With this in mind, we have proposed our own approach, which is based on the use of the modelling method. When creating a model, it is necessary to take into account the factors that influence the formation of the methodological principles of accounting for innovation costs.

In the opinion of the authors, the accounting method may be influenced by the following factors:

1) forms and sources of financing the costs of innovation (factor F);
2) the procedure for writing off capital investment costs (factor K);
3) the procedure for writing off the costs of current operating expenses (factor O).

Accounting for innovation costs largely depends on the financing process, which may include several areas of formation through: the company's own funds (F_1); long-term or short-term bank loans (F_2); funds allocated from local or state budgets (F_3); or other ways reserved for innovation costs (F_4). A reflection of sources of funding for innovation costs is given in Table 2.

Table 2. *Sources of funding for innovation costs in the accounting system*

Form of financing	Source of funding	Class of accounting accounts
Own funds of the enterprise (F_1)	Retained earnings, issue income, revaluation of assets	Class 4 accounts "Equity and collateral"
Raised funds (F_2)	Long- and short-term bank loans, financial leasing, long-term promissory notes	Class 5 Accounts "Long-Term Liabilities" and 6 "Current Liabilities"
Funds allocated from local or state budgets (F_3)	Budget allocations, targeted contributions, grants	Class 4 account "Equity and collateral" (account "Assigned financing and assigned revenue")
Other ways of financing (F_4)	Reserve to cover costs	Class 4 account "Equity and collateral" (account "Securing other expenses and payments")

Source: *Developed by the authors*

Each of the above areas of financing significantly affect the system of formation of the financial results of the enterprise. For example, in the case of financing with bank loans, there is a need to take into account the received credit resources and interest on the loan. Allocation of funds from budget revenues necessitates the separate accounting of targeted funding.

In the case of the acquisition (creation) of non-current assets, the costs incurred are included in the capital investment, and their amount increases the initial cost of non-current assets. The results of the study of the practice of accounting for innovation costs under this approach allowed us to identify two options – involving the cost of acquisition (creation) of new and/or significantly improved fixed assets (K_1) or intangible assets (K_2).

The reflection in the accounting of the write-off of costs for innovations associated with the creation of new products as they arise does not involve direct capitalization but is reflected in the current costs in full. To accumulate information on the costs of the preparation and development of new products, Borodkin (1999) proposed the introduction of a separate balance sheet account – "Expenses for the preparation and development of new products" (O_1) – and to account for them as part of future expenses. The debit of this account from the credit of various accounts during the period of development of products should reflect: consumed materials, accrued wages, depreciation, services of third parties, and other costs.

In enterprises with multi-item production, where the period of development is short and the costs are relatively small, in the case of individual production, costs can be planned and accounted for as part of overhead costs (O_2), as stipulated in paragraph 15.5 – "Costs to improve technology and organization production" AR(S) 16 "Costs" (1999). However, it should be remembered that the cost of improving technology does not belong to the type of preparation for the production of innovative products in the event that this technology involves the introduction of machines and mechanisms of traditional models and types or their replacement with the latest modifications of the same models. Thus, if the company does not implement significantly improved production methods, then there can be no question of preparing the production of innovative products.

Costs of innovation collected in expenditure accounts ("Research and development costs") (O_3) refer to the cost of production or financial results in one reporting period.

4. Results and Discussion

The analysis of the current practice of domestic industrial enterprises to reflect the costs of innovation in accounts allowed for the identification of several options. As a result of the consistent combination of factors and their features, it is possible to obtain all possible options for accounting for the cost of innovation. In the field of logical possibilities, 20 models were thus identified (Fig. 2). We describe the models most commonly used in enterprises.

$M_1 = F_1K_1$ and $M_5 = F_1K_2$ are models of innovative measures of a capital character which are carried out at the expense of the enterprise.

In the case of acquisition (creation) of non-current assets, the costs incurred are included in the capital investment and their amount increases the initial cost of non-current assets (Fig. 1).
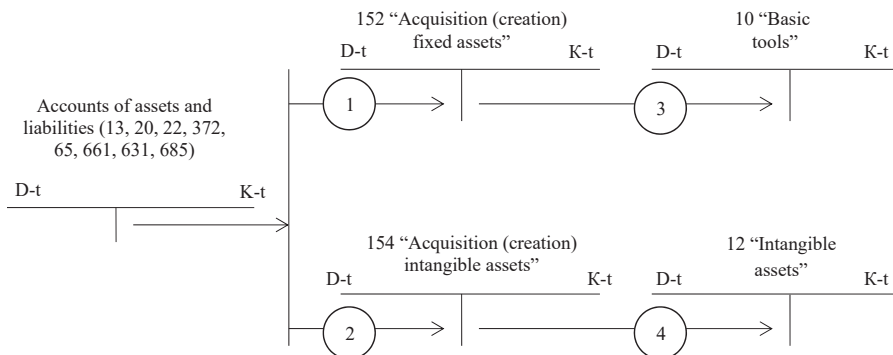
Content of business operations: 1) the initial cost of the acquired (created) innovative object of fixed assets is reflected; 2) the initial cost of the acquired (created) innovative object of intangible assets is reflected; 3) the acquired (created) innovative object of fixed assets is put into operation; 4) the acquired (created) innovative object of intangible assets is put into operation.

Figure 1. *The scheme of accounting for the cost of innovation for the acquisition (creation) of new types of non-current assets*

Source: *Generalized by the authors*

This technique is used in the case of an innovative direction to improve the material and technical base of the enterprise and increase economic benefits in the future by: increasing production capacity; increasing productivity; improving product quality; reducing operating costs as a result of innovative measures; and creating (or acquiring) intangible assets.

$M_2 = F_2K_1$, $M_6 = F_2K_2$ and $M_{10} = F_2O_1$ are models of innovative measures of a capital and non-capital nature, which are carried out at the expense of borrowed funds (mainly bank loans). The fee for their use is fixed (in the form of interest) and additionally provides for the return of invested funds to the creditor.

$M_9 = F_1O_1$ is a model of innovative measures which is carried out at the expense of the company's own funds concerning current costs ("Costs for the preparation and development of new products"). These include the cost of developing design, and estimate documentation for the development of new enterprises, industries, shops and units, the maintenance of personnel engaged in commissioning, and the cost of commissioning the comprehensive testing of equipment.
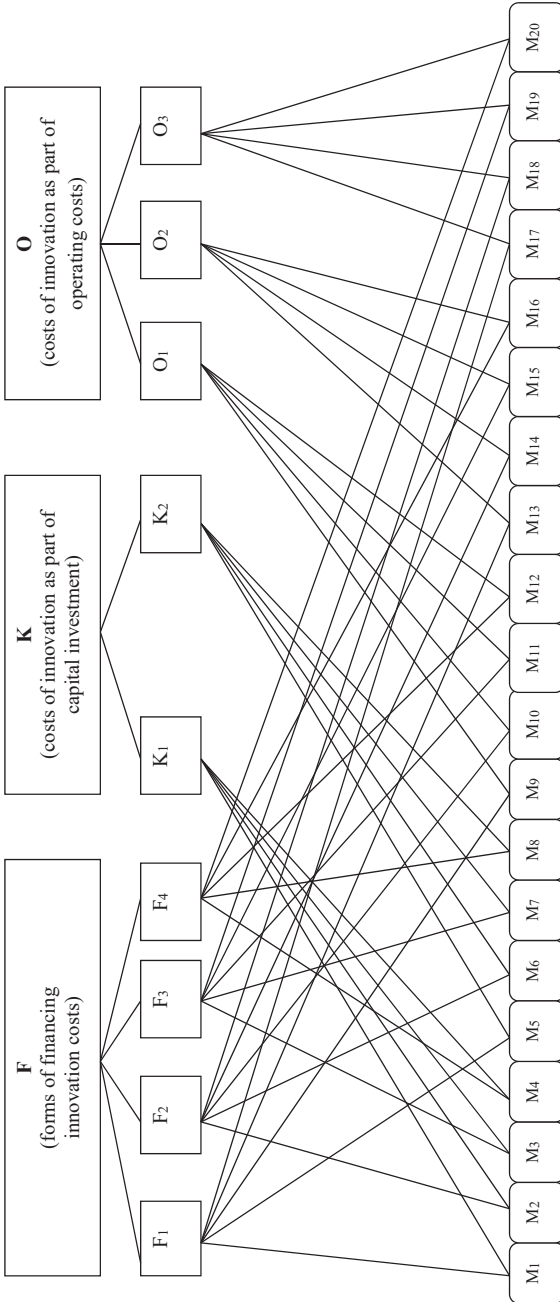
Figure 2. *The modeling of options for accounting for innovation costs*

Source: Generalized by the authors

Borodkin (1999), Koval (2019), Ozeran (2013), and others suggest accumulating information about the costs of the preparation and development of new products on account 39 "Deferred expenses" (Fig. 3).

Contents of business transactions: 1) reflects the production costs for the preparation and development of new products; 2) written off the costs of future periods for production costs.

Figure 3. *A scheme of accounting for the cost of innovation using account 39 "Deferred expenses"*

Source: Generalized by the authors

$M_{13} = F_1O_2$ and $M_{17} = F_1O_3$ are models of innovative measures which are carried out at the expense of the company's own funds with reference to current costs (23 "Production" and 941 "Research and development costs").

The option of reflecting costs for innovations in the write-off as they arise does not involve direct capitalization, but is reflected in the current costs in full (Fig. 4).

Content of business operations: 1) written off for production costs associated with the preparation and development of production of new products (goods, works, services); 2) reflects the costs of research and development of innovative products as part of other operating costs; 3) included in the cost of costs associated with the preparation and development of new products (goods, works, services); 4) written off to the financial results of the costs of research and development of innovative products (goods, works, services).

Figure 4. *A scheme of accounting for the cost of innovation to create new species of products (goods, works, services)*

Source: Generalized by the authors

Collected in expenditure accounts (23 "Production", 941 "Research and development costs"), the cost of innovation refers to the cost of production or financial results in one reporting period.

$M_{19} = F_3O_3$ is a model of innovative measures which is carried out at the expense of budget funds for the acquisition and commissioning of assets received free of charge. This method of accounting for the cost of innovation to create new products can be used in industrial enterprises in Ukraine for which the production of innovative products is not a one-time occurence, but a permanent concern.

Enterprises participating in technology parks can also receive targeted funding for innovation costs. In this case, Minakov (2005) proposes to keep records of earmarked funds on separate sub-accounts of account 48 "Targeted financing and earmarked revenues": 481 "Targeted revenues from the technology park"; 482 "Targeted financing of a technopark participant (profit)"; and 483 "Targeted financing of a technopark participant (VAT)".

$M_4 = F_4K_1$, $M_8 = F_4K_2$, $M_{12} = F_4O_1$ and $M_{20} = F_4O_3$ are models of innovative measures of a capital and non-capital nature, which are carried out at the expense of pre-formed reserves at the enterprise. The use of account 474 "Ensuring other costs and payments" with the creation of a reserve is appropriate for enterprises in which the creation of innovative products is not one-time, but systematic (Fig. 5).
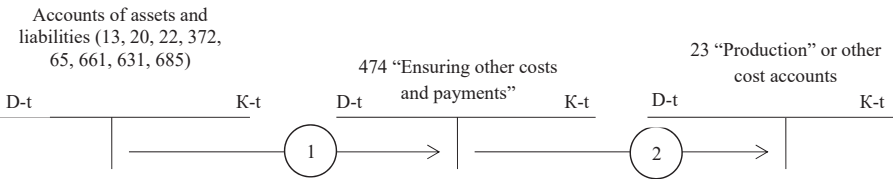
Content of business operations: 1) created a reserve for financing the costs of innovation, including social, legal, personnel; 2) the costs of innovation are written off at the expense of the previously created reserve.

Figure 5. *An accounting scheme for the creation of reserves to ensure the cost of innovation*
Source: Generalized by the authors

The use of the developed models will contribute to the more rational organization of accounting for innovation costs and their reflection in the financial statements to meet the needs of users. Whilst the cost of innovation is not a completely new object of accounting, it is an object of management, and is one of the key indicators in the decision-making process related to improving the efficiency of the financial and economic activities of enterprises.

The accounting information system can provide data on costs in different sections, including to reflect the structure of costs involved in the processes of creating new products and the technological renewal of production. Systems of modelling accounting information used by business entities allow for such a modification without significant

time and effort. At the same time, modern software creates the opportunity to generate the necessary information and obtain additional analytical indicators for the relative comparison of the costs incurred with the planned activity, and to identify reserves for their reduction.

5. Conclusions

The results of this study suggest that the current accounting practice does not allow for the full generation of the necessary information regarding the processes taking place within innovation activity. This is partly because innovation has not yet become an obvious object of business accounting, and costs incurred during the innovation process have not yet been properly reflected in the accounting system.

To a large extent, the choice of the right way to account for innovations depends on whether they are related to operating activities or are of a capital nature. The application of the proposed accounting approach will have a positive impact on the creation of a systematic, efficient, and complete reflection of the costs of innovation and their timely write-off to non-current assets or expense accounts of the reporting period, which is essential to determine financial results.

In the opinion of the authors, it is expedient to create a single methodology for accounting for the cost of innovation, which will help to provide reliable information and increase its analytical properties. It is also important to identify reserves to reduce costs. Thus, automation of the accounting of expenses for innovation will allow for their efficiency to be increased without a considerable increase in the complexity of accounting works.

The results of the study to account for the cost of innovation determine the need for the development and implementation of guidelines (standard correspondence of accounts) for accounting to reflect them in accounts and in accounting registers. The results of this study are aimed at improving the reliability, efficiency, and analytical nature of accounting, which will enhance the effectiveness of innovation cost management.

Prospects for further research in this area include the development of approaches to the generation of forms of internal reporting to manage the cost of innovation. The compilation of internal reporting will systematically allow for the formation of databases, which will facilitate both the rapid use of the necessary information to manage innovation processes and the rapid search for the necessary data.

References

1. ABUBAKIROVA, K.N. 2012. *Accounting for costs of innovation*. Doctoral dissertation. Nizhny Novgorod.
2. Accounting Regulation (Standard) 16 "Costs" (1999). Order of the Ministry of Finance of Ukraine dated 31.12.1999 No. 318. *Official Gazette of Ukraine*, 04.02.2000, No. 3, p. 181, Article 102, act code 13737/2000. Available from: https://zakon.rada.gov.ua/laws/show/z0027-00#Text

3. AVILKINA, M.O. 2009. Accounting for innovation costs: status and directions of development. *Accounting and Auditing*, **7**, 44–52.

4. AX, C., and GREVEB, J. 2017. Adoption of management accounting innovations: organizational culture compatibility and perceived outcomes. *Management Accounting Research*, **34**, 59–74. https://doi.org/10.1016/j.mar.2016.07.007

5. BASOVA, A. 2017. Accounting-analytical model of innovation-active business entities. *Advances in Economics, Business and Management Research*, **38**, 40–46. https://doi.org/10.2991/ttiess-17.2017.7

6. BONDAR, M., IERSHOVA, N., and CHAIKA, T. 2019. Strategic management accounting as an information platform for measuring innovation of the enterprise. *SHS Web of Conferences*, **67**, 06006. https://doi.org/10.1051/shsconf/20196706006

7. BORODKIN, O.S. 1999. Accounting costs for the preparation and development of new products. *Accounting and Auditing*, **4**, 15–18.

8. CHURSIN, A.A., and STRENALYUK, V.V. 2018. Synergy effect in innovative activities and its accounting in the technological competencies of an enterprise. *European Research Studies Journal*, **21**(4), 151–161. https://doi.org/10.35808/ersj/1110

9. DAVYDENKO, N., BURIAK, A., and TITENKO, Z. 2019. Financial support for the development of innovation activities. *Intellectual Economics*, **13**(2), 144–151. https://doi.org/10.13165/IE-19-13-2-06

10. DRUZHYNINA, V., LIKHONOSOVA, G., LUTSENKO, G., and KUSHAL, I. 2020. Innovative technology in terms of socio-economic value diffusion: accounting and analytical support. *European Journal of Sustainable Development*, **9**(3), 476–489. https://doi.org/10.14207/ejsd.2020.v9n3p476

11. EFREMOV, A.V. 2006. Accounting systems for managing costs for innovation. *Economic Bulletin of Rostov State University*, **4**(2), 105–109.

12. HRYTSAY, O.I. 2010. Directions of improving cost accounting for innovation processes. *Problems of Economics and Management: Bulletin of the Lviv Polytechnic National University*, **683**, 198–201.

13. HYK, V.V. 2021. Optimization of costs for innovations of industrial enterprises Western Ukraine in ensuring sustainable environmental development. *E3S Web of Conferences*, **234**, 00049. https://doi.org/10.1051/e3sconf/202123400049

n. ILCHENKO, O.O. 2009. *Accounting and cost analysis for innovation: management aspect*. Doctoral dissertation, State Academy of Statistics, Accounting and Auditing of the State Statistics Committee of Ukraine.

15. KANTAEVA, O.V. 2010. *Accounting and analysis of innovation activity of enterprises: organization and methodology: A monograph*. Zhytomyr: FOP Kuzmin Dn. L.

16. KORZHAVINA, E.N. 2009. *Accounting and analysis of investments in innovative projects of industrial enterprises*. Doctoral dissertation. Yoshkal-Ola.

17. KOVAL, L. 2019. Accounting of innovative activities. *Economy, finances, management: topical issues of science and practical activity*, **43**(3), 117–131. https://doi.org/10.37128/2411-4413-2019-3-10

18. KRUPKA, J.D. 2006. Variants of accounting for innovation processes at the enterprise. *Accounting and Auditing*, **5**, 11–18.

19. KUCHERENKO, T.Y., RATUSHNA, O.P., and MELNYK, L.Y. 2019. Accounting for financing of the enterprise's innovation activities. *Accounting and Finance*, **83**(1), 35–43. https://doi.org/10.33146/2307-9878-2019-1(83)-35-43

20. KUZMINSKY, Y.A., and VORONOVA, M.O. 2006. Peculiarities of cost accounting for development and development of production of innovative product (products). *Visnyk of Zhytomyr State Technological University. Economic sciences*, **37**(3), 52–56.

21. LEHENCHUK, S.F., VALINKEVYCH, N.V., VYHIVSKA, I.M., and KHOMENKO, H.Y. 2020. The significant principles of development of accounting support for innovative enterprise financing. *International Journal of Advanced Science and Technology*, **29**(8), 2282–2289.

22. MINAKOV, O.V. 2005. Accounting for innovation in enterprises participating in the technopark. *Accounting and Auditing*, **5**, 24–27.

23. OZERAN, V.O. 2013. Actual problems of cost accounting for innovation. *Accounting and Auditing*, **12**, 21–29.

24. PLASKOVA, N.S., PRODANOVA, N.A., OTESHOVA, A.K., RODIONOVA, L.N., and ARLANOVA, O.I. 2020. Innovative activity of the organization: improving methodological and accounting and analytical support. *Journal of Critical Reviews*, **7**(5), 693–696. http://dx.doi.org/10.31838/jcr.07.05.143

25. PYLYPENKO, A.A. et al. 2011. *Formation of accounting and analytical support for cost management of enterprises and associations: A monograph.* H.: KhNEU Publishing House.

26. RESLER, M.V. 2017. Accounting and analytical support for innovation process. *Scientific bulletin of Polissia,* **9**(1), 54–60.

27. SAENKO, K.S. 1991. *Accounting for NTP costs: A monograph.* Moscow: Finance and Statistics.

28. SIDORENKO, A.Y. 2011. *Accounting support of innovative activity in agro-food holdings.* Doctoral dissertation, Volgograd State Agricultural Academy. Volgograd.

29. SIRYK, Z., POPADYNETS, N., PITYULYCH, M., CHAKII, O., IRTYSHCHEVA, I., PANUKHNYK, O., HYK, V., FEDOTOVA, Y., ROHOZIAN, Y., and LYSYAK, N. 2021. Decentralization of local self-government under the conditions of administrative-territorial reform in Ukraine. *Accounting*, **7**(4), 781–790. https://doi.org/10.5267/j.ac.2021.2.006

30. SMOKVINA, G.A., and POPOVYCH, K.F. 2020. The organizational aspects of the formation of accounting policies for innovation expenditures on capital investments. *Business Inform,* **9**, 205–211. https://doi.org/10.32983/2222-4459-2020-9-205-211

31. STOLYARCHUK, N.M. 2018. Objects of accounting and internal audit of innovation. *Economics of Agro-industrial Complex*, **7**, 55–63. Available from: http://eapk.org.ua/sites/default/files/eapk/2018/07/eapk_2018_07_p_55_63.pdf

32. VALUEV, B.I., and KANTAEVA, O.V. 2009. Some issues of accounting for innovation costs and sources of their coverage: conceptual aspect. *Accounting and Auditing*, **12**, 28–35.

33. YEZHAKOVA, N.V. 2011. Innovative product as an object of accounting. *Scientific notes of Tavriya National University V.I. Vernadsky. Series: Economics and Management*, **24**(63), 268–274.

34. ZHUK, V.M. 2011. Conceptual approaches to solving surface and deep problems of accounting for innovation. *Accounting and Finance of AIC*, **1**, 36–39.

THE INVESTMENTS OF FINANCIAL INSTITUTIONS IN REAL INNOVATIONS: KAZAKHSTANI PRACTICE

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Abstract. *In this paper, the authors investigate the issue of the weak role played by financial institutions in Kazakhstan in generating and introducing innovations in the real sector of the economy. In the process of preparing this paper, three methods were used: statistical comparative analysis; economic and mathematical modelling; and the graphical method. Based on analysis and modelling, the authors identified the predominantly negative tendencies of the decreasing participation of financial institutions in the financing of entities in the innovation sector. International best practice also confirms that for the full development of real innovations, bank investments alone are insufficient. Along with*

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banking resources, there is huge investment potential for the development of the real sector, including innovation, the long-term resources of insurance companies, and a pension fund. This paper offers promising directions and recommendations for enhancing the participation of all of the major parties of the financial market of Kazakhstan in the financial support of innovations, so as to increase the competitiveness of the national economy and ensure its continued qualitative growth.

Keywords: *intersectoral cooperation, regulatory institutions, economic growth, investment.*

JEL Codes: *G24, G38, O16, O38, O43*

1. Introduction

The modern conditions of ongoing global geopolitical change and market volatility require the sustainable development of Kazakhstan's economy. Its progressive growth can be achieved by qualitatively diversifying the structure of the economy and increasing its competitiveness, including through the active generation and implementation of higher levels of technology. Naturally, the issue of innovative development is especially important for the economy of Kazakhstan, which is developing within the framework of the model of "catch up" development (Davletbayeva et al. 2018; Taubayev et al. 2019). This is particularly emphasised in documents of strategic importance, such as the President's "Kazakhstan – 2050" Strategy (2012) and the "Third Modernisation of Kazakhstan: Global Competitiveness" (2017). At the same time, the country is implementing the "State program of industrial and innovative development for a 5-year period" (2014) and the "Concept of innovative development of the Republic of Kazakhstan until 2020" (2013), which enshrine the basic principles, goals, and objectives of the innovative development of Kazakhstan. With that, difficulties in the implementation of this strategic direction of Kazakhstan are evidenced by the country's position in the Global Innovation Index (2019), where Kazakhstan ranked only 92 out of a possible 100 in the composite index of results.

The authors believe that for the qualitative growth of innovations and the innovation sector at large, efforts merely on the part of the state are not enough. Best international practice indicates that those countries that have managed to harmoniously combine the efforts of state bodies and private entrepreneurs achieve the greatest successes in innovative performance. Considering the capital intensity of any fully-fledged innovation process, the issue of financing plays an important role in the implementation of innovative projects (Andrijauskiene and Dumčiuvienė 2019). This refers to active financial and credit support for innovations by the entities of the financial and credit system, which bear the main burden in the practices of OECD countries. State bodies retain only the right of indirect participation in the part of the regulation that is aimed at aid and stimulation.

Meanwhile, the Kazakhstani practice of interaction between financial/credit structures and active innovative enterprises leaves much to be desired. Often, even projects with promising ideas do not pass the examinations of financial organisations against the background of their low-risk appetite and the requirements of the financial regulator. The results of this behaviour are evidenced by data such as the share of investments in fixed assets and in innovations (18.9% of GDP and less than 1% of GDP, respectively), and the fact that the share of innovative enterprises does not exceed 10% (compared to 50% in foreign countries) (Website of the Committee… 2020). In this regard, the prevailing tendencies and the presence of unresolved problems, including regulatory ones, which limit the investment potential of financial institutions in Kazakhstan emphasise the ambiguity and the relevance of this subject. There is a necessity for a critical reinterpretation of the content, forms, and mechanism for regulating the activities of financial organisations from the standpoint of their more productive interaction with the subjects of the innovation sector in the context of new economic realities.

Financial support for the effective functioning of the innovation sector constitutes an object of active research in connection with the need to improve it. Various aspects of this problem have been considered in the works of both Kazakh and international scientists, forming a scientific and methodological framework for the development of this subject and helping to achieve the purpose of this study. A study of the interrelation between the banking sector, the stock market, and the growth of innovation – with consideration of the democratic levels of political institutions – was carried out by C.-Y. Ho, S. Huang, H. Shi, and J. Wu (2018). Problems with the influence of intersectoral interaction on economic development, including in terms of innovative development, have been directly studied in the works of many Kazakh and international scientists. Among such studies is the work of A. Toxanova et al. (2017), which discusses various ways of financing innovative entrepreneurship. Toxanova et al. also considered the role of state development institutions in financing innovation, including the degree to which financial and credit instruments are used in the innovative development of the country.

Issues of enhancing the interaction between financial organisations and enterprises in the real sector were considered in a study by L. Matveeva et al. (2015), where the authors presented a model that allowed them to study the impact of the intra-group financing of financial and industrial groups and to determine the amount of investment possible. A study by N. Hutchison et al. (2016) examined the financial instruments of infrastructure investment projects, with the authors strongly supporting the idea that the introduction of project bonds will contribute to the growth of investment in infrastructure amidst a decrease in bank lending. The interrelation between internal and external financing and the degree of innovation in European companies is explored by P.A. Nylund et al. (2020) and R.P. Pradhan et al. (2020). Both groups of authors concluded that external financing in the form of debt reduces a company's profitability and constitutes a deterrent. However, despite the depth of the investigations carried out by these researchers, some aspects of intersectoral cooperation remain understudied.

2. Materials and methods

For the empirical analysis of the data used as evidence in this paper, econometric modelling methods were used – namely, correlation-regression analysis with the construction of paired and multiple linear regression models. The Stata 13 software suite was used as a modelling tool, and a graphical illustration of the dependencies was carried out in Excel. Statistics were taken from the international database of the World Bank (2020) and the database of the National Bank of the Republic of Kazakhstan for the period of 1993–2018. Within the framework of the modelling of dependency indicators, an attempt was made to determine the greatest degree of influence exerted by various sources of financing innovation on the growth of the innovation sector. The indicator "Export of high-tech goods in the total industrial export" was taken as an effective factor.

To assess the impact of the investment potential of various financial institutions on the growth of the innovation sector, an economic and mathematical model was constructed. For this, the selected indicators were grouped in the following areas: "bank loans"; "assets of financial institutions"; and "stock market" (Table 1). For each group of factors, a correlation analysis of interrelation with the indicator of "the export of high-tech goods in the Republic of Kazakhstan (Inn, % of industrial exports)" was conducted, and a corresponding regression model was constructed.

Table 1. *Grouping of indicators of sources of innovation financing*

Bank loans	Assets of financial institutions	Stock market
1 group	2 group	3 group
Domestic loan to the private sector by banks (C_1, % of GDP)	Banking assets (A_1, % of GDP)	Market capitalisation of companies (F_1, % of GDP)
Long-term bank loans to legal entities (C_2, % of GDP)	Pension assets (A_2, % of GDP)	Outstanding shares, total value (F_2, % of GDP)
Short-term loans of second-tier banks (C_3, % of GDP)	Assets of insurance companies (A_3, % of GDP)	

3. Results and discussion

The banking sector has been and remains the main source of credit support for the economy of Kazakhstan. However, the ratio of bank loans to GDP in 2019 was less than 22% (The current state of the banking… 2020). Evaluation and comparative analysis of the investment potential of the Kazakhstani insurance market and the insurance markets of developed countries suggest a significant absence in the investment opportunities of Kazakhstani insurance companies due to low levels of capitalisation and of the development of the insurance market itself. According to the data reported in "World Insurance: The Great Pilot East Countries", published in 2018 by the Sigma journal, the volume of

insurance premiums in Kazakhstan in US dollars amounted to 1.01 billion, compared to 1,469.37 billion in the United States, 336.51 billion in the UK, 440.65 billion in Japan, and 23.59 billion in the Russian Federation (Swiss Re Institute 2019). With that, the Kazakhstani share in the global insurance market in terms of total insurance premiums amounted to 0.02% in 2018, which is comparable to the levels of insurance premiums in Cyprus, Sri Lanka, Serbia, and Oman. Upon investigating the indicators of the national insurance sector of Kazakhstan for 2011–2019, according to the National Bank of the Republic of Kazakhstan, one can note the growth of total assets up to 1,206.1 billion tenge, the income of insurance premiums up to 508.6 billion tenge, and the income from insurance activities up to 399 billion tenge. However, the insufficient capitalisation of Kazakhstani insurance companies discourages the development of their investment activities. The value of equity of Kazakhstani insurers, despite the constant dynamics of growth, is less than 1% of GDP, or 553 billion tenge (The current state of the insurance… 2020).

The issues of using pension savings to invest in the Kazakhstani economy, in particular in the innovation sector, are very relevant in the search for optimal sources of financing for innovative development. Pension fund assets can serve as the main factor in the growth of financial markets, provided that these markets reach a certain level of development, have adequately formed infrastructure, and possess suitable available investment tools. Considering the pension sector as a source of financing innovation, the long-term nature of the obligations of pension funds and, therefore, their fairly significant potential for investment in the innovation sector should be noted. In recent years, Kazakhstan has seen an increase in the amount of pension savings accumulated by the Unified Accumulative Pension Fund, which amounted to 10,800.5 billion tenge in 2019. The ratio of pension savings to GDP was 15.7% in 2019 (The current state of the funded… 2020).

Considering the directions of investing the pension assets of the Unified Accumulative Pension Fund of Kazakhstan, it should be noted that pension assets are mainly placed in the government securities of Kazakhstan and other foreign countries. In August 2018, the decision of the National Bank of the Republic of Kazakhstan on the provision of long-term liquidity to the "domestic economy" changed the investment orientation of pension assets. The UAPF, within the framework of the allotted quota of 200 billion tenge, acted as a buyer of JSC Bank TsentrKredit, JSC AB Sberbank, JSC KaspiBank, JSC Eurasian Bank, JSC Nurbank, and JSC Bank Home Credit securities, with various terms of circulation (The National Bank… 2020). Perhaps this measure will help to some extent in solving the issue of banks associated with the lack of long-term resources for lending to the economy, including the innovation sector.

Considering the role of the stock market in the economy of Kazakhstan, it should be noted that the indicator of capitalisation of the stock market in relation to GDP decreased from 50% to 29% for the period of 2010–2019, and the capitalisation index of the exchange-traded bond market in relation to GDP for the analysed period slightly increased, from 19% to 20%. Despite positive changes, the Kazakhstani securities market has not yet become an effective mechanism for the redistribution of cash resources in the real sector, and does not significantly affect the development of the economy. A stock market has formed in the country, covering the circulation of a limited scope of securi-

ties. The solution to this issue lies in changing the mechanism for regulating the stock market, aimed at reorienting stock market participants towards long-term investments.

Assessment of the influence of the factors of the "bank loans" group showed a strong correlation with the export of high-tech goods .65). With that, short-term loans from second-tier banks do not have a positive effect on the development of innovations, since . This is because the terms of short-term lending do not coincide with the duration of the full innovation cycle. Considering the fact that the indicators of domestic lending to the private sector and long-term lending to legal entities are very closely interconnected, it is advisable to assess individual models (Eq. 1, 2):

$$I_{nn} = 5,43 + 0.49 \cdot C_1, \ (4.61) \ (0.14) \qquad\qquad (1)$$
$$I_{nn} = 16.0 + 1,8 \cdot C_2 - 3.03 \cdot C_3, \ (3.86) \ (0.25) \ (0.65) \qquad (2)$$

All regression coefficients are statistically significant. With that, an increase in the share of domestic loans to the private sector in GDP by 1% will involve an increase in the share of high-tech goods in industrial exports by 0.49%. Similarly, a 1% increase in the share of long-term bank loans to legal entities in GDP will contribute to a 1.8% increase in the share of exports, while an increase in the share of short-term bank loans in GDP by 1% leads to a decrease in the share of exports by 3.03% (Figure 1).
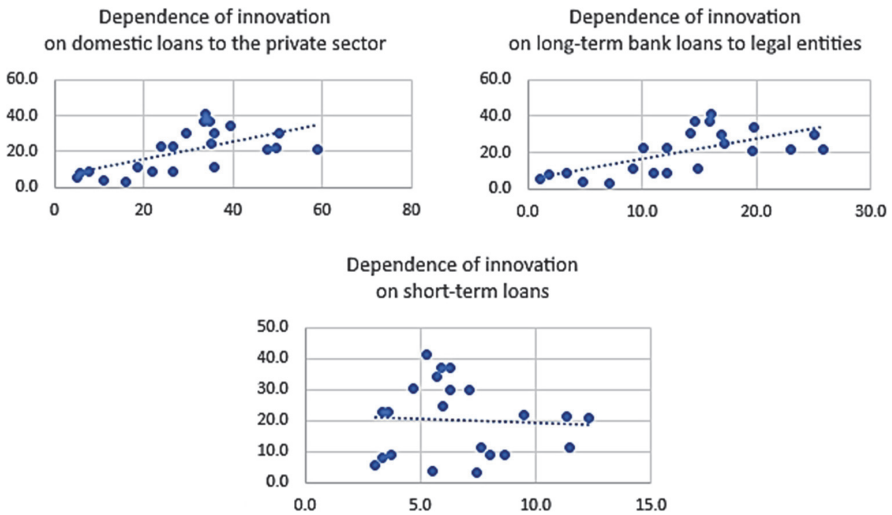

Figure 1. *The dependence of the results of innovation on the indicators of bank lending, including by loan terms, in the Republic of Kazakhstan*
Source: *compiled by the authors.*

Within the framework of assessing the influence of the factors of the "assets of financial institutions" group on the indicator of the effectiveness of innovative activities (the export of high-tech goods in the total volume of industrial exports) in the Republic of

Kazakhstan, the resulting attribute is most affected by the assets of insurance companies, and least affected by pension assets (Aggregate banking assets have a weak effect on the result . The regression model in this case has the following form (Eq. 3):

$$I_{nn} = 20.85 + 0.33 \cdot A_1 + 1.89 \cdot A_2 + 29.4 \cdot A_3, \ (8.89) \ (0.12) \ (0.97)(6.02) \qquad (3)$$

Thus, with an increase in the share of banking assets in GDP by 1%, an increase in the share of high-tech goods in industrial exports by 0.33% can be expected. In turn, with an increase in the share of pension assets by 1%, the share of exports of high-tech goods will increase by 1.89%. An increase in the share of assets of insurance companies will contribute to an increase in the export of high-tech goods by 29.4% of industrial exports (Figure 2).
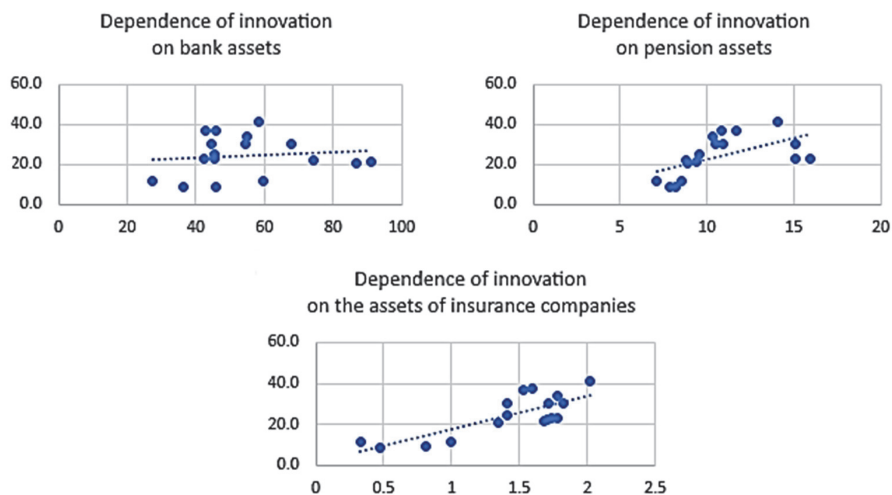
Figure 2. *The dependence of the results of innovation on various types of financial assets in the Republic of Kazakhstan*
Source: *compiled by the authors.*

According to the authors, the inconsistency of the results obtained regarding pension assets indicates the imperfection of the institutions that regulate financial organisations in terms of their interaction with the subjects of the innovation sector. Additionally, the current practice of strict regulation, whilst also concerning subjects of the banking sector, reduces the role of these regulatory institutions in the development of Kazakhstan's innovation sector. To study the degree of influence of the factors of the "stock market" group, which describe the developmental tendencies of the stock market of Kazakhstan, it is necessary to separately distinguish the indicators of "market capitalisation of listed Kazakh companies" and "value of shares in circulation". However, the results show that these indicators do not significantly impact the indicator "export of high-tech goods". The coefficients of paired correlation between these indicators amount to and , respectively (Figure 3).
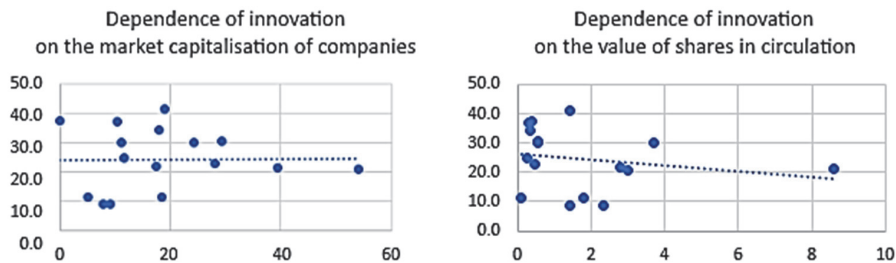
Figure 3. *The dependence of the results of innovation on the performance
of the stock market in Kazakhstan*
Source: *compiled by the authors.*

The same result is obtained from a regression analysis of the dependence of innovation on stock market indicators (Eq. 4):

$$I_{nn} = 24.5 + 0.13 \cdot F_1 - 1.44 \cdot F_2 \ (4.78) \ (0.25) \ (1.59) \qquad (4)$$

The results obtained by applying the economic-mathematical model allow for the formulation of the main conclusions in the context of this research:

1. The significant potential of the influence of bank loans on the results of innovation – primarily long-term bank loans, the terms of which correspond to the duration of a fully-fledged innovation cycle – is confirmed, which determines the prospects of their use in contrast to short-term loans, for which such a dependence was not observed.
2. A strong correlation was observed between the assets of insurance companies and the results of innovation, which indicates the potential of the insurance sector, including pension assets. The effective use of the long-term assets of the insurance sector in favour of innovation entities is successfully confirmed by global practice.
3. As expected, instruments of the securities market did not demonstrate an impact on the results of innovation due to the lack of development in the structure of the financial market and the lack of experience of entities in the innovation sector in the use of securities.

In the context of country models, there are differences in terms of activity and specialisation of financial organisations in the development of innovation. With that, the higher the degree of development of a country's economy, the higher the share of participation in the innovation process occupied by the resources of both the banking/pension and insurance sectors. A relatively low degree of participation of entities in the banking sector in the country's innovative development is noted in countries with the Anglo-Saxon model, where the stock market plays this role, through which real sector enterprises form up to 40% of their resources.

In emerging markets, including in Kazakhstan, the centre of gravity is shifting toward the public sector. Banking participation is mainly observed in cases where innovative projects are guaranteed or subsidised by the state (Rakhmetova et al. 2019). It is no secret that such tendencies are formed due to the fact that in the structure of the client base

according to the scale of activity, commercial banks give preference to large enterprises, the stability and solvency of which is undoubted. However, such enterprises do not express great demand for banking services due to the sufficiency of their own funds. On the contrary, active interaction with banks, including in innovation, manifests itself primarily among small- and medium-sized businesses. The activities of such enterprises are characterized by a high degree of uncertainty regarding outcomes and a lack of confidence that their ideas can be successfully commercialised, which in most cases leads to a lack of interest among banks in this area of activity.

One can single out the following directions as priority areas for enhancing the participation of banking organisations in the development of real innovation:

- the creation of industry-specific innovative banks is associated with the recognition of the priority of innovation in the modernisation and structural adjustment of the economy. According to the authors, all of the elements necessary for ensuring all stages of the innovation process (business incubation services, technology transfer, etc.) should be concentrated within the structure of such a bank, in combination with a clear industry orientation. This will reduce the cost of maintaining an array of development institutions;

- the development of cluster initiatives in the regions. In 2006 in Kazakhstan, the concept of creating regional socio-entrepreneurial corporations (SEC) was approved. These were territories created for the full production cycle of high-tech products, divided into several cluster formations. However, while support for regional economic entities, including innovatively active enterprises within the framework of the cluster approach, was fairly well conceived, problems remain in providing financial assistance to them. In this regard, financial institutions that would possess autonomy in deciding whether to grant a loan or finance a project should be built into the regional innovation system (Alquist et al. 2019). In particular, this refers to a combination of clustering practices that are already used in the real sector with the formation of regional banking clusters, which should include both regional development banks and industry-specialised banks in accordance with the industry specialisation of the region, which are to perform the functions of financing innovation;

- the introduction of tax incentive practices: there are various measures of tax incentives for innovation. The mechanism of tax incentives is as follows: for the first two years, a company is completely exempt from taxes, and in the following years their rate is set at 15% (Galyukshova 2010). Companies that work in technology parks have the right to pay only 10% of the income tax rate, while in a number of technology parks this rate is set at 0%.

4. Conclusions

The pronounced processes of globalisation and the current tendencies of financial and economic turbulence have exacerbated issues that concern the sustainable development of national economic systems, including those based on the harmonious intersec-

toral cooperation of various economic entities. In this study, an attempt was made to simulate data so as to prove the degree of influence of the resources of financial institutions on the development of the innovation sector in Kazakhstan. With that, the process of interaction between the financial/credit and innovation sectors of the economy is capable of simultaneously generating a multitude of effects – including results at the micro-, meso-, and macro- levels.

To effectively utilize the investment opportunities of Kazakhstani insurance companies, it is necessary to formulate an appropriate state investment policy concerning the insurance market, which should contribute to an increase in its investment potential and should factor in the country's investment priorities. To increase the role of pension assets in the development of the Kazakh economy and the innovation sector, it is necessary to develop mechanisms for transforming pension savings into investment resources aimed at developing priority sectors.

Acknowledgments

References

1. Address by the President of the Republic of Kazakhstan, leader of the nation, N.A. Nazarbayev: "Strategy Kazakhstan – 2050". Official website of the President of the Republic of Kazakhstan, 2012 [online]. Retrieved from: https://www.akorda.kz/en/addresses/addresses_of_president/address-by-the-president-of-the-republic-of-kazakhstan-leader-of-the-nation-nnazarbayev-strategy-kazakhstan-2050-new-political-course-of-the-established-state

2. Address by the President of the Republic of Kazakhstan, leader of the nation, N.A. Nazarbayev: "Third Modernization of Kazakhstan: Global Competitiveness". *Official website of the President of the Republic of Kazakhstan*, 2017 [online]. Retrieved from: https://www.akorda.kz/en/addresses/addresses_of_president/the-president-of-kazakhstan-nursultan-nazarbayevs-address-to-the-nation-of-kazakhstan-january-31-2017

3. ALQUIST, R., BERMAN, N., MUKHERJEE, R., and TESAR, L.L. Financial constraints, institutions, and foreign ownership. *Journal of International Economics*, 2019, **118**, 63–83. https://doi.org/10.1016/j.jinteco.2019.01.008

4. ANDRIJAUSKIENE, M., and DUMČIUVIENĖ, D. Inward foreign direct investment and national innovative capacity. *Engineering Economics*, 2019, **30**(3), 339–348. https://doi.org/10.5755/j01.ee.30.3.22832

5. DAVLETBAYEVA, N., TAUBAYEV, A., and KUTTYBAI, M. System problems of entrepreneurship development in Kazakhstan regions in conditions of globalization. *Proceedings of the IDIMT 2018: Strategic Modeling in Management, Economy and Society. 26th Interdisciplinary Information Management Talks*,

2018, 113–119. Retrieved from: https://idimt.org/wp-content/uploads/proceedings/IDIMT_proceedings_2018.pdf

6. GALYUKSHOVA, T.V. Tax support of innovative activities. Bull*etin of the Omsk University. Series Economics*, 2010, **4**, 170–176.

7. HO, C.Y., HUANG, S., SHI, H., and WU, J. Financial deepening and innovation: The role of political institutions. *World Development*, 2018, **109**, 1–13. https://doi.org/10.1016/j.worlddev.2018.02.022

8. HUTCHISON, N., SQUIRES, G., ADAIR, A., BERRY, J., LO, D., MCGREAL, S., and ORGAN, S. Financing infrastructure development: time to unshackle the bonds? *Journal of Property Investment and Finance*, 2016, **34**(3), 208–224. https://doi.org/10.1108/JPIF-07-2015-0047

9. MATVEEVA, L., MIKHALKINA, E., CHERNOVA, O., and NIKITAEVA, A. Strategic context of Russian financial and real economy sectors interaction. *Journal of Applied Economic Sciences*, 2015, **10**(37), 1085–1087.

10. NYLUND, P.A., ARIMANY-SERRAT, N., FERRAS-HERNANDEZ, X., VI-ARDOT, E., BOATENG, H., and BREM, A. Internal and external financing of innovation: Sectoral differences in a longitudinal study of European firms. *European Journal of Innovation Management*, 2020, **23**(2), 200–213. https://doi.org/10.1108/EJIM-09-2018-0207

11. PRADHAN, R.P., ARVIN, M.B., NAIR, M., and BENNETT, S.E. Sustainable economic growth in the European Union: The role of ICT, venture capital, and innovation. *Review of Financial Economics*, 2020, **38**(1), 34–62. https://doi.org/10.1002/rfe.1064

12. RAKHMETOVA, A., KALKABAYEVA, G., ISKAKOVA, Z., KURMANALINA, A., and TURMAKHANBETOVA, G. Institutional conditions of interaction of financial-credit and innovative economic sectors. *Entrepreneurship and Sustainability Issues*, 2019, **7**(1), 704–713. https://doi.org/10.9770/jesi.2019.7.1(51)

13. *Swiss Re Institute* [online]. 2019. Retrieved from: https://www.swissre.com

14. TAUBAYEV, A., KAMENOVA, A., LEGOSTAYEVA, A., SRAILOVA, G., and AYAZHANOV, K. Innovative entrepreneurship development: Main problems and educational limitations in Kazakhstan. *Economic Annals-XXI*, 2019, **177**(5-6), 92–100. https://doi.org/10.21003/ea.v177-08

15. The concept of innovative development of the Republic of Kazakhstan until 2020. *Adilet* [online]. 2013. Retrieved from: https://adilet.zan.kz/eng/docs/P1800000846

16. The current state of the banking sector of Kazakhstan. *Agency for Regulation and Development of the Financial Market of the Republic of Kazakhstan*, 2020. Retrieved from: https://www.finreg.kz

17. The current state of the funded pension system of the Republic of Kazakhstan. *Agency for Regulation and Development of the Financial Market of the Republic of Kazakhstan*, 2020 [online]. Retrieved from: https://finreg.kz/?docid=1126&switch=russian

18. The current state of the insurance sector in Kazakhstan. *Agency for Regulation and Development of the Financial Market of the Republic of Kazakhstan*, 2020 [online]. Retrieved from: https://finreg.kz/?docid=1180&switch=russian

19. *The Global Innovation Index.* 2019. Cornell INSEAD WIPO. Retrieved from: https://www.globalinnovationindex.org/Home

20. The National Bank of Kazakhstan on market conditions lends to banks to support the economy. *The National Bank of Kazakhstan*, 2020 [online]. Retrieved from: http://www.nationalbank.kz/?furl=news&switch=russian&kat=1&showall

21. *The state program of industrial and innovative development of the Republic of Kazakhstan for 2015–2019.* 2014. Retrieved from: https://adilet.zan.kz/rus/docs/ U1400000874

22. TOXANOVA, A., GALIYEVA, A., MUHAMEDZHANOVA, A., BAIBUSINO-VA, G., KULUBEKOVA, A., and ASHIKBAYEVA, Z. Innovative entrepreneurship financing in the Republic of Kazakhstan. *Journal of Applied Economic Sciences*, 2017, **12**(3), 875–892.

23. *Website of the Committee on Statistics of the Ministry of National Economy of the Republic of Kazakhstan* [online], 2020. Retrieved from: http://www.stat.gov.kz

24. *World Bank Data* [online], 2020. Retrieved from: https://databank.worldbank. org/source/world-development-indicators

CENTRAL ASIAN COUNTRIES: COMPETITIVENESS AND PROSPECTS FOR COOPERATION AND INTEGRATION

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Abstract. *This article provides an analysis of the economies of Central Asia in the post-Soviet period. The method of periodization allowed the stages of reforming these economies and the difficulties of their transitions to the market to be highlighted. The*

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authors used a systematic approach, the selection of necessary information, and logical inferences.

It is demonstrated that the economic potential and the narrowness of the sales markets in these countries are unattractive for investors. Aging populations, high youth unemployment, and rampant migration complicate the socio-demographic situations. The nationalistic egoism of the business elite, which has grown stronger in the years since independence, exerts significant pressure on political power.

An analysis of the indicators of the global competitiveness of selected countries leads to the notion that the national economies of Central Asia may show growth in the future. The region has a competitive advantage because of: the reduced costs of transport and logistics; a similar culture of consumption and customer demands; comparability of household income; and greater demand for products within the region.

Noting attempts of the countries in the region at integration, the authors outline intensifying contradictions and conflicts that include: ethnic enclaves, border problems, the distribution and regulation of water resources, trade, and customs barriers.

An important outcome of this study is the identification of opportunities for regional cooperation and the format for expanding integration ties between Central Asian countries. These countries represent a single economic space, and the use of the entire range of relations – from single agreements to international ones – will benefit these countries as a large region in the global market.

Keywords: *global competitiveness, Central Asian countries, cooperation, integration, socio-economic situation.*

JEL*: D41, F15, Z13*

1. Introduction

The countries of Central Asia (CA) cover the territory of five states: Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan. After the collapse of the USSR, these countries chose various methods of economic liberalization, state property privatization, and transition towards a market-based management model. They differ in the performance of the implementation of reforms, methods of management, and the degree of economic centralization. Over the course of time, mistakes in the management of the economies of these countries, border conflicts, and disputes over the solution of water-power problems have worsened their situations and led to strained relations. Today, the countries of this region are developing unevenly, and the available prerequisites for regional economic integration have not been sufficiently utilized. These countries started on the path towards market transformation simultaneously, but today one can observe differentiation in the levels of development. This can be explained by differences in starting conditions, available economic potential, management culture, national peculiarities, and assumed models of management. The period of time that has elapsed since gaining independence is also different for these countries.

Kazakhstan is positioned as a state with a territory of gargantuan scale and significant economic potential. The country has commercial reserves of ferrous and non-ferrous metals, 84 types of industrial minerals, and oil and gas – all of which support economic development. This republic ranks 7th in uranium production, 9th in silver production, and 10th in zinc and alumina production globally (Kazakhstan. General characteristic 2016; Nurasheva et al. 2019).

Market reforms are actively carried out, the Astana International Financial Center has been set up on the territory of the International EXPO–2017 exhibition site, the "People's IPO" project is being implemented, and shares in KEGOC, KazTransOil, and Kazatomprom are being successfully sold. In spite of sustainable GDP growth, the rate of the national currency is unstable, the banking sector is experiencing a state of fever. Analysts agree that the export-raw-material model is in a dampened stage, oriented towards the extraction of raw materials and providing financing from external resources.

The natural resources of Uzbekistan are quite diverse, and create favorable conditions for the development of the branches of the natural resource complex. The country is among the world leaders in reserves of silver, tungsten, phosphate rock, potassium salt, and rare earth metals; it is the third largest exporter of cotton in the world, and a major supplier of gold and natural gas to the global market. For a long time, elements of the centralized economy remained in Uzbekistan, and market reforms only began in the last 2–3 years. An investment environment and measures to stimulate investment, along with guarantees of protecting investors' rights, have been formed. The volume of accumulated investments in 2018 amounted to $190 billion, of which over $65 billion were international (Begalov 2018; Salimov 2018).

Turkmenistan is a predominantly desert country, with nomadic cattle raising and intensive farming in irrigated oases thanks to the Kara Kum Canal. The country has enormous gas (the fifth largest reserves in the world) and oil resources, and is the tenth largest cotton producer in the world – half of the irrigated land of Turkmenistan is occupied by this crop (Trapeznikov 2018; Turkmenistan Economy 2020).

Tajikistan is a small, mountainous country, poorly endowed with resources other than water. For a large part of the 1990s, Tajikistan was engulfed in civil war and remains in poverty today (Akhmedov 2016; Republic of Tajikistan. Recent social and economic trends and short-term prospective 2019).

Despite the stabilization of the economic situation after numerous political upheavals, Kyrgyzstan has not fully restored its potential. The main export-oriented industries are mining and energy, and gold mining at Kumtor – the world's largest gold deposit – provides a significant portion of currency supply. In addition, the republic ranks first in the world in terms of reserves and production of mercury. For a long time, Kyrgyzstan was the first and the only state in the region to join the WTO, which can be regarded as a product of its vigorous implementation of early economic reforms (Kyrgyzstan: Country overview 2018; World Economic Outlook Database 2019).

The countries of the region – with the exception of Kazakhstan – lag behind in the human development rating. These states are, to different degrees, open to international and regional trade, the movement of labor and capital, the provision of services, and

various forms of collaboration and cooperation. However, these countries have much in common, including geographic location, common history, linguistic and cultural proximity, and established economic ties. Therefore, current restrictions on foreign economic activity can be considered a temporary phenomenon.

It should be noted that there are few in-depth studies on the socio-economic problems of these countries. Instead, research is mainly conducted at the local level and is contained in scientific journals published domestically. There are no scientific papers that consider CA countries as a single economic territory, reflect the real level of integration, and consider the regional division of labor within. In addition, most publications have political implications, and seek to explain the decisions and legislative initiatives of the authorities.

On this evidence, this article sets the following **goal of the study**: to examine the characteristic trends of development and the distinctions of the national economies of CA countries to provide a forecast for the prospects of the region's development and the possibility of expanding integrative links between these countries. The **objectives of the study** are: to consider the stages of development of the economies of the CA countries in the period of independence; to observe the course and dynamics of market reforms; to elucidate the socio-economic situations in these states; and to show the degree of competitiveness of national economies and opportunities for regional economic cooperation. Therefore, the **subject matter** is: the socio-economic processes taking place in CA countries.

2. Methods and methodology of research

The presence of a real diversity of national economic models in global economic practice creates the need to use various research methods. In the course of this study, logical reasoning, various methods of sampling the necessary information and its grouping, and both system and statistical analysis have been used. The use of a context-specific approach made it possible to consider the special conditions of the development of countries, to clearly distinguish between the established facts, and to achieve the indicators of the economies of countries.

When considering the socio-economic situation in these countries, a systematic approach was used – involving consideration of the national economy as a system of established relations in the political, economic, and social spheres. This meant an analysis of all of the interconnections of countries within the region, which revealed a shared negative aspect of these economies – their primarily agrarian character, and hence the low productivity of labor.

Observation is widely used as an active cognitive process based on statistical data, which has led to an objective analysis of the economies of countries and conclusions that do not depend on the will and desires of individual experts and scholars. As a result, it can be concluded that government regulation plays a large role in the overall process of the functioning of national management systems.

Considering the five former republics of the Soviet Union as independent states, the authors resorted to comparison to recognize similarities and differences in these

countries and the processes taking place within them by comparing the main indicators of development. Similarities in the historical past have determined similarities in the ways of development of economies, the processes of transition to new methods of management, and the methods of government of these states. Here, analogy has been used as a method of scientific cognition, through which we have attained knowledge about a country on the basis of its similarity with another from the point of view of cultural, historical, and geographical contexts. The historical method of research is known as a tool of cognition of social phenomena and processes. In this regard, the authors used periodization – the study of economic processes according to the main periods of development of countries – by comparing the Soviet and post-Soviet eras. Knowledge of cognition methods enabled the authors to note the continuity of the historically-changing forms of development of countries in the region, which explains the rather complex and slow transition of individual CA countries to market relations.

Using the methods of processing and analyzing the statistical data on countries' GDP, global competitiveness, available resources, etc., it became possible to reveal that in the modern world there is a large variety of national economic models, which confirms the objective need to develop a theory of the nation-specific peculiarities of economic models. From a practical point of view, the study of the CA countries focuses on the multiplicity of ways of economic development, and thus obliges reformers to take into account variability and plurality when it comes to choosing methods of transforming the existing economic system.

3. Results of the study and discussion

3.1. The results of the stages of reforming economies

Analysis of the economies of the CA countries allows for the identification of several periods of their transformation.

The first stage was macroeconomic stabilization based on a tight monetary policy. In 1991–1994, economies were liberalized, orientations towards political independence were adopted, and the following two years were aimed at strengthening economic trends in the policies of these states.

The second stage was aimed at overcoming the decline in production. In 1995–1999, the transition to a socially-oriented economy began, the concept of reforms was developed, and the activation of human capital took place. During this period, there was slight economic growth, which was a prerequisite for the third stage – when significant changes began in all spheres of life.

The third stage – 2000–2005 – can be characterized as a period of struggle with poverty and unemployment, the beginning of economic growth, and a sense of some results from market reforms. The years 2000–2005 were marked by economic recovery in all of the countries of the region, and governments began to actively implement social programs on: education, health care, retirement insurance, social protection, and employment. GDP growth in Kazakhstan was achieved through the export of fuel and power

resources, in Kyrgyzstan and Tajikistan through the growth of agricultural production, and in Uzbekistan due to the work of enterprises according to the old model.

The fourth stage took place in 2006–2010. The decisive factors that determined the success of reforms in this period were the speed and intensity of structural transformations, the quality of state regulation of the economy, and activity in the development of market institutions. The emphasis shifted from macroeconomic stabilization to protection of property rights**,** respect for the rule of law, predictability of economic conditions and the "rules of the game", and the formation of trust in the authorities.

The fifth stage began in 2011 and continues to the present day. This period is characterized by the implementation of institutional reforms, thee deepening of market reforms, the implementation of legislative initiatives, and the strengthening of the banking sector and financial market. The creation of integration associations and unions is also intensifying.

The countries under examination all demonstrate an increase in indicators in attracting direct international investment, especially in the extractive industries. Whilst large investments are attracted by Kazakhstan, the share of other countries remains small due to the weak progress of reforms (Kazakhstan in 2017 2018). International experts note the desire of the leadership of CA countries to enter into an open and constructive dialogue with investors. Measures are being taken to improve the investment climate, the conditions of doing business**,** and the regulatory and legal framework, in order to ensure compliance with international best practice. Regulation on specific issues is consistently improving (for example, tax, currency, and customs regulations) (Nurasheva et al. 2020). The openness of the world creates conditions that force national businesses to compete with companies from other countries, while fragile domestic business structures are put in a difficult position. Transnational companies have become the major influencing factor, of which there are over 70,000 globally, according to the UN. Their annual turnovers often exceed the budgets of many states, and the interests of these monsters do not always coincide with those of national states – which can lead to social conflicts. Foreign investors consider CA to be an extremely attractive region in terms of investment. Proximity to the fast-growing markets of Russia, China, and a number of Asian countries offers great opportunities to many investors in industry and in the financial services sector (Europe and Central Asia Economic Update 2020). At the same time, proximity to China may present some danger in view of the level of labor productivity and production efficiency in this country.

3.2. National economies: economic climates and weight in the global economy

In a region with more than 71 million people and a total GDP of \$265.2 billion in 2019, there are two leaders: in terms of population – Uzbekistan (over 45% of the region's population), and in terms of economy – Kazakhstan (around 60% of regional GDP, Fig. 1). Population size and size of the economy are key factors that investors and trading partners pay attention to when deciding upon long-term cooperation plans. Clearly, the larger the volume of the market, the greater the opportunities for business development.
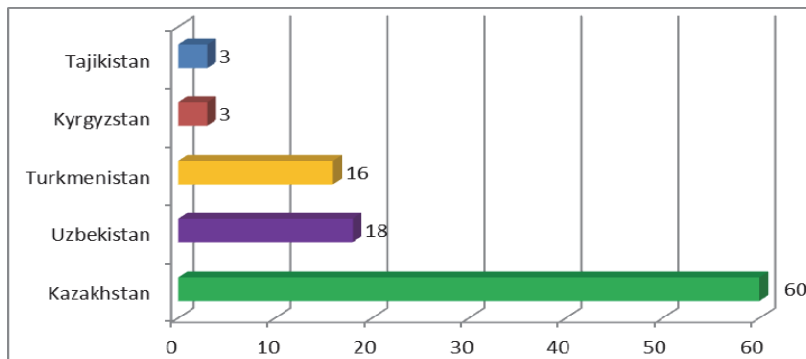
Figure 1. *Individual CA countries' shares of total CA GDP in 2019.*
Source: *Statistical Yearbook "Commonwealth of Independent States" (2019); The Rating of the World on the level Country of GDP (2019)*

As can be seen from Figure 2, the populations of the CA countries are relatively small compared to their nearest neighbors – indeed, their competitors. Similarly, the volume of the economies of these countries is not as attractive for investors (Fig. 3).
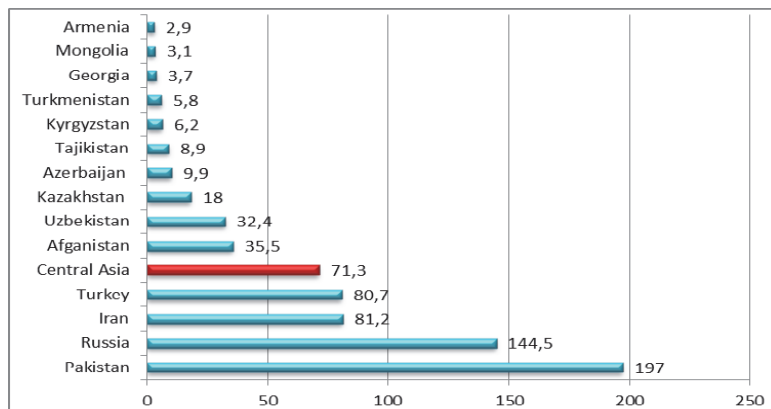

Figure 2. *The populations of selected countries in 2019, million*
Source: *Statistical Yearbook "Commonwealth of Independent States" (2019)*

If the CA countries are represented as a single economic territory, they are far more competitive in comparison to such countries as Azerbaijan, Armenia, Afghanistan, Georgia, and Mongolia, and become more comparable in terms of population and size of economy to such countries as Pakistan, Iran, Turkey, and Russia (World Economic Outlook Database, 2019). For a long time, the stereotype persisted that the CA countries

had nothing to trade among themselves, and were competitors to each other because of their agrarian and raw material economies.
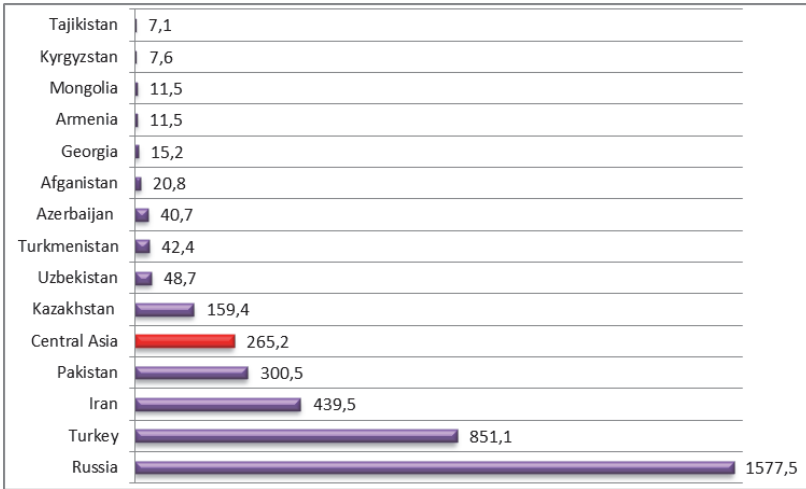

Figure 3. *The GDPs of selected countries in 2019, billion $*
Source: *The Rating of the World on the level Country of GDP (2019)*

Indeed, data on the export and import of goods, presented in Figures 4 and 5, indicate that the size of regional trade within the CA countries is insignificant (6.3%). Meanwhile, that the countries have things to trade with each other is considered a prerequisite for deepening the division of labor within the region.
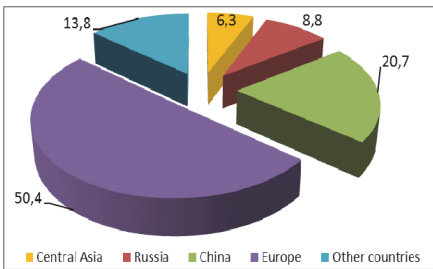

Figure 4. *Export destinations for CA countries, %*

Figure 5. *Export destinations for CA countries excluding mineral commodities, %*

Source: *own calculation based on the survey (2019)*

The main components of the goods exported by the CA countries are mineral resources and the products of their processing (87.6%), which these countries do not trade with each other and instead send outside the region (Oseledko 2018; Trade Summary

for Europe & Central Asia 2018). However, if one removes the export of mineral commodities and metals from this data, a completely different picture is observed (Figure 5). Now, active regional trade is noticeable, despite the existence of various barriers. Mineral commodities (oil, gas, primary processing products) and metals (gold, copper, ferrous metals, zinc) account for 97.1% of the region's exports to Europe, 93% of its exports to China, and 66.5% of its exports to Russia, where a considerable amount of export is also composed of soft goods and food. Analysis shows that hydrocarbons form the vast majority of the exports of Turkmenistan and Kazakhstan. These countries are considerably less focused on regional markets than Tajikistan and Kyrgyzstan, whilst Uzbekistan occupies an intermediate position.

The high dependence of CA countries on the export of goods carries great risks associated with the volatility of global prices. The key issue here is the so-called "Dutch disease" when – due to the significant export volumes of minerals – the development of other sectors of the economy, especially the processing industry, is frozen. This gives rise to the social stratification of society (as few earn money from exports), bureaucracy, and corruption (Amini, Douarin, and Hink 2021). Today, the finished products of CA countries are not competitive enough in foreign countries. At the same time, there are competitive advantages within the region due to: 1) reduced transportation and logistical costs; 2) a similar consumption culture and customers' needs; and 3) more in-demand goods in terms of comparability between levels of income.

A more detailed analysis suggests that the possibilities for regional cooperation are quite large. According to the theory of comparative advantages, the export of goods and services in which the country specializes allows for the purchase of those goods and services for which production is less profitable. As a result, all of the countries participating in the international division of labor increase their well-being. On this issue, it is necessary to convey the notion that only regional integration will attach considerable weight to the region and create incentives for the development of its countries.

3.3. Socio-demographic factors of identification

CA states are located in different climatic zones with a wide variety of natural conditions and, according to the UN criteria, they belong to the classification of developing countries. Political and economic transformations are being carried out in all CA countries with varying intensity, and attempts are being made to integrate into the global economy. Kazakhstan and Kyrgyzstan are members of the Eurasian Economic Union on par with Russia, Belarus, and Armenia (Statistical Yearbook "Commonwealth of Independent States" 2017; Ubiria 2015). The population of the region 25 years ago was 50 million people – in the time since, it has increased by 42%. This is a fairly high indicator, and this growth was accompanied by an increase in life expectancy and a reduction in mortality (Table 1).

The highest birth rates can be observed in the poorest countries – 22.6 and 23.8 people per 1000 inhabitants in Kyrgyzstan and Tajikistan, respectively. Compared to the other countries of the region, the mortality rate is very high in Kazakhstan – 8.2 people

per 1000 inhabitants (Satubaldin 2014; World Economic Outlook Database 2020). In the main agrarian territories, the population density exceeds 100 people per square kilometer, which is comparable to the indicators of large cities. By population, the largest country in the region is Uzbekistan, which is home to 32.4 million people. Of these, 8 million live in the Fergana Valley with a population density of 360 people per square kilometer, which is 12 times higher than the overall population density of Kyrgyzstan and 55 times higher than that of Kazakhstan (for comparison, in Shanghai this indicator is 435 people per square kilometer) (Statistical Yearbook "Commonwealth of Independent States" 2017; Zakhvatov 2014).

Table 1. *The main demographic indicators of the CA countries, 2019*

	Population (million people)	Population density (per 1 sq. km)	Area (thousand sq. km)	Birthrate (number of births per 1000 people)	Mortality (number of deaths per 1000 people)	Natural growth of population
Kazakhstan	18.0	6.5	2,725	18.7	8.2	10.5
Kyrgyzstan	6.2	30.5	200	22.6	6.6	16.0
Tajikistan	8.9	60.,8	143	23.8	6.1	17.7
Turkmenistan	5.8	11.7	488	19.3	6.1	13.2
Uzbekistan	32.4	70.9	447	16.9	6.1	11.6
Total	71.3	-	4,003	-	-	-

Source: *Statistical Yearbook "Commonwealth of Independent States" (2019)*

According to the UN, individual countries in the region are gradually approaching the threshold of old age. In 2018, the age structure of the populations of Kyrgyzstan and Uzbekistan changed from a young one towards an increase in the proportion of people over 65 years of age. With an increase in the proportion of the aged population, experts also note a tendency of growth in the proportion of children (in 2018, their proportion was one third).

There is uncontrolled growth in large cities due to the appearance of slum territories, which is fraught with social tension. Kyrgyzstan provides an example, where the inhabitants of the outskirts of Bishkek were the main driving force behind the coups of 2005 and 2010. Because of inter-ethnic clashes in the south of Kyrgyzstan in 2010, tens of thousands of Uzbeks and Kyrghiz left their homes. According to the Office of the United Nations High Commissioner for Refugees, the clashes in Osh and Jalal-Abad led to the displacement of around 375,000 people, 169,500 of whom never returned. These examples demonstrate the problems that CA countries may potentially face in the future (Rezvani 2013).

In the CA region, Tajikistan, Uzbekistan, and Kyrgyzstan are considered the poorest countries, with the predominance of the agrarian sector in their economies. Around half of the population of the region is below the poverty line, and a systemic crisis, with high inflation and unemployment, has had a negative impact. The rise in prices of essential

goods has badly affected the poorer strata of society, and the population spends, on average, 70% of their income on food. Average monthly incomes are also low, constituting: $70.1 in Kyrgyzstan; $53.8 in Uzbekistan; and $32.6 in Tajikistan (Tsereteli 2018; The standard of living… 2019; World Bank 2017; Sputnik Tajikistan 2018).

It must be said that uneven regional development is observed in all of the countries of the region. Thus, according to the Statistic Committee of Kyrgyzstan, the highest real incomes are in the capital of Bishkek ($80.4) and in the Osh ($72.7) and Chui ($64) oblasts; the lowest are in the Naryn and Talas oblasts ($14.5) (Kyrgyzstan Economy Profile 2020).

Uneven distribution of income also takes place in Tajikistan. Although Tajik authorities declared that GDP had grown by 12% and household income by 10% in 2017, experts say that the real growth rate of the economy was only 7% (Najmiddinov 2018). In general, the welfare of households in Tajikistan improved mainly due to financial remittances from abroad, wage growth, and self-employment. The average monthly nominal wage of salaried employees in 2017 was 1,228 somoni ($135), and the minimum wage in the country was 400 somoni ($44). For reference, 1 US dollar is equal to 9.11 Tajik somoni. There are large regional differences in incomes: the highest wages are received by Dushanbe residents – 1,934 somoni – and the lowest wages are received in the Khatlon oblast – an average of 916 somoni (World Bank 2017; Sputnik Tajikistan 2018; Najmiddinov 2018; Khramova et al. 2020).

It should be noted that, thanks to the support of the World Bank Group, in 2015–2018 the Partnership Strategy for Tajikistan was implemented, which expanded opportunities in the private sector, especially in rural areas. As a result, the investment climate has improved, the costs of doing business have decreased, and the hydropower and mining industries have been developed. Investment in education, water supply and sanitation, irrigation, and transport has also increased.

The situation in Turkmenistan is somewhat better. The presence of an abundance of natural resources masked the need for change, delaying the reforms of the first generation such as price and trade liberalization, privatization of state property, and the creation of market regulation institutions. Changes began only after 2007, and tight administrative control and the large role of the public sector in the economy remain the main obstacles for the development of the private sector. In 1993, privileges were introduced for the country's citizens – water, gas, and electricity became free, and, later, free gasoline was also introduced. This privilege was cancelled in 2014, and since 2017 all public utilities privileges have been withdrawn (Azatlyk Radio 2017; Crude Accountability 2009). As a result, food prices have begun to rise, public sector wages are stalling, and unemployment is growing.

At present, Turkmenistan is experiencing an economic crisis, facilitated by a global decline in the prices of power resources and the high cost of building expensive facilities (for example, for the 2017 Asian Games). International experts note the deterioration of the economic situation in the country and the decline in income of the population (Richardson 2013; Turkmenistan Economy 2020). The country is considered one of the most closed in CA, and indeed globally, and official unemployment statistics are not

published. Since 2007, Turkmenistan's authorities have not provided information regarding population size. Meanwhile, income level is above the average in the region: on 1 January 2017, the monthly minimum wage was set at 650 manats ($185). Despite this, Turkmenistan is still in the early stages of its transition to the global market. For reference: the official exchange rate of the Turkmenistan central bank is 3.51 manats per $1.

SMEs and private entrepreneurship are the basis of Uzbekistan's economy, constituting 56.7% of GDP and 77% of all employed work (Yusupova 2018). Over 60% of the population lives in densely populated villages, leading to high employment of the population, and the inflation rate does not exceed 5–6% (Isayev (2017; Melibayev 2017). At the same time, the authorities openly admit that officially reported figures differ greatly from real ones. Thus, the Minister of Finance, Jamshid Kuchkarov, reported at a meeting of the Senate that the real inflation rate, following the results of 2017, was projected at 14%, although the State Statistics Committee gave a figure of 9–10% (Smirnov 2017). In a country with an official level of unemployment of around 5%, there is chronic, hidden unemployment – up to 20% in cities. Meanwhile, according to government reports, hundreds of thousands of jobs are created annually in the republic. In 2015 alone, over 980,000 jobs were ostensibly created in the country, of which more than 60% were in rural areas. Labor migration has taken on such a scale that it is no longer possible to manage it, and over 3 million Uzbek citizens work abroad (in Russia, Kazakhstan, Turkey, and even Kyrgyzstan). Migrant remittances account for 12% of GDP, but since the statistics only take into account official bank transfers, in reality, the amount of money transferred by migrant workers to their homeland is much higher (Salimov 2018; Yusupova 2018).

A tour of the CA countries suggests that there are many common problems. These include: excessive centralized regulation of the economy; the underdevelopment of market relations; the low incomes of the population; and the uneven development of regions within countries.

3.4. Global indicators reflect internal problems

Today, due to many factors, CA countries are not in the best condition in terms of the main indicators. GDP per capita in Uzbekistan, Kyrgyzstan, and Tajikistan is several times lower than in developed countries (Table 2) (Tsereteli 2018; Europe and Central Asia Economic Update 2020).

Table 2. *A comparison of selected countries based on GDP per capita, 2019*

No.	Countries of the world	GDP per capita, $	No.	Countries of the world	GDP per capita, $
1	Norway	82,733	12	Turkmenistan	8,073
2	Qatar	72,677	13	Turkey	7,615
3	USA	65,062	14	Belarus	6,372
4	Germany	49,692	15	Georgia	4,806
5	France	43,500	16	Azerbaijan	4,779

No.	Countries of the world	GDP per capita, $	No.	Countries of the world	GDP per capita, $
6	UK	42,036	17	Armenia	4,447
7	Israel	41,553	18	Ukraine	3,133
8	Japan	41,418	19	India	2,188
9	Russia	11,461	20	Uzbekistan	1,560
10	Kazakhstan	10,447	21	Kyrgyzstan	1,307
11	China	10,099	22	Tajikistan	815

Source: *Eurasian Economic Commission (2019); Monitoring of Sustainable Development Goals Indicators in CIS region (2019); List of Countries by Projected GDP per capita (2019)*

As displayed above, GDP per capita is higher in Kazakhstan and Turkmenistan, whilst in the other countries of the region it ranges from $815 to $1,560, which seems to be an extremely low figure on which to carry out reforms and engender innovative development. Uzbekistan, Kyrgyzstan, and Tajikistan are in 156th, 161st, and 176th place among the world ranking of GDP per capita, respectively (Monitoring of Sustainable Development Goals Indicators in CIS region 2018; Europe and Central Asia Economic Update 2020; World Economic Outlook Database 2020). Kazakhstan witnessed high rates of economic growth from 2003 to 2013, and GDP per capita peaked in 2014 at $12,500 (The main socio-economic indicators of the Republic of Kazakhstan in 1991–2017 2018). Over the past 20 years, $108 billion has been attracted to the economy of the republic – 80% of total foreign investment in all CA states (UNCTAD 2018; Pritchin 2017). Additional improvements to the economy were provided by the upgrading of the transit infrastructure, in particular the Western Europe–Western China highway and the transportation of goods through the country's territory to Russia, China, and Europe. In addition to GDP per capita, CA countries have low economic competitiveness (Table 3).

Table 3. *The index of the global competitiveness of selected countries according to the World Economic Forum*

No.	Countries	2017–2018		2016–2017	
		Rank	Score	Rank	Score
1.	Azerbaijan	35	4.69	37	4.55
2.	Russia	38	4.64	43	4.51
3.	Kazakhstan	57	4.35	53	4.41
4.	Georgia	67	4.31	59	4.35
5.	Armenia	73	4.19	79	4.07
6.	Tajikistan	79	4.14	77	4.12
7.	Ukraine	81	4.10	85	4.08
8.	Kyrgyzstan	102	3.90	111	3.75

Source: *Schwab (2017); World Economic Outlook Database 2020*

As can be seen, the gap between industrially developed countries and the states of the CA region is very large (Schwab 2017; World Economic Outlook Database 2020). In terms of competitiveness, only Kazakhstan occupies a middle level – Tajikistan is in 79th place, Kyrgyzstan is in 102nd place, and Turkmenistan and Uzbekistan are not represented in the ranking at all. A deeper analysis of the main components of the global competitiveness index shows that the countries of the CA region, even in comparison with the CIS countries, are significantly lagging behind in development (Table 4) (World Bank 2020, pp. 73–74; World Economic Outlook Database 2020).

According to the six indicators in Table 4, Russia, Azerbaijan, and Kazakhstan occupy middling positions. Kyrgyzstan demonstrates very low indicators, and Uzbekistan and Turkmenistan, as noted, are often not present in these calculations. In our opinion, these indicators are of great importance, as they reflect the advancement of reforms, economic freedom, and prospects for scientific and technological development. In this case, the lack of full-value market relations in the countries of the region hinders the implementation of reforms, the introduction of innovations, and the growth of the population's well-being. For example, in Turkmenistan, the state retains a dominant influence in the economy, leaving elements of the planning system with subsidies and exerting tight control over production and price formation.

Table 4. *The rating of some countries of the CIS and CA regions by major indices of global development, 2018*

	Health and primary education	Higher education and training	Labor market efficiency	Infrastructure	Innovation	Technological readiness
Russia	54	32	60	35	49	57
Armenia	55	69	51	80	70	77
Azerbaijan	74	68	17	51	33	56
Kazakhstan	59	56	35	68	84	52
Kyrgyzstan	75	89	113	109	126	102
Tajikistan	73	76	34	99	47	114

Source: *UNDP (2018); Cornell University, INSEAD, and WIPO (2018); Ease of Doing Business Index (2018)*

There is strict export and currency control in a mostly-closed economy, which holds back foreign investors and disincentivizes innovation. Having transformed in the wake of a communist regime, Turkmenistan chose an overly cautious approach to economic reform, hoping to use the sale of gas and cotton to maintain a generally inefficient economy, and the scale of privatization was limited. However, thanks to high oil and gas prices, export revenues are rising.

In practice, the markets of many countries are highly monopolized. This is facilitated by barriers to foreign trade and all manner of preferences created by governments to "protect domestic producers". Natural monopolies and state corporations also play large

roles in the economies of all countries. Commercial enterprises in a region often exist in an artificially-created supportive environment, without encountering strong competition.

In addition to domestic, economic, and social difficulties, CA countries face unresolved inter-state problems. In particular, Tajikistan and Kyrgyzstan have disputes with neighboring Uzbekistan regarding their territories, and the issue of water frequently engenders argument (Ayupov 2016). After gaining independence, the regional water-power exchange scheme, which has been in effect since the existence of the USSR, has for some reason ceased to meet the national interests of the CA countries. Intensive use of the water resources of the Syr-Darya and Amu-Darya rivers since the 1960s has caused global climate change due to increased water consumption and the pollution of rivers with salts, fertilizers, and pesticides from the drainage of farmlands (Kristopher 2013; Izhitskiy et al. 2016).

With the advent of 2018, 25 years had passed since the creation of the International Fund for Saving the Aral Sea, and a lot of work has been done in this regard. In 2018, meetings and discussions took place, and the Convention on the Legal Status of the Caspian Sea was signed within the framework of the Fifth Caspian Summit in Aktau city (Kazakhstan) on August 12 (Masanov 2018). One of the key events in actualizing water-power issues in the region will be the projected launch of the Rogun hydroelectric power station in Tajikistan, which will become the largest of its kind in CA (Musabekov, Nurasheva, and Mergenbayeva 2018). In general, it must be said that the CA countries have much to do in order to avoid remaining on the periphery of global civilizational development. At the same time, Kazakhstan – being the most powerful and developed state – can play a leading role, and use its potential and experience to boost the economy of the entire region.

3.5 Central Asian cooperation: experience, problems, and difficulties

Within the framework of the CA region, there were positive trends in integration processes. The foundations for these trends were laid by the Treaty on the Establishment of the Common Economic Territory of 30 April 1994, between Kazakhstan, Kyrgyzstan, and Uzbekistan. This organization was named the Central Asian Union (CAU). In March of 1998, Tajikistan joined the CAU, and on 17 July of the same year, at the summit in Cholpon-Ata, the name CAU was changed to CAEC – the Central Asian Economic Community. In the period from 1994 to 1996, 180 documents were developed and adopted with the aim of creating a legal basis for integration. The seriousness of these intentions was indicated by the fact that the states even signed agreements on the organization and formation of a peacekeeping battalion under the auspices of the UN (Chronicle of Eurasian integration 2014).

A legal basis was created for state cooperation that was envisaged to ensure free movement of goods, services, capital, and labor, and implementation of the agreed payment, budget, tax, tariff, customs, and currency policies. In order to implement this Treaty, the Program of Action was developed for the formation of the Common Economic Territory of States until 2000. Agreements on the following have been signed: use of fuel, power,

and water resources; construction and operation of gas pipelines in the region; and parallel operation of the power systems of Kazakhstan, Kyrgyzstan, Tajikistan, and Uzbekistan. In the social sphere, the Program of Cooperation in the Field of Migration and the Program to create conditions for free movement of labor have also been accepted.

Attempts at integration in the region have been made many times, but only parts of these agreements have been implemented. In Tashkent at the end of 2001, the Presidents of the four republics decided to transform the CAEC into the CAC – Central Asian Cooperation. It was at this point that Islam Karimov, realizing that there had been no talk of integration, proposed to reformat the CAEC into the Central Asian Economic Forum – that is, to turn the association into a membership club like the Economic Forum in Davos (Ilkhamov 2019).

On 28 February 2002, in Almaty, the heads of the four states signed the Treaty on the Establishment of the Organization of Central Asian Cooperation (OCAC), which emerged in place of the CAEC and provided for the latter's liquidation. The word "community" was replaced by the vague term "cooperation". This term is present in the names of extremely free structures such as the APEC or OECD, where the implementation of decisions is not obligatory. In addition, the word "economic" disappeared from the name. This meant that the ultimate goal of the CAEC – the creation of a common market of goods, services, and capital – remains unattainable for the present.

However, in the years 2000–2009 the region intensified integration into the global economy, and trade-economic ties were established with 192 countries. During these years, 30% of the volume of the foreign trade of CA countries was accounted for by the EU, 18% by Russia, and 13% by China. Joint projects were implemented in the fields of energetics, transport, communication, health care, and science, and positive results were achieved by the joint use of interstate highways and railway transport for the transit of goods and access to the markets of third-world countries. Unified rules for the certification, standardization, and quality control of healthcare products, medical equipment, and medical goods produced in the countries of the region came into force (Solehzoda 2015).

Over the course of time, alongside positive trends in regional cooperation, there was a slowing of the rate of integration. Internal regional trade declined, and the leaders of the CA states witnessed the unviability of the global cooperation projects that they had previously scheduled, instead deciding to limit themselves to their own economies. The advantages of globalization were thus not utilized due do a number of reasons, including: different levels of market transformation in the economies of these countries; differences in the rate and scale of economic liberalization; and the low levels of investment activity. The issues of interaction of these states in the real sector of the economy and the social and cultural spheres remain unsolved. The separation of states was observed, mutual suspicions grew between them, there was a struggle for leadership in the region, and territorial disputes arose (Yusupov 2015).

The further history of the integration of the CA countries speaks to the discredit of the very idea of integration. In 2004, Russia joined the OCAC, and in the following year, at the summit in St. Petersburg, a decision was adopted that envisaged the transformation of the OCAC into the Eurasian Economic Community – EurAsEC.

At the beginning of 2007, the President of Kazakhstan, N. Nazarbayev, tried to revive the idea of regional integration. This question involved the formation of a single economic territory of the five CA countries with the goal of "ensuring the security, economic growth, political stability, and prosperity of the region" (Address of the President of the Republic of Kazakhstan… 2007, p. 8). At the same time, the President of Uzbekistan I. Karimov directly stated his position in observing that "this initiative is unacceptable for Uzbekistan. In order to create such unions, it is necessary that the level of economic and social development of countries is comparable. Unfortunately, we still have a lot of questions, so it's premature to talk about some kind of union" (Uzbekistan left the EurAsEU in 2008 due to doubts regarding its effectiveness).

With the abolition of the Central Asian Union and the withdrawal of Uzbekistan from the EurAsEC, there are no common multilateral mechanisms of cooperation between the CA countries. Today, bilateral relations are the main format of interaction between countries, which contain a broad range of relations at various levels: from agreements on individual issues to union agreements – such as between Kazakhstan and Kyrgyzstan. In addition, the Asian cooperation is partially supported in the framework of such broader unions as the CIS and the SCO.

A sober look at the situation in the post-Soviet countries shows that, despite almost 30 years of independence, most have not become economically independent. In the global conditions of the modern division of labor and the objective reduction of natural resources, the main vector of development of the CA countries should, in the opinion of the authors, be directed towards regional integration.

3.6. Prospects for the integration of the Central Asian countries

According to experts, in the next two to three years the CA countries will look for new ways of cooperation and rethink their positions in international and regional processes (Yusupov 2018). This is indicated by the changes in Uzbekistan after I. Karimov's death and the recent events in Kazakhstan in connection with the resignation of President N. Nazarbayev. One should expect the launch of new formats and regional consultations aimed at strengthening cooperation, both within the countries of CA and with Russia. At the same time, one can assume that cooperation in the region will develop mainly in the form of bilateral or trilateral relations, for example, Kazakhstan–Uzbekistan, Kazakhstan–Kyrgyzstan, or Kazakhstan–Uzbekistan-Turkmenistan. It is also important to understand that each of the CA countries has its own goals and visions, and will advance its own interests. The analysis of the broader situation in the region allows some conclusions to be drawn.

1) It is impossible to regard the ethnic and socio-cultural homogeneity of the region as absolute. It is undeniable that some countries hearken back to the idea of "nomadic democracy" whilst others speak of a developed urban culture. At the same time, the Turkic cultural component is perceived as a potential threat by Persian Tajiks.

2) CA is not a unified region and is not recognized by its member countries as such. It is characteristic that in Soviet times the region was called "Central Asia and

Kazakhstan", which spoke to its division into two heterogeneous parts. Despite the dominance of Islam, there is no unified religious identity.

3) Due to the approximately similar structure of the CA economies and the absence of serious technological specializations, CA countries are not partners – they are instead competitors. The narrow natures of sales markets give rise to small semi-handicrafts, which produce products that are not always of good quality and are often characterized by a weak product line. The small scale of production of a particular type of product often instigates attempts to master many additional directions that allow equipment to be purchased and craftsmen to be employed. However, the scale of production in these directions is also not large, and, consequently, their competitiveness remains low.

4) There are currently unsolvable interstate contradictions and conflicts on issues such as: ethnic enclaves; borders; the distribution and regulation of water resources; customs walls; and population migration.

5) The nationalism of political powers and business elites has its impact, because they identify their own interests with national ones. It is for this reason that the elites in power in the CA countries have no interest in structures that will be delegated auditing functions. Meanwhile, without the creation of supranational structures, integration is not possible.

6) External forces are not interested in the independent integration of CA countries. Parties from outside make attempts to involve one or another CA country in their sphere of influence, whilst the leaders of some countries are ready to play upon the contradictions among global players in an attempt to seize dominance in the region. This increases distrust in power structures, and makes wider integration very problematic.

It seems, then, that there is no motivation to create mechanisms for integration and multilateral cooperation in CA. However, that is not so. Today, countries simply address internal problems: inflation, unemployment, low incomes, old enterprises, the agricultural and raw material economy, the struggle of business elites for an affected area, and so on. As such, the need for intraregional cooperation is more urgent than ever. In the opinion of the authors, it is necessary:

- To solve each problem separately at the interstate level. For example, it is necessary to solve the Aral problem. Thanks to the financing of the World Bank and the efforts of Kazakhstan, the "Little Aral" was restored to life via the building of a dam. Water salinity has decreased significantly, marine organisms have reappeared, around 20 species of fish are harvested, and three fish factories operate. Today, experts are proposing the restoration of the "Big Aral" through a set of activities in the Amu-Darya river basin (Izhitskiy et al. 2016; Ayupov 2016).

- To carry out more intensive internal reforms that will lead to the levelling of income in certain localities and the increase of welfare in general. The introduction of real market relations will create the basis for countries to conclude agreements in the fields of customs and tax, and will contribute to the formation of the CA financial market. A start was made when the International Financial Center of Astana was established at the EXPO–2017 site.

- To create a separate agreement for 2–3 years on the specialization of countries in the production of certain products and services in order to make export and import effective, and to guarantee crops and the output of certain goods. This will create close links between the enterprises of the CA countries, expand cooperation, and balance their consumer markets. In the regional market, product competitiveness increases due to the reduction of transportation and logistical costs, and the exploitation of similar patterns of consumption and the similar needs of customers. In fact, due to the cultural proximity of the CA countries and the comparability of revenues, local products are more often in demand within the region than abroad.

At the same time, the CA states can integrate into various broader structures which include other countries, for example Russia. Integration associations such as the CIS, CSTO, EAEU (Eurasian Economic Union), and SCO should be mentioned as successful ones. Of course, there are other associations such as the Organization of Islamic Cooperation and the Cooperation Council of Turkic-speaking countries, but they do not play such a significant role for CA. Instead, they mainly represent discussion platforms, and their adopted decisions are non-obligatory.

Despite difficulties, experts predict that the countries of the CA region will, in the long term, encounter positive dynamics of economic growth. According to World Bank estimates, the average economic growth rate in Kazakhstan will be around 2–3%, in Kyrgyzstan 3–3.5%, in Tajikistan 5–6%, and in Uzbekistan and Turkmenistan around 6% (Zubov 2016).

Progress will depend on the effectiveness of the economic policies of the CA governments, and on political stability in general. External factors such as the stability of world energy prices will also have an effect. The influence of China and the Shanghai G8, which accounts for 40% of the world's population and a third of the global economy, will continue to increase. New global initiatives will be promoted under the auspices of "One Belt, One Path".

4. Conclusion

1. From the analysis performed in this paper, it can be concluded that whilst the countries of CA have, at various rates, trodden the path of independence, the opportunities of market reform have not been fully utilized. The levels of technological development, domestic market capacity, and economic potential in these countries are insufficient for active advancement. Social problems remain unresolved, and the business elite – who have grown stronger in the years since independence – exert significant pressure on the authorities.

2. CA countries are relatively small compared to their nearest neighbors/competitors, and the sizes of their economies are not attractive for investors. If the CA countries are integrated as a single economic territory and if various barriers are removed, then they will benefit as a large region. The main areas of potential cooperation include: a) the joint use of the water and power resources of the region; b) creating advantages for the goods of the region and fostering mutual trade; c)

the development and expansion of transport communications; d) cooperation and specialization in a range of products and the creation of joint ventures; and e) cooperation in the field of agriculture, including the creation of a network of processing enterprises.

3. The population growth rates in the region require more decisive reforms: some territories suffer from agrarian overpopulation; the growth of large cities is uncontrolled; around half of the region's population are below the poverty line; increases in food prices affect the poor social classes especially; unemployment contributes to migration outside the region; and inter-ethnic clashes occur intermittently.

4. Global indicators of the competitiveness of the CA countries are extremely low, even in comparison with the CIS countries. The developmental gap between industrialized countries and the states of the CA region is very large, which clearly prohibits the introduction of reforms and innovation. The authors recommend that these countries integrate and act in the international division of labor as a single region with a population of 70 million people and a GDP of 260 billion dollars – comparable to the GDP of Iran or Pakistan. This will increase the attractiveness of these countries to foreign investors who will introduce new technologies and deploy their experience in organizing production and business.

5. Prospects for the further development of the countries of the region are seen in integration and cooperation on a bilateral and multilateral basis. This can aid in solving water-power problems, agreements on the free movement of labor, goods, services, and capital, and the formation of a single financial market.

Acknowledgments

References

1. Address of the President of the Republic of Kazakhstan, Nursultan Nazarbayev, to the People of Kazakhstan, February 28, 2007. *Official website of the President of the Republic of Kazakhstan* [online]. Available from: https://www.akorda.kz/en/addresses/addresses_of_president/address-of-the-president-of-the-republic-of-kazakhstan-nursultan-nazarbayev-to-the-people-of-kazakhstan-february-28-2007

2. AKHMEDOV, B. 2016. Foreign policy of the Republic of Tajikistan. *Free Thought*, no. 8, 16–18. Dushanbe.

3. AMINI, C., DOUARIN, E., and HINK, T. 2021. Individualism and attitudes towards reporting corruption: evidence from post-communist economies. *Journal of*

Institutional Economics: First View. Published online on 4 February 2021. Cambridge University Press. https://doi.org/10.1017/S1744137420000648

4. AYUPOV, A. 2016. Hydropower potential of Central Asia in the context of Eurasian integration. *Russia and the New States of Eurasia*, no. 3, 89–98. Available from: https://www.imemo.ru/publications/periodical/RNSE/archive/2016/3

5. AZATLYK RADIO. 2017. Gurbanguly Berdimuhamedov instructed to cancel benefits for population of Turkmenistan. *Alternative Turkmenistan News* [online]. 7 June 2017. Available from: https://habartm.org/archives/7186

6. BEGALOV, B.A. 2018. *The socio-economic situation of the Republic of Uzbekistan*. Tashkent: State Committee of the Republic of Uzbekistan on Statistics.

7. Chronicle of Eurasian integration 2014. *Eurasia* [online]. 1 May 2014. Available from: https://e-history.kz/ru/contents/view/chronicle_of_eurasian_integration_2061

8. CORNELL UNIVERSITY, INSEAD, and WIPO. 2018. *The Global Innovation Index 2018: Energizing the World with Innovation*. Ithaca, Fontainebleau, and Geneva. ISSN 2263-3993.

9. CRUDE ACCOUNTABILITY. 2009. *Turkmenistan's Crude Awakening Oil, Gas & Environment in the South Caspian*. Project of the Open Society Institute. Available from:https://kipdf.com/turkmenistan-s-crude-awakening-oil-gas-and-environment-in-the-south-caspian_5ab6aac61723dd349c81c377.html

10. Ease of Doing Business Index 2018. *World Bank Rating* [online]. Available from: https://www.doingbusiness.org/en/rankings

11. EURASIAN ECONOMIC COMMISSION. 2019. *EAEU numerically 2019: A brief statistical compilation*. Moscow. Available from: http://www.eurasiancommission.org/ru/act/integr_i_makroec/dep_stat/econstat/Documents/Brief_Statistics_Yearbook_2019.pdf

12. ILKHAMOV, A. 2019. New meeting of heads of Central Asian States: old issues. *Exclusive* [online]. 26 March 2019. Available from: http://www.exclusive.kz/expertiza/politika/115792/

13. ISAYEV, T. 2017. Economic development of independent Uzbekistan. *Podrobono* [online]. 26 June 2017. Available from: https://podrobno.uz/cat/economic/ekonomicheskoe-razvitie-nezavisimogo-uzbekistana/

14. IZHITSKIY, A.S., ZAVIALOV, P.O., SAPOZHNIKOV, P.V., KIRILLIN, G.B., GROSSART, H.P., KALININA, O.Y., ZALOTA, A.K., GONCHARENKO, I.V., and KURBANIYAZOV, A.K. 2016. Present state of the Aral Sea: diverging physical and biological characteristics of the residual basins. *Scientific reports*, **6**, 23906. https://doi.org/10.1038/srep23906

15. Kazakhstan. General characteristic. Mineral resources of Kazakhstan. Geography. *Poznayka* [online]. Last modified 18 July 2016. Available from: https://poznayka.org/s39039t1.html

16. KHRAMOVA, M., RYAZANTSEV, S., RAKHMONOV, A., and KASYMOV, O. 2020. The impact of remittances from abroad on socio-economic development in

Tajikistan. *Central Asia and the Caucasus*, **21**(4), 79–95. https://doi.org/10.37178/ca-c.20.4.09

17. KRISTOPHER, D.W. 2013. Nature society linkages in the Aral Sea region. *Journal of Eurasian Studies*, **4**(1), 18–33. https://doi.org/10.1016/j.euras.2012.10.003Get rights and content

18. Kyrgyzstan: Country overview 2018. *Export* [online]. Available from: https://www.export.gov.kz/

19. Kyrgyzstan Economy Profile. 2020. *IndexMundi* [online]. Page last updated on 27 November 2020. Available from: https://www.indexmundi.com/kyrgyzstan/economy_profile.html

20. List of Countries by Projected GDP per capita. 2019. *World Economic Outlook, May. International Monetary Fund* [online].

21. MASANOV, Y. 2018. In Aktau the Convention on the legal status of the Caspian Sea has been signed. What does it mean? *InformBuro* [online]. 13 August 2018. Available from: https://informburo.kz/stati/v-aktau-podpisali-konvenciyu-o-pravovom-statuse-kaspiyskogo-morya-chto-eto-znachit.html

22. MELIBAYEV, N. 2017. Economy of Uzbekistan - 2017. *Kak Tak To!* [online]. 29 December 2017. Available from: https://kaktakto.com/analitika/kak-zavershit-ekonomika-uzbekistana-2017-god/Sergey

23. *Monitoring of Sustainable Development Goals Indicators in CIS region.* 2019. Moscow: Interstate Statistical Committee of CIS.

24. MUSABEKOV, K., NURASHEVA, K., and MERGENBAYEVA, A. 2018. Problems and prospects of regulation of water resources of the Aral Sea basin. *Journal of Advanced Research in Law and Economics*, **9**(1(31)), 167–182. https://doi.org/10.14505//jarle.v9.1(31).22

25. NAJMIDDINOV, S. 2018. Tajikistan reported a 12% increase in GDP and a 10% increase in household income. *EurAsia Daily* [online]. Available from: https://eadaily.com/en/news/2018/01/17/v-tadzhikistane-zayavili-o-roste-vvp-na-12-a-dohodov-naseleniya-na-10

26. NURASHEVA, K., KULANOVA, D., ABDIKERIMOVA, G., MERGENBAYE-VA, A., and ORYMBASSAR, A. 2019. Ways of development of the region economy by means of market tools of management (in terms of Kazakhstan). *International Journal of Social Science and Humanity*, **9**(4), 111–117. ISSN: 2010-3646. https://doi.org/10.18178/ijssh.2019.V9.1001

27. NURASHEVA, K., KULANOVA, D., ABDIKERIMOVA, G., MERGENBAYE-VA, A., and SHALABAEV, I. 2020. Problems of financial market development in Central Asia (on the model of Kazakhstan). *Intellectual Economics*, **14**(1), 5–30. ISSN 1822-8038 (online). https://doi.org/10.13165/IE-20-14-1-01

28. OSELEDKO, V. 2018. Central Asia's Economic Evolution from Russia to China. *Stratfor* [online]. 5 April 2018. Available from: https://worldview.stratfor.com/article/central-asia-china-russia-trade-kyrgyzstan-kazakhstan-turkmenistan-tajikistan-Uzbekistan

29. REZVANI, B. 2013. Understanding and explaining the Kyrgyz-Uzbek interethnic conflict in Southern Kyrgyzstan. *Anthropology of the Middle East*, **8**(2), 167. DOI: 10.3167/ame.2013.080205.

30. RICHARDSON, J.V. 2013. The information economy of Turkmenistan: A seven-year update. *IFLA Journal*, **39**(3), 243-250. http://dx.doi.org/10.1177/0340035213498836

31. SALIMOV, S. 2018. Socio-economic development of the Republic of Uzbekistan for years of independence. *Annals of Reviews and Research*, **4**(3), 65–69. ARR. MS.ID.555638.

32. SATUBALDIN, S.S. 2014. Central Asia: problems of cooperation and integration. *Proceedings of National Academy of Science of the Republic of Kazakhstan. The series of social sciences and humanities*, **1**, 42–55.

33. SCHWAB, K. 2017. *The global competitiveness report 2016–2017*. Geneva: World Economic Forum. ISBN-13: 978-1-944835-04-0.

34. SMIRNOV, S. 2017. Uzbekistan numerically and in facts. Official vs reality. *InformBuro* [online]. Available from: https://informburo.kz/mneniya/sergey-smirnov/uzbekistan-v-cifrah-i-faktah-oficioz-protiv-relanosti.html

35. SOLEHZODA, A. 2015. Potential of Central Asian countries in economic integration with the EAEU. *Bridges News*, **8**(7). International Center for Trade and Sustainable Development, 9 December 2015. Available from: https://www.ictsd.org/bridges-news

36. SPUTNIK TAJIKISTAN. 2018. Incomes of Tajikistan population increased. *Trend* [online]. 25 May 2018. Available from: https://www.trend.az/casia/tajikistan/2908185.html

37. Statistical Yearbook "Commonwealth of Independent States". 2019. Moscow: Interstate Statistical Committee of CIS. ISBN 978-5-89078-153-6.

38. PRITCHIN, S. 2017. Ranking the Central Asian States as investment destinations. *The Diplomat* [online]. 4 April 2017. Available from: https://thediplomat.com/2017/04/ranking-the-central-asian-states-as-investment-destinations/

39. *Republic of Tajikistan. Recent social and economic trends and short-term prospective (September 2019)*. 2019. Eurasian Fund for Stabilization and Development. Available from: https://efsd.eabr.org/upload/iblock/c1e/Eng_RT_macro_2019Q2.pdf

40. *The main socio-economic indicators of the Republic of Kazakhstan in 1991–2018*. 2019. Astana: Statistics Committee of the Ministry of National Economy.

41. The Rating of the World on the level Country of GDP. 2019. In: *World Bank Support for Open Data 2013-2018*, p. 16.

42. *The standard of living of the population of the Kyrgyz Republic 2013-2018*. 2019. Bishkek: National Statistics Committee of the Kyrgyz Republic.

43. Trade summary for Europe & Central Asia. 2018. *World Integrated Trade Solution (WITS)* [online]. Available from: https://wits.worldbank.org/CountryProfile/en/Country/ECS/Year/2018/Summary

44. TRAPEZNIKOV, V. 2018. Results of 2017: The economy of Turkmenistan demonstrated a high dynamics of development. *SNG.Today* [online]. 2 February 2018.

Available from: https://sng.today/ashkhabad/5942-itogi-2017-goda-ekonomika-turkmenistana-pokazala-ysokuyu- dinamiku-razvitiya.html

45. TSERETELI, M. 2018. *The economic modernization of Uzbekistan*. Central Asia-Caucasus Institute and Silk Road Studies Program. ISBN: 978-91-88551-09-2. Available from: https://www.silkroadstudies.org/resources/pdf/SilkRoadPapers/2018-04-Tsereteli-Uzbekistan.pdf

46. Turkmenistan Economy 2020. *Countries of the World* [online]. Last updated 27 January 2020. Available from: https://theodora.com/wfbcurrent/turkmenistan/turkmenistan_economy.html

47. UBIRIA, G. 2015. *The Soviet legacy and nation-building in Central Asia: the making of the Kazakh and Uzbek nations*, 1st edition. Australian National University' Centre for Arab and Islamic Studies (the Middle East & Central Asia).

48. UNCTAD. 2018. *World Investment Report 2018*. Geneva: United Nations. ISBN 978-92-1-112926-7.

49. UNDP. 2018. *2018 Statistical Update: Human Development Indices and Indicators*. New York: UNDP.

50. Uzbekistan left the EurAsEU due to doubts about its effectiveness. 2008. *RIA News* [online]. 13 November 2008. Available from: https://ria.ru/20081113/154962672.html

51. WORLD BANK. 2017. *Overview of Tajikistan* [online]. 19 January 2017. Available from: http://www.vsemirnyjbank.org/ru/country/tajikistan/overview

52. WORLD BANK. 2020. *Europe and Central Asia economic update, spring 2020: fighting COVID-19*. Washington, DC: World Bank. Available from: https://openknowledge.worldbank.org/handle/10986/33476

53. World Economic Outlook Database, October 2019. *International Monetary Fund* [online]. Retrieved 15 November 2019. https://www.imf.org/en/Publications/SPROLLs/world-economic-outlook-databases#sort=%40imfdate%20descending

54. World Economic Outlook Database, October 2020. *International Monetary Fund* [online]. Retrieved 14 March 2021. Available from: https://www.imf.org/en/Publications/WEO/weo-database/2020/October

55. YUSUPOV, J. 2015. Central Asia: unrealized potential within regional economic cooperation. *Central Asia Analytical Network* [online]. 14 September 2015. Available from: http://caa-network.org/archives/5463

56. YUSUPOV, J. 2018. Prospects for regional economic cooperation in Central Asia. *Central Asia Analytical Network* [online]. 10 September 2018. Available from: https://www.caa-network.org/archives/14095

57. YUSUPOVA, S.N. 2018. Socio-economic situation in Uzbekistan in the years of independence. *International Journal of Current Research*, **10**(10), 74368–74370. https://doi.org/10.24941/ijcr.32601.10.2018

58. ZAKHVATOV, A. 2014. The valley of problems – Fergana. *Dialog* [online]. 30 June 2014. Available from: http://www.dialog.tj/news/dolina-problem-fergana

59. ZUBOV, A. 2016. What will be Central Asia in 30 years – forecast. *365 Info* [online]. 20 June 2016. Available from: https://365info.kz/2016/06/kakoj-budet-tsentralnaya-aziya-cherez-30-let-prognoz/

THE MEASUREMENT OF QUALITY OF INCOME TAX ASSESSMENT IN BUILDING CONTRACTORS

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Abstract. *In modern scientific research, income is considered exclusively in the context of the problems of levying income tax. Fuller use of such elements as rates and incentives can seriously affect tax regulation in the economy, the rate of economic growth, investment attractiveness for potential investors, and an increase in GDP. The purpose of this study is to develop practical recommendations on the use of the quality of the calculation of income tax by building contractors in the Republic of Kazakhstan. The object of the study is the system of tax relations arising between contractors of the building industry in the Republic of Kazakhstan and the state upon taxing income. The subject of the study is a set of theoretical aspects and practical problems existing within the framework of the current mechanism of income taxation for building contractors in the Republic of Kazakhstan. The authors used the following methods of scientific cognition: the dialectical method; the method of historical and logical analysis; the method of system approach and synthesis; the comparative method; and the economic and statistical method. Analysis of the influence of various factors on tax payments for the corporate income tax of the BI Group building company was considered with the use of correlation and regression analysis. The study of various theories*

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of profit allowed the authors to conclude that income is the final result and the main goal of entrepreneurial activity, which allows for the active use of the regulatory mechanism of tax.

Keywords: *financial reporting, estimation error, entrepreneurial activity, income taxation, leading companies.*

JEL Codes: *KH25, K34, H71*

1. Introduction

One of the most important aspects of the functioning of the tax system is the assessment of the tax burden and its impact on business. Income tax occupies an important place in the activities of business entities, and constitutes one of the economic instruments through which the state influences the market economy (Yatsenko 2020; Prokopenko 2019). In any organisation, special attention is paid to such an important part of the accounting system as income tax, where income is a part of the net income created by the enterprise during production. In Kazakhstan, as in many other countries, companies maintain accounting and tax records. Accounting and financial reporting are carried out in accordance with international financial reporting standards and the Law of Kazakhstan "On accounting and financial reporting". The tax accounting of Kazakhstani companies is based on international financial reporting standards, the above-mentioned Law "On accounting and financial reporting", and the provisions of the Tax Code of the Republic of Kazakhstan No. 120-VI "On taxes and other obligatory payments to the budget" (2017).

Due to the different requirements of legislative acts underlying these types of accounting, discrepancies arise between accounting and taxation management. These discrepancies arise due to the difference in approaches regulating these two types of accounting, as well as due to the different approaches to accounting stipulated in accounting and taxation management policies. The differences between accounting and taxation management are reflected in accounting, which allows for the comparison between the conditional income tax expense accrued on the amount of accounting profit and the current income tax calculated according to taxation management rules (Ivanyshyna and Panura 2018; Sidorova 2015).

Accounting income is income or loss for the period before the deduction of income tax expenses. Taxable income/tax loss represents income or loss for a period determined in accordance with the rules established by tax legislation. The main issue in income tax accounting is the question of how to take current and future tax consequences into consideration (Kusmanova 2015; Shevchuk 2020). Current income tax is the amount of income tax that must be paid to the budget, assessed in relation to taxable income for the current period. Deferred income tax is an accounting indicator used to compare the tax effect of transactions with their effect on accounting, which yields a less distorted financial result (Sidorova and Goncharenko 2020).

Since income tax affects cash outflow and the size of the financial result, it must be accurately and correctly calculated and reflected in financial statements in accordance

with the Tax Code. For users of financial information, not only the current, but also the future tax consequences of transactions which the company performed during the reporting period are important, as well as the impact that the repayment of obligations and recovery of the value of assets will have on income tax in future periods. Therefore, this task is consistent with the general goals of International Financial Reporting Standards (IFRS), one of which is to provide credible information to whom it may concern. The purpose of this research is to develop practical recommendations on the use of the quality of the calculation of income tax in building contractors in the Republic of Kazakhstan.

2. Methods

Before considering the procedure for measuring the quality of calculating the income tax of building companies in the Republic of Kazakhstan, which is carried out with the use of IFRS 12 "Income Taxes", it should be noted that building is an important industry for both the economy and society, and, judging by the activities of businesspersons in this market, is attractive for entrepreneurship. However, new construction projects are often launched by market participants without an actual forecast of future demand. Profit growth creates a financial basis for the implementation of the expanded reproduction of the enterprise and the satisfaction of the social and material needs of the founders and employees.

The basis for the procedure for forming the profit of an economic entity serves as a single model adopted for all enterprises, regardless of ownership (Figure 1). Corporate income tax directly affects the amount of net profit, since this indicator is determined by the difference between the amount of profit received from the implementation of activities and the amount of tax calculated at the corresponding rate (Koshkarbaev and Abdiraimov 2012). Income is the final financial result that describes the production and economic activities of the entire enterprise – that is, it forms the basis of the economic development of the enterprise. According to K.Y. Tsygankov (2015), profit is one of the key concepts in the system of accounting and taxation management of an enterprise. In accordance with the Tax Code of the Republic of Kazakhstan No. 120-VI "On taxes and other obligatory payments to the budget" (2017), corporate income tax can be divided into two components: current taxes and deferred taxes.
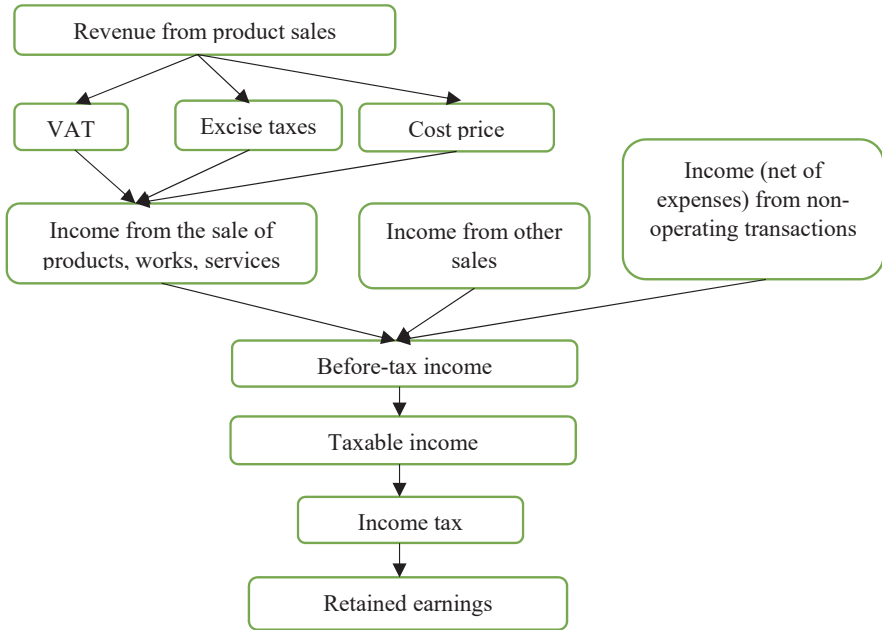
Figure 1. *The generation of the income of an economic entity*

Objective 12 of the IFRS (IAS), "Income Taxes", involves the accounting treatment of income taxes (Figure 2) (Kusmanova 2015). The corporate income tax payable by most legal entities amounts to 20% of the net taxable income. Some small companies may qualify for a special tax regime with lower tax rates. Net taxable income is the difference between total income and the expenses incurred to generate income. Remuneration, representation expenses, and some other types of expenses are deductible only within the established limits. Apart from deducting expenses, legal entities can defer operating losses for up to ten years to reduce deferred income (Sadykov and Alkhimova 2019).
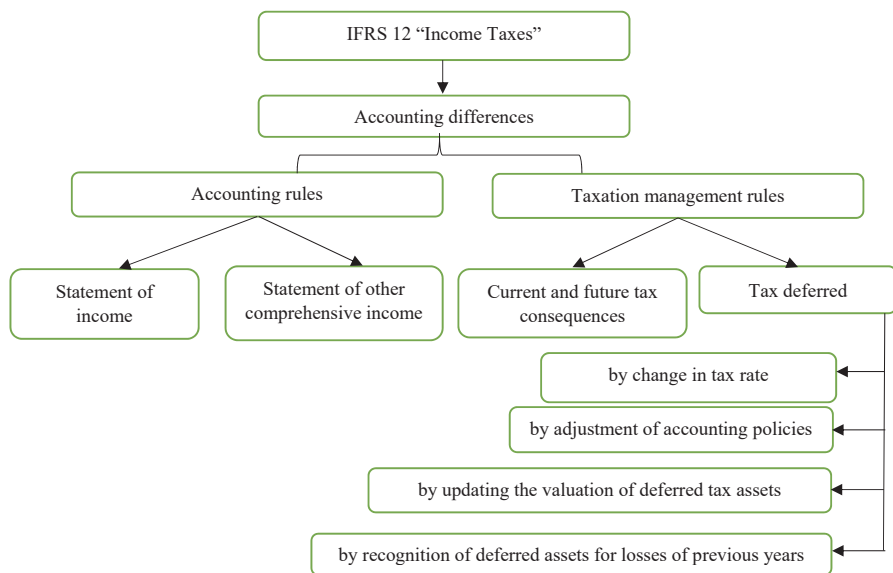
Figure 2. *IFRS Objective 12, "Income Taxes"*
Source: *compiled by the authors based on the materials from Kusmanova (2015)*

Income tax is one of the main taxes in the taxation system of any state, which constitutes the main source of income for the budgets of different levels, and a significant tool for regulating and stimulating the activities of economic entities (enterprises), directly and indirectly influencing the process of redistribution of surplus product by means of withdrawal of part of the net income of the enterprise (Mitrofanova 2013). Income tax (corporate income tax; hereinafter – CIT) is one of the most significant types of taxes paid by an enterprise (Figure 3), the rates of which may vary depending on the type of activity, according to the tax legislation of the Republic of Kazakhstan (Table 1).

Table 1. *Corporate income tax rates*

No	CIT	Rate	Basis
1	CIT withheld from taxable income	20%	Clause 1 Article 313 of the Tax Code
2	CIT withheld from the taxable income of legal entities producing agricultural products, aquaculture (fish farming), products from the implementation of activities for the production of agricultural products, aquaculture products (fish farming), processing, and sale of the specified products of in-house production, as well as the products of such processing	10%	Clause 2 Article 313 of the Tax Code
3	CIT withheld from income taxed at source of payment, excluding income of non-residents from sources in Kazakhstan	15%	Clause 3 Article 313 of the Tax Code
4	CIT withheld from the income of non-residents from sources in the Republic of Kazakhstan, defined by Sub-clauses 1) – 9), 11) – 34) of Clause 1 Article 644 of the Tax Code, not associated with the permanent establishment of such non-residents, as well as from the income specified in Sub-clause 10) Clause 1 Article 644 of the Tax Code, with the exception of income specified in Sub-clauses 2) – 5) Paragraph 1 Article 646	20%	Clause 4 Article 313 of the Tax Code Sub-clauses 1) of Clause 1 Article 646 of the Tax Code
5	CIT withheld at the source of payment from non-resident income, in terms of income in the form of insurance premiums under risk insurance contracts, value gains, dividends, remunerations, royalties	15%	Clause 4 Article 313 of the Tax Code Sub-clauses 2), 5) of Clause 1 Article 646 of the Tax Code
6	CIT withheld at the source of payment from non-resident income, in the form of insurance premiums under risk reinsurance contracts and from the provision of international transportation services	5%	Clause 4 Article 313 of the Tax Code Sub-clauses 3), 4) of Clause 1 Article 646 of the Tax Code
7	CIT from the net income of a non-resident legal entity operating in the Republic of Kazakhstan through a permanent establishment	15%	Clause 5 Article 313 of the Tax Code Clause 1 Article 652 of the Tax Code
8	CIT from the income of a person registered in a state with preferential taxation included in the list defined by Article 644 of the Tax Code	20%	Clause 4 Article 313 of the Tax Code Clause 2 Article 646 of the Tax Code
9	CIT withheld at the source of payment from income from value gains upon the sale of shares issued by legal entities specified in Sub-clause 6) Clause 1 Article 293 of the Tax Code, interests in legal entities specified in Sub-clause 6) Clause 1 Article 293 of the Tax Code, and dividends received from legal entities specified in Sub-clause 6) Clause 1 Article 293 of the Tax Code	5%	Clause 3 Article 646 of the Tax Code

Source: *compiled by the authors based on the materials from Shakhvorostova (2020)*
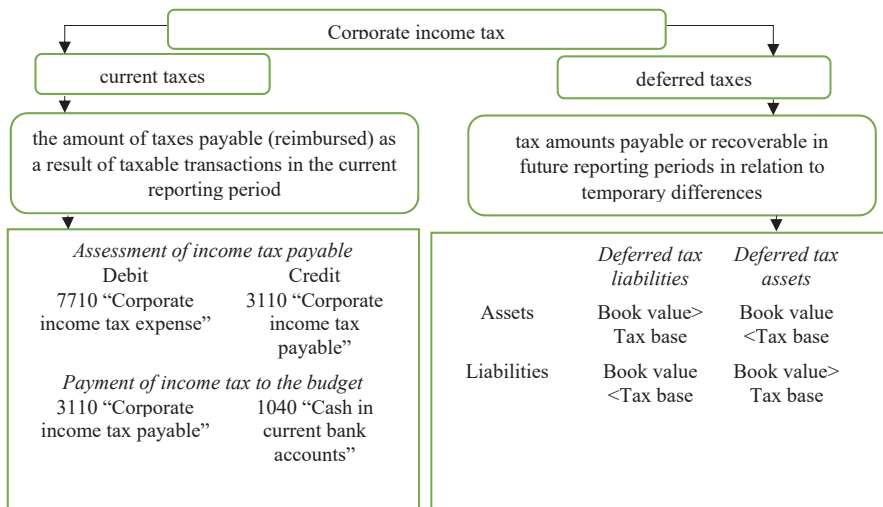
Figure 3. *The components of corporate income tax*

Source: *compiled by the authors based on the materials from Kusmanova (2015)*

N.N. Tyutyuryukov et al. (2019) highlight the following income taxation systems (Figure 4):
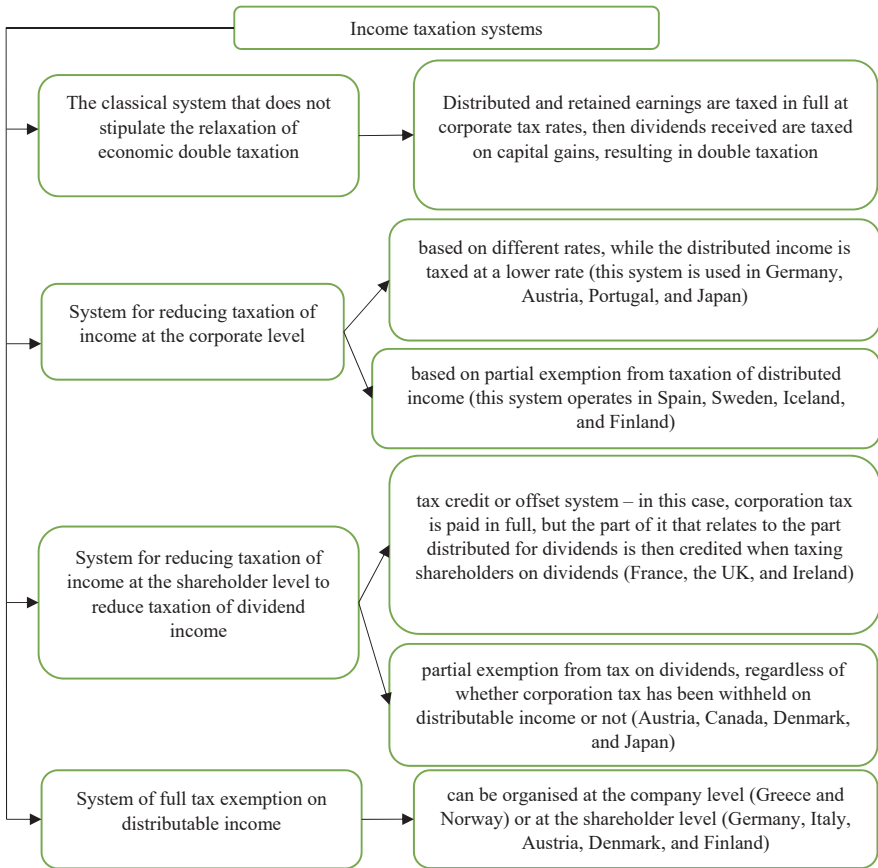
Figure 4. *Systems of income taxation*

Source: *compiled by the authors based on the materials from Tyutyuryukov et al. (2019)*

In the generation of income tax, not only is its taxable base is important, but also the rate and tax benefits (Kulyagina and Bedulina 2016). When summarising the international experience of taxation of income, certain conclusions were made in applying the reform of income tax: it is necessary to estimate the possibility of a differentiated approach to setting rates and to consider options for the use of income tax incentives aimed at stimulating investment activities (Table 2).

Table 2. *Foreign experience in the taxation of income*

Country	Developed countries	Central and Eastern European countries
USA, France, Germany, etc.	Almost all costs may be excluded from gross profit, with minor restrictions	
Poland, Bulgaria, Hungary, etc.		The solution to the problem of combining the fiscal and regulatory functions of income tax in different countries varies from setting high tax rates and maintaining incentives for organisations to adopting lower rates and reducing the bulk of benefits

Source: *compiled by the authors based on the materials from Lykova (2017)*

The legislation of European states enshrines various approaches to taxing the profits of legal entities, but this diversity can be reduced to several basic schemes. The results of monitoring the tax rates and benefits of several developed countries (USA, Great Britain, Germany, France, and Russia) are presented in Table 3.

Table 3. *Tax rates in developed countries*

Indicator	Personal income tax rates	Income tax rates	VAT rates (basic)
USA	Differentiation 10–39.6%	Differentiation 15–35%	-
Great Britain	Differentiation 10–50%	20% and 23%	17.5%
Germany	Differentiation 0–45%	15% + 5.5% + (7–17.5% trade tax)	19%
France	Differentiation 0–41%	33.33%	19.6%
Russia	13%	20%	18%

Source: *compiled by the authors based on the materials from Saez and Gruber (2002)*

In the "Paying Taxes 2019" report, Kazakhstan ranked 56th ("Taxation in 2019"), with an analysis of the CIT reporting process provided. According to the results of said research, the total tax rate in Kazakhstan is 29.4%, which represents the share of taxes and contributions in the company's income. This indicator remains at the level of the previous year. Comparing this indicator of Kazakhstan (29.4%) with other jurisdictions, it is below the average for Central Asia and Eastern Europe (32.8%), and significantly below the average of the countries of the Organisation for Economic Cooperation and Development (OECD; 40.2%), as displayed in Figure 5.
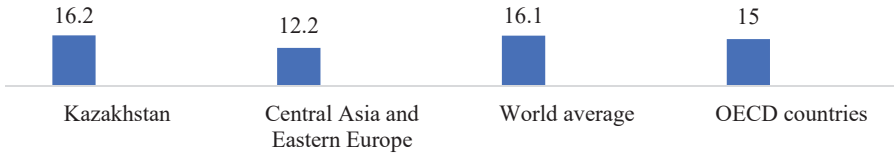
Figure 5. *The average CIT rate in 2019 in Kazakhstan*
Source: *compiled by the authors from World Bank Group and PwC (2018)*

In accordance with the Order of the Minister of Finance of the Republic of Kazakhstan No. 422, "Expenses for current income tax, as well as expenses (income) for reflecting deferred tax assets and liabilities" (2010) are accounted for in the Statement of Income in line 101 – "Income tax expenses". When explaining the correlation between income tax expense (income) and accounting profit, an organisation uses the applicable tax rate that provides the most significant information for users of financial statements, in accordance with the Tax Code of the Republic of Kazakhstan (Table 4).

Table 4. *The alignment of income tax in the statement of income and financial statements*

Statement of Income	Income tax expense	Financial statements
Tax expense.	Current tax expense.	Change in tax rates of the reporting period compared to the previous period.
Total current and deferred tax related to items that are debited or credited to equity.	Adjustments recognised in the period for current tax in prior periods.	The amount and expiry date (if any) of the period of validity of deductible differences, unused tax losses and tax credits for which a deferred tax claim is not recognised on the balance sheet.
Tax expense related to profit or loss from discontinued operations and the results of ordinary operations on discontinued operations for each reporting year.	Deferred tax expense related to the creation or reversal of temporary differences and changes in tax rates or the introduction of new taxes.	The aggregate amount of temporary differences associated with investments in subsidiaries, branches, associates, and joint ventures for which deferred tax liabilities are not recognised.
Tax expense or income related to changes in accounting policies and errors that are included in profit or loss because they cannot be accounted for retrospectively.	Reduction of expenses, for both current and deferred tax, by means of a previously unrecognised tax loss, tax credit, or temporary difference from a prior period.	The amount of a deferred tax asset and the nature of the evidence in favour of its recognition if disposal of such an asset depends on future taxable income in excess of the income arising from the reversal of existing taxable temporary differences, and if the organisation has a taxable loss in the current or prior period in the relevant tax jurisdiction.
	Allowance (or recovery) of a deferred tax asset.	The nature of the potential tax consequences that could arise from the payment of dividends to shareholders.

Below is an example of the effect of the applicable tax rate on the presentation of the numerical reconciliation, considering that the initial cost of the building is 100,000 tenge and the asset has been in operation for 5 years (Table 5) (Kusmanova 2015). The results of the analysis of the application of the reconciliation of the income tax rate are reflected in Figure 6, which shows savings in the form of an increasing trend up to the 10th year. A decreasing effect is observed in the last 2 years.

Table 5. *An analysis of the application of the reconciliation of the income tax rate*

| Tax report-ing	1st year	2nd year	3rd year	4th year	5th year	6th year	7th year	8th year	9th year	10th year	11th year	12th year	13th year
Deductions	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	8.000	4.000
Tax base	92.000	84.000	76.000	68.000	60.000	52.000	44.000	36.000	28.000	20.000	12.000	4.000	-
Depreciation expense	100.00	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000	10.000			
Book value	90.000	80.000	70.000	60.000	50.000	40.000	30.000	20.000	10.000	-			
Difference in expenses and deductions (1–3)	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	8.000	8.000	4.000
Differences in present value (2–4)	2.000	4.000	6.000	8.000	10.000	12.000	14.000	16.000	18.000	20.000	12.000	4.000	-
Deferred tax expense (sav-ings) (5*7)	400	400	400	400	400	400	400	400	400	400	1.600	1.600	800
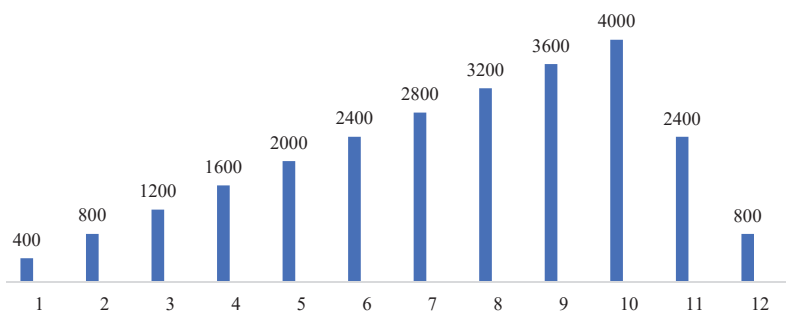
Figure 6. *The dynamics of changes in income tax from the 1st to the 13th year*
Source: *compiled by the authors based on the materials from Kusmanova (2015)*

As a result of the understating and subsequent overstating of depreciation deductions in tax accounting, the amount of income tax liabilities will be incomplete. For a more accurate presentation of income tax expenses in financial statements, an entity must recognise a deferred tax asset in the financial statements due to temporary differences. As

Table 4 shows, the effect of the amount of the depreciation deduction in tax accounting on the final amount of the current income tax expense will be offset by the corresponding posting of deferred tax recognition in the financial statements.

3. Results

When assessing income tax, it is necessary to understand that construction, as an important industry for the economy, has ambiguous trends, as this industry depends on many factors. Nevertheless, there are leading companies in Kazakhstan and, according to the latest data, 57 large enterprises engaged in the building of residential and commercial buildings are registered in Kazakhstan (Figure 7).
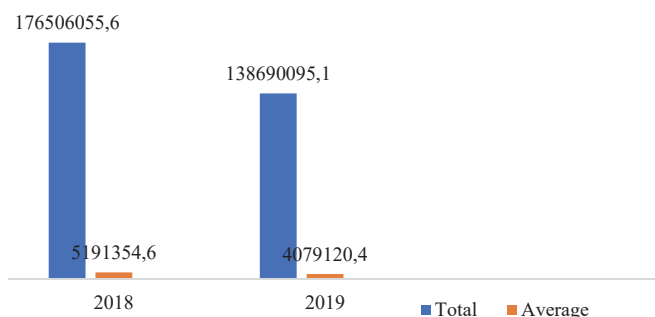

Figure 7. *The total and average amount of taxes of the largest taxpayers in the construction industry*

Source: *compiled by the authors based on the materials from Tukesheva et al. (2019)*

Among these building companies, the following companies of the Republic of Kazakhstan were included in the top 10 largest taxpayers for 2018–2019, the income of which provides the following insight (Tables 6 and 7).

Table 6. *The income of the largest taxpayers engaged in construction in the Republic of Kazakhstan for 2014–2019*

Company	Income, billion tenge					
	2014	**2015**	**2016**	**2017**	**2018**	**2019**
BI Group government corporation	241.69	249.64	263.49	315.16	376	365
Bazis Construction LLP	53.42	54.5	55.63	61.22	72.25	27.87
Alina Group LLP	37	37.45	42.6	43.12	45.41	46.1
Standart Tsement LLP	18.01	18.44	19.74	20.21	22.88	44.79
ASPMK-519 LLP	22.97	23.01	23.94	24.30	25.89	25.99
Montazhspetsstroi JSC	21.89	22.02	23.97	24.56	25.04	26.02
Trest Sredazenergomontazh JSC	41.94	42.14	42.6	43.12	43.72	36.25
Almatyinzhstroi JSC	44.01	44.17	44.89	45.12	47.47	40.11

Table 7. *An analysis of the tax payments for corporate income tax of the largest taxpayers of the Republic of Kazakhstan (thousand tenge)*

Company	2014	2015	2016	2017	2018	2019
BI Group government corporation	14,629,821	15,906,163	16,456,750	17,920,575	20,591,173	8,500,616
Bazis Construction LLP	2,049,050.2	2,691,439.3	3,041,295.3	3,528,888.4	4,118,234.6	1,700,123.2
Alina Group LLP	1,388,328.1	1,573,541.1	1,772,413.1	1,929,307.2	2,134,275.2	2,165,386.3
Standart Tsement LLP	916,762.1	945,725.2	980,248.2	1,029,811.2	1,132,167.2	2,016,424.3
ASPMK-519 LLP	969,258	994,688.1	1,049,511.1	1,238,858.1	1,364,021.1	1,387,129.2
Montazhspetsstroi JSC	1,735,864.4	1,888,228.4	2,030,361.8	2,076,006.8	2,150,038.8	2,265,204.2
Trest Sredazenergomontazh JSC	1,685,192.1	180,985.1	1,835,823.2	1,881,801.2	2,014,213.3	1,923,145.1
Almatyinzhstroi JSC	1,740,727.1	1,927,963.3	1,967,808.4	2,013,420.4	2,115,765.4	1,942,164.2

Source: *compiled by the authors based on the materials from Forbes Kazakhstan (2018)*

According to Tables 6 and 7, the BI Group is a large building holding, a leader in the real estate market of Kazakhstan which has been operating since 1995, during which time it has earned a reputation as a professional and reliable partner. At present, the BI Group is a diversified holding, the structure of which is made up of divisions and directorates in various areas of building, development, and engineering (Table 8).

Table 8. *The main indicators of the BI Group's building activities for 2014–2019*

Year	CIT tax payments, million tenge	Income, million tenge	The volume of completed construction and installation works, million tenge	Investments in house-building, million tenge	Number of building contractors, units	The volume of building works performed on "green construction", million tenge
2010	11,879.286	209,320	1,367,238	291,476	8,787	297,385
2011	12,016.298	217,650	1,397,589	297,835	7,798	305,937
2012	12,208.476	227,450	1,425,174	305,092	7,052	327,164
2013	12,478.093	236,980	1,606,647	335,655	8,024	375,375
2014	14,629.821	241,690	1,744,914	421,013	7,103	132,313
2015	15,906.163	249,640	1,870,682	428,241	7,896	396,923
2016	16,456.751	263,490	2,055,924	497,861	8,376	427,105
2017	17,920.575	315,160	2,270,729	613,487	8,597	479,264
2018	20,591.173	376,000	2,670,256	687,092	9,634	507,688

Source: *compiled by the authors based on the materials from Deloitte. Kazakhstan Highlights (2018)*

Of great interest is the analysis of the influence of various factors on tax payments for the corporate income tax of the BI Group (Figure 8).
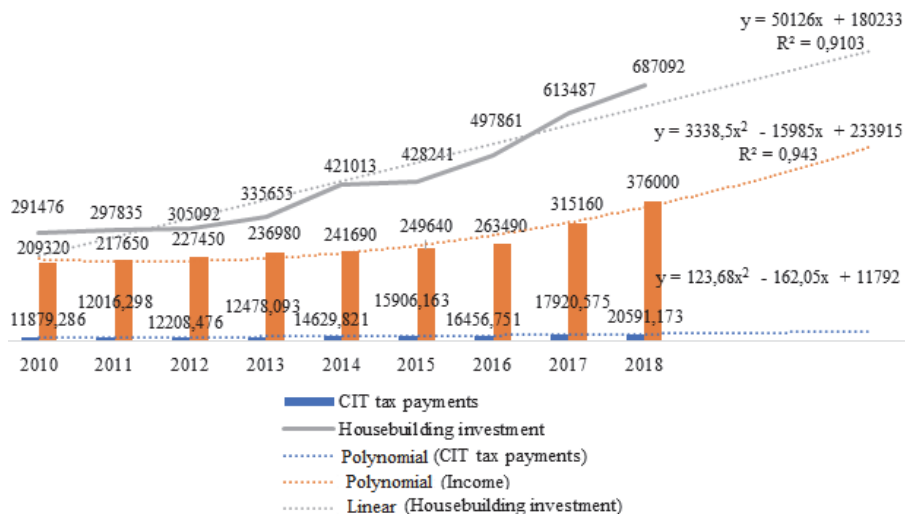
Figure 8. *The dynamics of the building works of the BI Group for 2014–2018, million tenge*

Such research can be performed with the use of correlation–regression analysis. The following notation will be used for analysis of the performance indicators of the BI Group company:

y – tax payments for corporate income tax (million tenge).

x_1 – income (million tenge);

x_2 – volume of completed construction and installation works (million tenge);

x_3 – volume of investments in housebuilding (million tenge);

x_4 – number of building contractors (units);

x_5 – volume of building works performed on «green construction» (million tenge).

To select the factors that should be included in the multiple linear regression equations, the statistical data of these indicators for 2010–2018 will be used (Table 9).

Table 9. *The matrix of matching correlation parameters*

	y	x_1	x_2	x_3	$x_{4...}$	$x_{5...}$
y	1					
x_1	0.9904	1				
x_2	0.9859	0.8906	1			
x_3	0.9465	0.6677	0.6616	1		
x_4	0.6221	0.6549	0.6325	0.68650	1	
x_5	0.6487	0.6865	0.6532	0.70197	0.7169	1

Upon estimating multiple linear regression, in order to ensure the statistical reliability of the results, it is required that the number of observations be at least 3 times greater than the number estimated by the parameter. Because of this, only three factors can be included in the model sought in this study. The results of the correlation analysis (Table 9) indicate that the following factors have the greatest influence on tax payments for corporate income tax (y): "income" (x_1), "volume of completed construction and installation works" (x_2), and "volume of investments in housebuilding" (x_3). Therefore, it is necessary to include the above three factors in the multiple regression model – x_1, x_2, and x_3. As a result of approximating the initial statistical data, the following multiple linear regression equation was obtained (Eq. 1):

$$y = 3{,}891.709 + 0.054x_1 + 0.007x_2 + 0.021x_3, R^2 = 0.985,$$

$$(2.421) \quad (7.764) \: (18.956) \: (15.612) \tag{1}$$

The multiple correlation coefficient equates to $R = 0.992$, which indicates a close correlation of the resulting parameter with two factorial traits simultaneously. Furthermore, the data of the regression analysis protocol indicates that the observed value of the Fisher criterion is $F_{obs.} = 107.100$. The critical value of the Fisher criterion at the significance level $\alpha = 0.05$ and the number of degrees of freedom $k_1 = m = 3$, $k_2 = n - m - 1 = 3$ (where n is the number of observations, m is the number of factors) equates to $F_{crit.}(0.05; 3; 5) = 5.409$. Because $F_{obs.} > F_{crit.}(107.100 > 5.409)$, the resulting regression equation is statistically significant and reliable.

The significance of the parameters of the obtained regression equation can be verified with the use of the Student's t-test. In the regression model, the t-statistics for the corresponding coefficients are indicated in parentheses. Comparing the values of the observed t-statistics values with the critical value $t_{crit.} = 2.571$ (at a significance level $\alpha = 0.05$ and the number of degrees of freedom $k = n - m - 1 = 5$), it can be concluded that the regression coefficients are statistically significant and reliable, and that the intercept is not.

Next is the analysis of the parameters of the obtained multiple regression equation: with a 1 million tenge increase in the company's income, its CIT payments should increase by 0.054 million tenge; with a 1 million tenge increase in the volume of completed construction and installation works, CIT payments should increase by 0.007 million tenge; with a 1 million tenge increase in investment in housebuilding, CIT payments should increase by 0.021 million tenge. One of the indicators that can be used to estimate the measure of the response of one variable to a change in another is the coefficient of elasticity. In the case under study, this will indicate the ability of CIT payments to change depending on changes in income, the volume of completed construction and installation works, and the volume of investments in housebuilding. Using (Eq. 2):

$$\bar{E}_{yx_i} = b_i \cdot \frac{\bar{x}_i}{\bar{y}}, \tag{2}$$

the following values of the aggregate average elasticity coefficients were obtained (Eq. 3):

$$\overline{E}_{yx_1} = 0.948\%, \quad \overline{E}_{yx_2} = 0.840\% , \quad \overline{E}_{yx_3} = 0.609\% \tag{3}$$

Having analysed these coefficients of elasticity, it is established that:
1. with a 1% average increase in the company's income, CIT payments will increase by 0.948% of their average amount, with the average values of the remaining variables unchanged;
2. with a 1% average increase in the volume of completed construction and installation works, CIT payments will increase by 0.840% of their average amount, with the average values of the remaining variables unchanged;
3. with a 1% average increase in investment in housebuilding, CIT payments will increase by 0.609% of their average amount, with the average values of the remaining variables unchanged.

Below is a consideration of the receipt of the estimated profit of the BI Group and the risks that may arise during the interaction of the activities of companies in related building industries (Table 10).

Table 10. *The indicators describing the financial activities of enterprises*

No.	Name	Income (USD)	Income from sales (million tenge)
P1	Sheberbuild LLP	not lower than 83	12.630
P2	Concern "Naiza – kurylys"	not lower than 72	11.010
P3	Munaikurylyservis LLP	not lower than 62	9.410

For a more complete understanding of the financial activities of companies that can affect profitability, a consideration of an alternative solution carrying the least risk is required. It is necessary to find the most advantageous solution, P_i. Table 9 indicates, by row:

P_1 – estimated profit from the implementation of the overhaul of the technical equipment of a new building at each enterprise;

P_2 – possible income from the implementation of the current renovation of the housing stock at each enterprise;

P_3 – estimated income from the implementation of the current repair of non-residential premises at each enterprise;

P_4 – possible income from the completion of the construction and installation works of a new building at each enterprise.

In this case, this is a task under conditions of uncertainty, when the probability of possible solutions is unknown. Therefore, approaches must be considered in a situation of uncertainty, where the following criteria are used: the Laplace principle of insufficient reason; maximum Wald criterion (the rule of extreme pessimism); minimal Savage criterion (minimum risk rule); and the Hurwitz criterion of generalised maximin (pessimism–optimism). That is, this problem corresponds to cases where the necessary decision should be made from a number of alternative decisions – $i = 1, …, 4$ – which will correspond to the income q_{ij} ($j = 1, 2, 3$) from the sale of products, P_i. The subsequent matrix $Q = (q_{ij})$ is called the matrix of consequences (possible decisions), and is as follows (Eq. 4):

$$Q(4,\ 3) = \begin{pmatrix} \{76\} & 54 & 32 \\ 46 & 22 & 24 \\ 10 & 12.5 & 11.6 \\ 41 & \{60\} & \{65\} \end{pmatrix},$$

(4)

In the braces ({}) of the matrix (4), the maximum values of each column are marked. When making decisions under conditions of uncertainty (the probability of the consequences of the decisions made is not indicated), the concept of a risk matrix $R = (r_{ij})$ is also introduced. Let us presume that it is necessary to assess the risk of the ith solution, but we do not know the real-world situation. If this was known, then the best solution that brings the greatest income would be chosen. If the situation was j^{th}, then a decision would be made regarding the greatest income $q_j = max_i q_{ij}$. Hence, in making the ith decision, we risk getting not q_j, income, but only part of it – i.e., making the ith decision carry the risk of not taking part of the income (Eq. 5):

$$r_{ij} = q_j - q_{ij} = max_i q_{ij} - q_{ij},$$

(5)

r_{ij} represents elements of the new risk matrix, R, which for this task will have the form as follows (Eq. 6):

$$R(4,\ 3) = \begin{pmatrix} 76-76 & 60-54 & 65-32 \\ 76-46 & 60-22 & 65-24 \\ 76-10 & 60-12.5 & 65-11.6 \\ 76-41 & 60-60 & 65-65 \end{pmatrix} = \begin{pmatrix} 0 & 6 & 33 \\ 30 & 38 & 31 \\ 66 & 47.5 & 53.4 \\ 35 & 0 & 0 \end{pmatrix}$$

(6)

Having the matrices of consequences (4) and risks (6), 4 criteria can be used to choose a solution under conditions of uncertainty.

1. Laplace's principle of insufficient reason is used in cases when it can be assumed that any one of the solutions is no more probable than another. Then, the probabilities of decisions can be considered equal, and the choice of decision can be made as in a risk situation. That is, the advantage is given to the option that provides the minimum average expected risk (Eq. 7):

$$b_i = min_i \sum_{j=1}^{n} r_{ij} \cdot p_{ij},$$

(7)

where p_{ij} is the probability, which is the same for all solutions (in the presence of four solutions).

According to rows from the risk matrix (6), the results are as follows (Eq. 8):

$$b_1 = 0 \cdot \frac{1}{4} + 6 \cdot \frac{1}{4} + 33 \cdot \frac{1}{4} = \frac{6+33}{4} = \frac{39}{4} = 9\frac{3}{4} = 9.75;$$

$$b_2 = 30 \cdot \frac{1}{4} + 38 \cdot \frac{1}{4} + 31 \cdot \frac{1}{4} = \frac{30+38+31}{4} = \frac{99}{4} = 24\frac{1}{4} = 24.25;$$

$$b_3 = 66 \cdot \frac{1}{4} + 47.5 \cdot \frac{1}{4} + 53.4 \cdot \frac{1}{4} = \frac{66+47.5+53.4}{4} = \frac{166.9}{4} = 41\frac{29}{40};$$

$$b_4 = 35 \cdot \frac{1}{4} + 0 \cdot \frac{1}{4} + 0 \cdot \frac{1}{4} = \frac{35}{4} = 8\frac{3}{4} = 8.75,$$

(8)

The smallest value among the four obtained solutions corresponds to the fourth solution, $b_4 = 8.75$ Therefore, according to the Laplace principle of insufficient justification,

preference of the solutions – from the standpoint of the greatest income – is given to the fourth solution, P_4.

2. The maximum Wald criterion is used when a guarantee is required that the rewards in all cases are not less than the largest possible reward in the worst conditions. The best solution will be the one for which the gain will be the largest among the minimums of different options. The criterion used in this approach is called maximin (Eq. 9):

$$a_i = \max_i \left(\min_j q_{ij} \right),$$

(9)

where q_{ij} is the gain (results) that corresponds to a pair of connected solutions P_i ($I = 1, ..., 4$) and circumstances (assumptions) Q_j ($j = 1, 2, 3$).

Thus, the payoffs, q_{ij}, for each pair of combinations of decisions and assumptions are taken as the initial data when choosing solutions according to the Wald criterion. This criterion is simple and clear, but conservative in the sense that it orientates the person who makes the decision to too limited a line of behaviour. Therefore, the Wald criterion is used in cases where it is necessary to ensure success under any possible conditions. Then, proceeding from the consequences matrix (4), the row-by-row minimal numbers are as follows: $a_1 = 32$; $a_2 = 22$; $a_3 = 10$; $a_4 = 41$. Of these numbers, the largest value corresponds to the fourth line, . Hence, Wald's criterion recommends making the fourth decision, P_4.

The minimum Savage criterion is used in cases where it is necessary under any conditions to prevent a large risk. In accordance with this criterion, the advantage is given to the solution for which the maximum losses for different options are minimal (Eq. 10):

$$b_i = \min_i \left(\max_j r_{ij} \right),$$

(10)

where r_{ij} are losses that correspond to the ith decision under the jth variant of the circumstance.

This criterion is among the cautious. However, unlike Wald's criterion, which is aimed at obtaining a guaranteed payoff, Savage's criterion minimises possible losses. Here, the initial data upon choosing a solution are losses r_{ij}, which correspond to each pair of combinations of decisions and circumstances – P_i and Q_j. The main initial assumption of this criterion is that the application of variants of the circumstance affects the actions of smart opponents (competitors), whose interests are directly opposite to the interests of the decision-maker. This circumstance compels the person who makes the decision to ensure minimum losses from these actions of opponents. Proceeding from the risk matrix (6), the maximum values for each row are as follows: $b_1 = 32$; $b_2 = 22$; $b_3 = 10$; $b_4 = 35$. From these numbers, the minimum value, b_{min}, is chosen, which corresponds to the third solution, P_3.

4. The Hurwitz criterion of generalised maximin (pessimism–optimism) is used when it is necessary to fall somewhere between the line of behaviour based on deterioration and the line of behaviour based on improvement. In this case, the advantage is given to the solution variant for which the G_i indicator turns out to be the maximum, which is determined according to (Eq. 11):

$$G_i = \lambda \max_i q_{ij} + (1 - \lambda)\min_j q_{ij}, \tag{11}$$

where λ is a coefficient considered as an indicator of optimism ($0 \le \lambda \le 1$). At $\lambda = 0$, the line of behaviour is based on improvement; at $\lambda = 1$, the line of behaviour is based on deterioration – therefore, the Hurwitz criterion coincides with the Wald criterion.

In practice, the value of the coefficient λ is in the range from 0 to 1, and is taken depending on the specific circumstances and the risk propensity of the decision maker (the closer to 0, the greater the risk). Below are two cases where the risk is from 30% to 60%:

1. take $\lambda = 0.4$ (risk – 60%). Then, from matrix Q row-by-row, considering formula (4), we have (Eq. 12):

$$\begin{aligned}
G_1 &= 0.4 \cdot 32 + 0.6 \cdot 76 = 12.8 + 45.6 = 58.4; \\
G_2 &= 0.4 \cdot 22 + 0.6 \cdot 46 = 8.8 + 27.6 = 36.4; \\
G_3 &= 0.4 \cdot 10 + 0.6 \cdot 12{,}5 = 4 + 7.5 = 11.5; \\
G_4 &= 0.4 \cdot 41 + 0.6 \cdot 65 = 16.4 + 39 = 54.4,
\end{aligned} \tag{12}$$

Based on the data obtained, the Hurwitz criterion recommends making the first decision, P_1, which corresponds to G_{max}.

2. take $\lambda = 0.5$ (risk – 50%). Then, from matrix Q row-by-row, we have (Eq. 13):

$$\begin{aligned}
G_1 &= 0.5 \cdot 32 + 0.5 \cdot 76 = 16 + 38 = 54; \\
G_2 &= 0.5 \cdot 22 + 0.5 \cdot 46 = 11 + 23 = 34; \\
G_3 &= 0.5 \cdot 10 + 0.5 \cdot 12.5 = 5 + 6.25 = 11.25; \\
G_4 &= 0.5 \cdot 41 + 0.5 \cdot 65 = 20.5 + 32.5 = 53,
\end{aligned} \tag{13}$$

Based on the data obtained, the Hurwitz criterion recommends making the first decision, P_1, which corresponds to G_{max}.

3. take $\lambda = 0.6$ (risk – 40%). Considering formula (6), from, the matrix Q row-by-row, we have (Eq. 14):

$$\begin{aligned}
G_1 &= 0.6 \cdot 32 + 0.4 \cdot 76 = 19.2 + 30.4 = 49.6; \\
G_2 &= 0.6 \cdot 22 + 0.4 \cdot 46 = 13.2 + 18.4 = 31.6; \\
G_3 &= 0.6 \cdot 10 + 0.4 \cdot 12.5 = 6 + 5 = 11 \\
G_4 &= 0.6 \cdot 41 + 0.4 \cdot 65 = 24.5 + 26 = 50.6,
\end{aligned} \tag{14}$$

Based on the data obtained, the Hurwitz criterion recommends making the fourth decision, P_4, which corresponds to G_{max}.

4. take $\lambda = 0.7$ (risk – 30%). Then, from matrix Q row-by-row, we have (Eq. 15):

$$\begin{aligned}
G_1 &= 0.7 \cdot 32 + 0.3 \cdot 76 = 22.4 + 22.8 = 45.2; \\
G_2 &= 0.7 \cdot 22 + 0.3 \cdot 46 = 15.4 + 13.8 = 29.2; \\
G_3 &= 0.7 \cdot 10 + 0.3 \cdot 12.5 = 7 + 3.75 = 10.75; \\
G_4 &= 0.7 \cdot 41 + 0.3 \cdot 65 = 28.7 + 19.5 = 48.2.
\end{aligned} \tag{15}$$

Based on the data obtained, the Hurwitz criterion recommends making the fourth decision, P_4, which corresponds to G_{max}. The results of using the criteria for making a decision are summarised in Table 11 (the "+" sign indicates the decision recommended by the corresponding criterion).

Table 11. *A summary of the results of using different criteria for decision making*

Criterion	Solutions			
	P_1	P_2	P_3	P_4
Laplace				+
Wald				+
Savage			+	
Hurwitz	+ (risk – 60% and 50%)			+ (risk – 40% and 30%)

Opportunities to improve the validity and quality of management decisions

Table 11 indicates that under conditions of uncertainty, the BI Group has the following solutions:

1) the company should not choose the current repair of the housing stock at each enterprise, because the second solution was not selected by any of the criteria;
2) with an attitude of lower risk, the third and fourth options (current repair of non-residential premises or construction and installation works of a new building at each enterprise) should be chosen;
3) with an attitude of higher risk (according to the Hurwitz criterion – 50% and above), the first option (overhaul of the technical equipment of a new building at each enterprise) should be chosen;
4) based on three criteria, it is best to choose the construction and installation work of a new building at each enterprise, because the corresponding risk is lower (according to the Hurwitz criterion – 40% and below).

The analysis of the dependence of investments in the innovative process of the BI Group's building activity shows that investments increase with an increase in the number of construction and installation works. Thereby, of the four solutions in conditions of uncertainty, the optimal choice is selected – the construction and installation work of a new building at each of the three enterprises. This is selected as it poses less risk: firstly, and most importantly, this is associated with innovation in the form of new equipment, which, although it requires investment, also brings the most income with less risk than the other solutions; and secondly, a new building means construction and installation works. The efficient application of the methodological tools proposed in this study can significantly increase the validity and quality of management decisions taken to develop the potential of enterprises in the construction industry. Considering the building industry in general, the situation looks as follows: at the end of 2019, 605.7 billion tenge worth of investments were attracted to housebuilding, which was 15.5% higher than in 2018 (Figure 9).
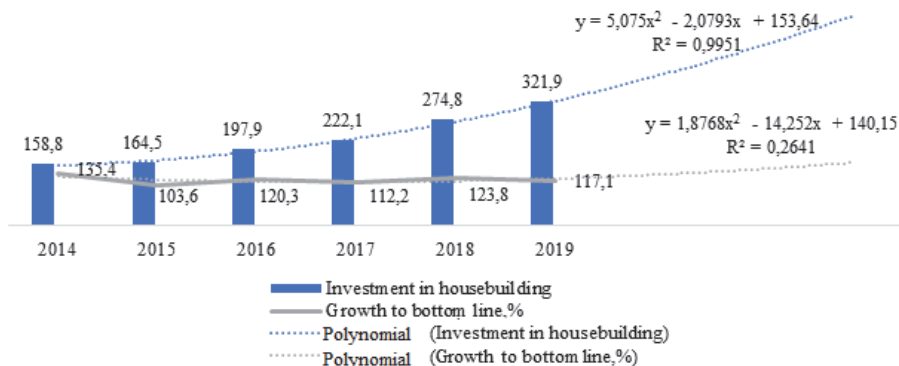
$$y = 5{,}075x^2 - 2{,}0793x + 153{,}64$$
$$R^2 = 0{,}9951$$

$$y = 1{,}8768x^2 - 14{,}252x + 140{,}15$$
$$R^2 = 0{,}2641$$

Figure 9. *The dynamics of investments in housebuilding in the Republic of Kazakhstan for 2014–2019, billion tenge*

Source: *compiled by the authors based on the materials from Ministry of National Economy of the Republic of Kazakhstan (2020)*

Overall, 4 tenge worth of private investment was attracted per 1 tenge of public funds. The annual volume of investments in housebuilding in Kazakhstan exceeded one trillion tenge in 2017, when the Nurly Zher program was launched in the republic. It should be remembered that the purpose of Nurly Zher was to increase the affordability of housing for the population. The tools used for this include: subsidising the interest rate on mortgages; subsidising loans to developers; and bringing engineering infrastructure to construction sites, including for individual construction. The last point is important, as apartment construction is predominantly developing in fairly large cities. For four months of 2019, the amount of investment in housebuilding amounted to 321.9 billion tenge – an annual growth of 17.1% delivered at once. It is noteworthy that during 2018, investments in housing construction reached a record amount of 1.2 trillion tenge – 18.6% more than the previous year (979.8 billion tenge) (Figure 10).

At the end of July 2019, 6.5 million square meters of housing were commissioned. Further, according to the press service of the Ministry of Industry and Infrastructure Development of the Republic of Kazakhstan, a total of 55,849 housing units have been commissioned in the republic, including 24,013 individual houses. The increase in the volume of housing commissioned in comparison with the previous year continues in seven regions. The leaders in the commissioning of housing are the Turkestan (130.9%), Kyzylorda (128.7%), and Kostanay (118.6%) regions. A decrease in the rate of housing being commissioned is noted in the Mangistau region (87.7%) and in Nur-Sultan (64.1%). The index of physical volume in the building industry in the January–July 2019 period compared to the same period in the previous year amounted to 111.5%. Positive dynamics were observed in eight regions. The leaders in this regard are the Kyzylorda (275.5%), Karaganda (193.6%), and Atyrau (129%) regions. A decrease in this indicator was noted in three areas: the Mangistau (−30.4%) region and the cities of Nur-Sultan (−12.5%) and Shymkent (−34.4%).
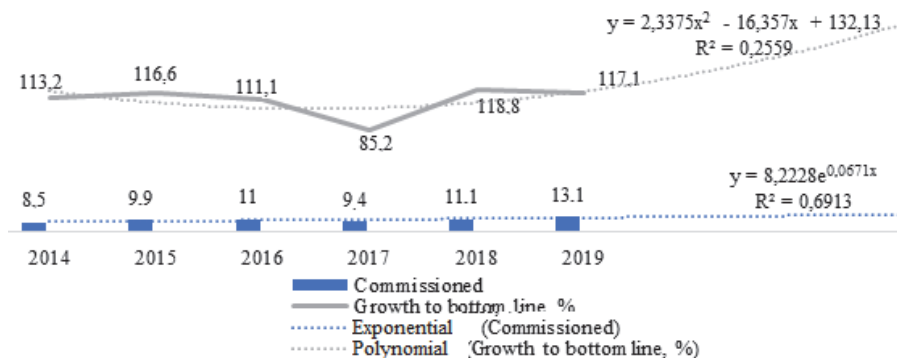
Figure 10. *The dynamics of indicators of new residential buildings commissioned in the Republic of Kazakhstan for the period from 2014–2019, thousand units*

Source: *compiled by the authors based on the materials from Ministry of National Economy of the Republic of Kazakhstan (2020)*

In 2019, the commission of housing in the amount of 13.1 million square meters is planned. In as little as four months of 2019, the total area of new buildings commissioned was 3.5 million sq. m. Ultimately, the more investments that are made in housebuilding, the more income the building company will receive and, accordingly, the CIT payments of the company will be higher. Due to the fact that the possibility of the population to purchase housing has significantly increased, there is an increase in mortgage lending due to the introduction of state programs. At the end of April 2019, mortgage loans increased by 24.8% year-on-year – from 1.1 trillion to 1.4 trillion tenge. The launch of the state program "7-20-25" in 2018 gave a new impetus to the mortgage market. Thus, within the framework of this program, as of 30 May 2019, 7,900 applications for loans in the amount of 91.4 billion tenge had already been approved.

The "7-20-25" program is the first housing program in Kazakhstan designed exclusively for the primary housing market, where the developer is chosen by the program participant. This stimulates the development of the housebuilding sector not only on the part of the population, but also on the part of developers: the effective demand of Kazakhstanis for primary housing is satisfied by increasing the motivation of the housebuilding market to commission new residential buildings (Resolution of the Board… 2018). Stimulating income growth through the taxation system is one of the main tasks of the state. The correct and timely calculation and payment of taxes allows for the minimization of many of a company's risks associated with the accrual of penalties and fines from government agencies. Therefore, the choice of income as an object of taxation allows states to record the appearance of excess profits in individual organisations, determine the reasons for their appearance and, if necessary, use the regulatory mechanism of taxation.

4. Conclusions

The main issue in accounting for income taxes is how to account for current and future tax consequences. According to the balance sheet method, the financial statements of a company should reflect the tax consequences of the reporting period (current income tax) and future tax consequences (deferred taxes). When calculating income tax, it is necessary to understand that construction, as an important industry for the economy, has an ambiguous nature, since this industry depends on many factors. Nevertheless, there are leading companies in Kazakhstan and, according to the latest data, 57 large enterprises engaged in the construction of residential and commercial buildings are registered.

Based on correlation and regression analysis, the authors analysed the influence of various factors on tax payments for the corporate income tax of the BI Group company, as well as the ability of corporate income tax payments to change depending on changes in the volume of construction and installation works and the volume of investments in housebuilding. The more investments are made in housebuilding, the more income the building company will receive and, accordingly, the corporate income tax payments of the company will increase.

Stimulating income growth through the taxation system is one of the main tasks of the state. Therefore, the choice of income as an object of taxation allows states to fix the appearance of excess income in individual organisations, to determine the reasons for its appearance and, if necessary, to use the regulatory mechanism of taxation. Tax liabilities play a significant role in the financial and economic activities of companies, and the correct and timely calculation and payment of taxes allows for the minimization of many of the company's risks that are associated with the accrual of penalties and fines from government agencies.

References:

1. DELOITTE. 2018. International tax: Kazakhstan highlights 2018 [newsletter]. Available from https://www2.deloitte.com/content/dam/Deloitte/kz/Documents/tax/other/Kazakhstan_Highlights_2018_To_practice.pdf
2. FORBES KAZAKHSTAN. 2018. 50 largest private companies [online]. Available from https://forbes.kz/leader/50_krupneyshih_chastnyih_kompaniy/
3. IVANYSHYNA, O.S., and PANURA, Y.V. 2018. Economic content of tax administration. *Bulletin of Mukachevo State University. Series "Economy"*, **1**(9), 159–162.
4. KOSHKARBAEV, K.U., and ABDIRAIMOV, B.O. 2012. Profit taxation as a condition for the efficient operation of an enterprise. *KazEU Bulletin*, **2**, 85–89.
5. KULYAGINA, E.A., and BEDULINA, V.V. 2016. Modern views (concepts) on the economic content of profit. *Economy*, **2**, 16–24.
6. KUSMANOVA, B. 2015. Guidance on the application of IAS 12 "Income Taxes" [online]. Available from https://online.zakon.kz/document/?doc_id=31036723
7. LYKOVA, L.N. 2017. *Taxes and taxation*. Moscow: Urait.

8. *Ministry of National Economy of the Republic of Kazakhstan*. 2020. https://old. stat.gov.kz/

9. MITROFANOVA, I.A. 2013. The economic essence, principles, functions of income tax: An evolutionary approach. *Finance and Credit*, **44**(572), 39–51.

10. Order of the Minister of Finance of the Republic of Kazakhstan No. 422 "Expenses for current income tax, as well as expenses (income) for reflecting deferred tax assets and liabilities". 2010. Available from https://online.zakon.kz/Document/?doc_id=30820085

11. PROKOPENKO, I.A. 2019. Taxation as a component of investment climate. *Scientific Bulletin of Mukachevo State University. Series "Economy"*, **1**(11), 28–32.

12. Resolution of the Board of the National Bank of the Republic of Kazakhstan No. 107 "On approval of the Programme of mortgage lending "7-20-25. New opportunities for purchasing housing for every family". 2018. https://online.zakon.kz/Document/?doc_id=33830419

13. SADYKOV, R., and ALKHIMOVA, I. 2019. Doing business in Kazakhstan: important issues of taxation and legal regulation. *KPMG in Kazakhstan and Central Asia* [online]. Available from https://assets.kpmg/content/dam/kpmg/kz/pdf/2019/09/Doing-business-in-Kazakhstan-2019_rus.pdf

14. SAEZ, E., and GRUBER, R. 2002. The elasticity of taxable income: Evidence and implications. *Journal of Public Economics*, **84**(1), 147–155.

15. SHAKHVOROSTOVA, G.P. 2020. Tax and social security rates for 2020 [online]. Available from https://online.zakon.kz/Document/?doc_id=32469577

16. SHEVCHUK, I. 2020. Improving tax control in the context of budget decentralization. *Scientific Horizons,* **1**(86), 46–52.

17. SIDOROVA, E. 2015. Improvement the methods of tax regulation mechanism effectiveness assessment in the Russian Federation. *Economic Annals-XXI,* **155**(11-12), 47–50.

18. SIDOROVA, E.Y., and GONCHARENKO, L.I. 2020. Tax regulation of customs payments in the state policy of Russia. *Lecture Notes in Networks and Systems,* **115**, 636–642.

19. Tax Code of the Republic of Kazakhstan No. 120-VI "On taxes and other obligatory payments to the budget". 2017. Available from https://online.zakon.kz/document/?doc_id=36148637

20. TSYGANKOV, K.Y. (2015). Capital and profit as concepts and indicators. Origin, economic meaning, role in management. *Siberian Financial School*, **6**(113), 141–151.

21. TUKESHEVA, L., KHODZHAEVA, D., KANAFIN, K., DOSYMOV, D., ABUGALIEVA, P., ZHUMADILDINOVA, A., and NAURBEKOVA, A. 2019. Report of 300 large taxpayers and their contribution to the economy of Kazakhstan. *University of International Business* [online]. Available from https://uib.edu.kz/press-reliz-300-nalogoplatelshhikov/

22. TYUTYURYUKOV, N.N., GURNAK A.V., and KNYAZEVA, A.V. 2019. *Tax systems of foreign countries*. Moscow: Prometheus.

23. WORLD BANK GROUP and PWC. 2018. *Paying taxes 2019*. Available from https://www.doingbusiness.org/content/dam/doingBusiness/media/Special-Reports/PwC---Paying-Taxes-2019---Smaller-19112018.pdf

24. YATSENKO, V.S. 2020. Assessment of the impact of the tax burden on the activities of enterprises in the Republic of Kazakhstan. *Economics and Management Issues*, **1**(23), 16–22.

MARGIN ANALYSIS IN MANAGEMENT AND OPERATIONAL PROFITABILITY AND PRICING POLICY OF A PRODUCTION ORGANIZATION

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Abstract. *The article aims to discuss methodological approaches to developing a profitability management policy for a manufacturing company's operations and pricing based on a margin model. The article defines the effectiveness of operating activities, formed complementarily based on the etymological approach in the comparative analysis of similar formulations in the literature. The purpose of the research is to justify the system of performance indicators of profitability, reflecting the effectiveness of operating activities. Practical solutions for factor analysis and forecasting the impact of a set of external and internal factors on the level of cost and profitability of operating activities based on modeling key business valuation indicators are proposed. A methodology for the phased calculation of options for price scenarios using the accounting method NIFO and the level of marginal costs is proposed. The calculation algorithms and the practical implementation of the pro-*

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posed methodology for predicting the optimal price level for a manufacturing enterprise's sold products are presented.

1. Introduction

One of the main stages of analysis and forecasting the profitability of a manufacturing company's operating activities, the prospects for increasing its business activity, strengthening its financial position, solvency, and investment attractiveness is the identification and measurement of the influence of environmental and internal factors (Alam et al. 2019).

For a comprehensive study of the profitability of operating activities, it is necessary to use unique factor analysis methods to construct appropriate models and form a sufficient amount of information about the dynamics of the values of factors and useful indicators. Any company's performance, which is measured by profit margin and profitability, is achieved by increasing the volume of commercial production and sales of products. The level of profit margin ability depends on various factors, including production costs, price parameters in the material and labor markets, pricing, and assortment policy of the production company itself (Berkowitz et al. 2020). Besides, profit margin ability is influenced by such factors as the level of security with working capital, the sufficiency and speed of the flow of financial resources, solvency, and the cost of servicing borrowed funds (Urbano and Aparicio 2016). It is necessary to consider the already existing influence of factors and determine the trends of their further dynamics using multifactor models of profit margin and operating profitability to justify the forecast of profit margin ability in the budgeting process (Cieślik and Michałek 2018).

2. Literature Review

Methodological foundations for evaluating business performance and managerial analysis of profitability, basic methods for managing operating profit based on connection "cost – volume – profit" (CVP) are presented in the works of foreign and domestic experts, such as Apcherch (2002), Drury (2012), Ilina and Ilysheva (2016), Kerimov (2017), Nikolayeva and Shishkova (2017), Horngren, Foster and Datar (2008), Sheremet (2000), Shim and Siegel (1996), and others.

In a market economy, the primary measure of business performance is performance, a generalized concept that captures all aspects of the organization's life (Wittman et al. 2017). Efficiency is a broader concept than efficiency. Despite this, some experts identify these terms, which, in our opinion, is erroneous. Here are some generally accepted definitions of the concepts of "effectiveness" and "efficiency," from which it follows that

sometimes there are significant differences between them (Du and O'Connor 2018). So, in the dictionary of Dal's (2016), "effectiveness" comes from the same root word "result" (French – *resultat*), as "the consequence of something, the consequence, the conclusion, the result, the outcome, the end of the case." Ushakov (2000) cites the formation of the word "result" from the Latin *resultatus* (literally – "reflected"), representing the "final result, consequence, completing any actions, phenomena, development of something." Interpretation of the concept of "result" is also contained in other sources: the result is the final result for which some action is taken. The result is the performance of someone's skill, achievement in any activity. The result is the digital result of some mathematical action, the process (Dmitriyev 2003). Firstly, the above formulations characterize the result and effectiveness as terms reflecting the absolute and relative outcome of something, respectively, without emphasizing its positive nature. Therefore, the effectiveness in economic analysis can be represented by positive as well as negative parameters.

The meaning of the term "effectiveness" reflects the positive result of the analyzed actions or events. Ushakov's (2000) explanatory dictionary gives the following definition: "Effective – giving effect, leading to the desired results, effective." The explanatory dictionary of economic terms defines efficiency as "achieving any specific results with the lowest possible costs or obtaining the maximum possible volume of products from a given amount of resources" (Black 2000).

The indicators of effect and efficiency differ since the first reflects the absolute result (as a rule, the excess of revenues over expenses) (Ključnikov et al. 2017). The second is relative (as a rule, the ratio of the effect to costs or payments).

A comparative analysis of various definitions of the term "efficiency" presented in the outstanding economic literature allowed us to generalize them and formulate this concept concerning an enterprise's operating activities (Yuan and Xu 2019). Efficiency is a comprehensive systematic characteristic of the level of business quality, which is evaluated by various entities based on the interpretation of the values of the system of aggregated and detailed indicators calculated using the available amount of financial and non-financial information (Du and O'Connor 2018).

When analyzing the results or generating forecast parameters of operational activities, one should consider effectiveness as a system of qualitative characteristics subjectively assessed by various business turnover participants (managers, company owners, investors, lending organizations, fiscal and regulatory institutions) based on the interpretation of a certain amount of financial and non-financial information (Wu et al. 2018).

According to specific criteria, various entities evaluate it depending on their affiliation and the degree of participation when considering the enterprise's performance parameters. So, the companies' owners are guided by performance indicators' values, formed based on financial and management reporting data (return on shareholders' equity, dividend yield per share, etc.). Lending organizations evaluate the effectiveness of companies' funds according to the profitability of credit operations (Cerqua and Pellegrini 2018). Investors analyze the profitability of investments by the level of return on capital. Tax authorities are interested in increasing companies' performance and, as a result, increasing tax revenues to the budget (Rahman et al. 2019).

Despite the specificity of a company's performance indicators evaluated by various financial and economic relations, the most aggregated of them are profitability indicators, a percentage of a particular profit indicator to resources, costs, income, capital, etc. (Urbano and Aparicio 2016). Professionals distinguish several groups of profitability indicators. Russian specialists traditionally combine profitability indicators into three groups such as economic profitability (return on assets and their elements), financial profitability (return on shareholders' equity and borrowed funds in various forms), and profitability of production and sales (return on sales and costs) (Gerasimenko 2007; Lebedev 2012; Malyshenko and Goncharova 2015; Akolzina 2016).

The set of profitability indicators should not be excessive to avoid their partial duplication and disperse stakeholders' attention. The estimated and forecasted profitability parameters and the initial cost components that form them (income, expenses, profits, assets, capital, and liabilities) should be reliably measured and reflected in financial and management reporting. Incorrectly defined parameters distort the manager's behavior and reduce their productivity. A limited number of key parameters are needed that drive the organization (Phelps 2004, p. 10).

A special place in assessing and forecasting the profitability of organizations' operating activities is occupied by identifying and measuring the impact of various external and internal environments. It allows timely adjusting of the management of business processes, creating reliable protection against external risks, minimizing their possible negative consequences, and preventing internal threats coming from the imperfection of the management organization of the company itself (Wang et al. 2018).

The increase in profitability is directly related to the growth of the financial result of operating activities, whose share in the total revenue of the company is a determining factor reflecting the "quality" of profit: "The concept of quality of profit arose because of the need to compare the profits of different enterprises, and also because of the need to realize assessments in 'quality'" (Bernstein 1996, p. 546).

As Drury (2012, p. 36) notes, to achieve a common goal – to maintain a competitive position in the market – companies operating in various industries focus on multiple factors (Gavurova et al. 2017a). It assigns a unique role to factor analysis in terms of identifying reserves for growth in the productivity of production activities: factor analysis can be aimed at elucidating the action of factors shaping the results of economic activity from various sources of spatial or temporary origin (Sheremet 2000, p. 302).

3. Materials and Methods

The methodology and practice of this study are based on scientific and practical publications of Russian and foreign experts on the formation of a theoretical base for analysis and forecasting of a system of indicators of operational performance using the margin approach and methods of managing the cost structure, production volumes, market factors that determine them, and the rationale criteria parameters (Kozubikova et al. 2019). In the process of the study, the following general scientific economic and specific methods were used:

- Analysis and synthesis;
- Systematization;
- Modeling,
- Statistical generalization to substantiate theoretical principles.

The practical recommendations aim to improve the methodological apparatus for analyzing and evaluating the effectiveness of the operating system management of production companies. For the practical implementation of the proposed methodological approaches, the mathematical apparatus of deterministic factor economic analysis and modeling of exposure to external and internal constraints were used, such as production volumes and product range, cost elements and their structure, pricing policy, and market demand (Lawrenz and Oberndorfer 2018).

4. Results and Discussion

In recent years, in the analytical management practice of commercial organizations, there has been a need to develop an operational policy that would allow timely response to adverse market trends (Satori et al. 2018). Achieving the optimality of such a policy is based on:

- In-depth study of the achieved level of business performance (Belás and Sopková 2016);
- Realistic measurement and assessment of the impact of various factors of the external and internal environment, primarily on the profitability of operating activities;
- Justification of the optimal set of forecast indicators of business activity and their values for the formation of operating budgets and control of their implementation (Urbano et al. 2019);
- Development of information components for making management decisions aimed at business competitiveness;
- Substantiation of optimal pricing policy and timely response to market factors of demand and competition (Lawrenz and Oberndorfer 2018);
- Formulating operational risk management policies (Long et al. 2018).

Despite the widespread presentation of methodological developments in the field of managing the operating activities of companies in Russian and foreign literature, each of them requires adaptation to the specific conditions of the production activity of a particular company and the stage of its life cycle, the prevailing system of business process management, information, and analytical management needs.

The criteria for profitability used to evaluate and forecast a manufacturing company's operating activities are largely determined by the stage of its life cycle and products sold (Behun et al. 2018). As a rule, at the initial phase of developing new products, until the breakeven point is reached, operating activities' financial result (profit from sales) remains negative for a long time. In this situation, it is important that the interim financial result – profit margin, reaches a positive value, which is a prerequisite, since sales revenue should exceed the total variable costs of its production, which usually include elements such as material, costs on wages of production workers and social contributions, energy costs for production processes, etc. (Walsh and Winsor 2019).

An important step in the analysis of operating performance is the study of the influence of various factors on the value of profit margin (P_{MARG}) and the level of marginal profitability (ROS_{MARG}). Based on the methodology developed by the specialists of the DuPont company ("DuPont", "E.I. du Pont de Nemours and Company"), so-called "The DuPont System of Analysis," which consists of transforming the rate of return on shareholders' equity (*ROE)* for conducting its multivariate analysis, we propose the conversion of indicators – marginal profit and marginal profitability by converting them into multivariate deterministic models.

$$P_{MARG} = N - VC = \sum_{i=1}^{n} q_i \cdot p_i - \sum_{i=1}^{n} q_i \cdot vc_i^{1} = \sum_{i=1}^{n} q_i \left(p_i - vc_i^{1} \right), \quad (1)$$

where P_{MARG} – profit margin;

N – sales revenue;

VC – total variable cost;

q_i – the physical quantity of the *i*-type product sold;

p_i – the unit price of the *i*-type product sold;

n – number of types of products sold;

vc_i^{1} – unit variable costs per unit of the *i*-type product sold.

It is worth noting that conducting factor analysis involves using at least two measurements of each indicator included in the analytical multivariate model. If the task is to calculate the influence of factors on profit margin in a retrospective plan for the elapsed time, then, as a rule, the actual data of the indicators of the reporting period and the base (previous), or the actual data of the indicators of the reporting period and planned budget indicators are used. The factor analysis mechanism will be similar if the task is to determine the influence of various factors on profit margin in the forecast period; only the data on the indicators included in the analytical model should reflect their achieved parameters and the data budgeted for the planned period.

To justify management decisions to identify the degree of influence of various factors on operating activities' profitability, it is necessary to use the information on the production and marketing of products, investment activities, organizational changes within the enterprise, etc., which are classified as internal management information and are available only to internal users (Chen and Chang 2019).

To calculate the influence of factors on profit margin in retrospect, we used the initially planned budget indicators and existing (reporting) period (Table 1). Since the analyzed company produces two types of products, the original multi-factor model of profit margin ability is transformed into a six-factor model as follows:

$$P_{MARG} = q_A \left(p_A - vc_A^{1} \right) + q_B \left(p_B - vc_B^{1} \right) = x_1 (x_3 - x_5) + x_2 (x_4 - x_6) \quad (2)$$

Table 1. *Calculation of the Influence of Factors on Profit Margin.*

Index	Shorthand	Plan	Report	±Δ	±D, %
1. Profit margin, thousand rubles	$P_{MARG_{z3}}$	1017	1298	281	27,63
2. Sales revenue, thousand rubles	N	28095	33212	5117	18,21
3. Total variable cost, thousand rubles	VC	27078	31914	4836	17,86
4. The physical quantity of A products sold, units	$q_A(x_1)$	3900	4400	500	12,82
5. The physical quantity of B products sold, units	$q_B(x_2)$	990	1080	90	9,09
6. Unit price of A products, thousand rubles.	$p_A(x_3)$	5,30	5,56	0,26	4,91
7. Unit price of B products, thousand rubles	$p_B(x_4)$	7,50	8,10	0,60	8,00
8. Unit variable costs per unit of production A, thousand rubles	$vc_A^1(x_5)$	5,09	5,40	0,31	2,55
9. Unit variable costs per unit of production B, thousand rubles	$vc_A^1(x_6)$	7,30	7,55	0,25	3,42
10. The influence of factors on profit margin, thousand rubles – total:	ΔP_{MARG}	-	-	281	-
Including due to changes: 10.1. The physical quantity of A products sold	$\Delta P_{MARG_{x1}}$	-	-	105	-
10.2. The physical quantity of B products sold	$\Delta P_{MARG_{x2}}$	-	-	18	-
10.3. Unit prices of sold products A	$\Delta P_{MARG_{x3}}$	-	-	1144	-
10.4. Unit prices of sold products B	$\Delta P_{MARG_{x4}}$	-	-	648	-
10.5. Unit variable costs per unit of output A	$\Delta P_{MARG_{x5}}$			-1364	-
10.6. Unit variable costs per unit of output B	$\Delta P_{MARG_{x6}}$			-270	-

Source: *Developed by the authors.*

Calculations of the influence of each of the six factors on profit margin are made by the method of chain substitutions:

1. $\Delta P_{MARG_{x1}} = [(4400(5,30 – 5,09) + 990(7,50 – 7,30)] – [3900(5,30 – 5,09) + 990(7,50 – 7,30)] = 105$ thous.rub.
2. $\Delta P_{MARG_{x2}} = [4400(5,30 – 5,09) + 1080(7,50 – 7,30)] – [4400(5,30 – 5,09) + 990(7,50 – 7,30)] = 18$ thous.rub.
3. $\Delta P_{MARG_{x3}} = [4400(5,56 – 5,09) + 1080(7,50 – 7,30)] – [4400(5,30 – 5,09) + 1080(7,50 – 7,30)] = 1144$ thous.rub.
4. $\Delta P_{MARG_{x4}} = [4400(5,56 – 5,09) + 1080(8,10 – 7,30)] – [4400(5,56 – 5,09) + 1080(7,50 – 7,30)] = 648$ thous.rub.
5. $\Delta P_{MARG_{x5}} = [4400(5,56 – 5,40) + 1080(8,10 – 7,30)] – [4400(5,56 – 5,09) + 1080(8,10 – 7,30)] = –1364$ thous.rub.
6. $\Delta P_{MARG_{x6}} = [4400(5,56 – 5,40) + 1080(8,10 – 7,55)] – [4400(5,56 – 5,40) + 1080(8,10 – 7,30)] = –270$ thous.rub.

Check: $\Delta P_{MARGx1} + \Delta P_{MARGx2} + \Delta P_{MARGx3} + \Delta P_{MARGx4} + \Delta P_{MARGx5} + \Delta P_{MARGx6}$ = 105 + 18 + 1144 + 648+(-1364)+(-270)=*281 thous.rub.*= ΔP_{MARG}

Such calculations of the influence of factors on profit margin allow us to obtain information not only about the nature of influence, but also measure the degree of their impact on effective indicators, which provides useful information to relevant business process management entities to make adequate decisions aimed at minimizing negative processes in the future; justification measures to reduce entrepreneurial risks (Mota et al. 2019) and their financial consequences (Fairlie and Fossen 2018).

As calculations showed, the marginal profit in the reporting period exceeded the planned level by 281 thousand rubles, resulting from the influence of both positive and negative factors. The most significant positive impact on the dynamics of marginal profit was exerted by the price of product A, an increase of 4.91%, yielding an additional amount of profit of 1,144 thousand rubles. The influence of the cost of product B, despite its more intensive growth rate (by 8.00%), allowed to increase the financial result only by 648 thousand rubles, which is due to the smaller share of sales of products B compared to products A in the total physical sales.

The advantage of multivariate modeling also lies in the fact that this approach helps identify the negative impact of individual factors, which may not be so evident in the usual comparison of effective indicators (Gavurova et al. 2017b). The proposed multifactor model for the formation of profit margin made it possible not only to detect, but also to calculate the negative impact of two factors on it: the growth of unit variable costs for both products A and products B, as a result of which the profit margin was less than what was planned by the budget, respectively, at 1364 thousand rubles and 270 thousand rubles. Thus, none of the factors that had a positive effect on profit compensated for the entirely negative impact of the growth of variable costs for products A. It follows from this situation that the company needs to focus in the coming budget period on finding ways to prevent the growth of variable costs, especially for products A.

To conduct a factor analysis of the following order (with details of individual elements of variable costs that are part of variable values) to the level of variable expenses by type of product, we suggest using the corresponding factor model. The factor model for product A is given as an example:

$$VC_A = \sum_{j=1}^{m} VC_{A_j}^{1} \cdot q_A ,$$

(3)

where:

VC_A – value of variable costs for products A;

$vc_{A_j}^1$ – unit variable costs per unit of production A for the *j*-th element (type, article);

q_A – physical quantity of products A;

$vc_{A_j}^1$ – unit variable costs per unit of production A for the *j*-th cost element;

m – number of elements of variable costs that form the total value of variable costs for products A.

Factor analysis allows you to simulate the studied effective indicator and determine which drivers can be effectively managed in the planned budget period to minimize pos-

sible financial losses if there is a sufficient probability of malicious processes. The calculations can be successfully used to assess the significance of certain factors' impact on the predicted effective indicator, making a possible assessment of them in the future in several ways, based at least on the optimistic, pessimistic, and average level of the available initial information (Kusmiati et al. 2019). Suppose the physical quantity of products sold is differently measurable in physical terms (for example, the physical amount of products is measured in units, tons, liters, etc.). In that case, a similar factor analysis should be performed for individual types of products that are individually measurable in terms of a physical quantity.

One of the areas of performance analysis is the assessment of the business activity of the analyzed object, which is manifested in the dynamism of the organization's development, the achievement of its goals, which reflect various absolute cost and relative analytical indicators, and above all, the rate of turnover of organization's assets and resource productivity (Caliendo and Kritikos 2019). The assessment of business activity is based on the results of a study of the absolute values of the levels and dynamics of profitability and resource productivity ratios, defined as the ratio of profit or income indicators to the resources used in economic activity (current and non-current assets and their elements, financial, labor resources, etc.), as well as with the values of total costs and their articles, types, elements.

One of the most critical indicators of an organization's operating performance is sales profitability, the value of which can be determined based on the ratios of various profit indicators (marginal, gross, sales profit, profit before tax, net profit, etc.) and income indicators (Androniceanu et al. 2019).

Assessing the effectiveness of operating activities, a comparative analysis of profit margin ability is not enough. Therefore, we propose to transform one of the most important indicators based on the DuPont model – sales profitability, calculated for this case based on profit margin (ROS_{MARG}).

$$
\begin{aligned}
ROS_{MARG} &= \frac{P_{MARG}}{N} = \frac{N - VC}{N} = 1 - \frac{VC}{N} = 1 - \frac{VC \cdot \overline{CA} \cdot \overline{TL} \cdot \overline{TA}}{N \cdot \overline{CA} \cdot \overline{TL} \cdot \overline{TA}} = \\
&= 1 - \left(\frac{\overline{TA}}{\overline{TL}} \cdot \frac{\overline{TL}}{\overline{CA}} \cdot \frac{VC}{\overline{TA}} \cdot \frac{\overline{CA}}{N} \right) = 1 - \left(\frac{\overline{E} + \overline{TL}}{\overline{TL}} \cdot \frac{\overline{TL}}{\overline{CA}} \cdot \frac{VC}{\overline{TA}} \cdot \frac{\overline{CA}}{N} \right) = \\
&= 1 - \left[\left(1 + \frac{\overline{E}}{\overline{TL}} \right) \cdot \frac{\overline{TL}}{\overline{CA}} \cdot \frac{VC}{\overline{TA}} \cdot \frac{\overline{CA}}{N} \right] = 1 - \left[(1 + x_1) \cdot x_2 \cdot x_3 \cdot x_4 \right]
\end{aligned}
$$

(4)

where:

ROS_{MARG} – profit margin;

N – sales revenue;

$\underline{VC}$– total variable cost;

$\overline{CA}$ – period average balance value of current assets;

$\overline{TL}$ – period average balance value of total liabilities;

$\overline{TA}$ – period average balance value of total assets;

$\overline{E}$ – period average balance value of shareholders' equity;

$\dfrac{\overline{E}}{\overline{TL}}(x_1)$ – equity current ratio;

$\dfrac{\overline{TL}}{CA}(x_2)$ – debt ratio (the reciprocal of the liquidity ratio – covering current assets of total liabilities);

$\dfrac{VC}{\overline{TA}}(x_3)$ – total assets maintenance ratio by variable costs (cost of assets);

$\dfrac{\overline{CA}}{N}(x_4)$ – current assets load ratio (the reciprocal of the coefficient of their turnover).

The presented model reflects the dependence of profit margin ability on four factors, each of which has an inverse effect on its dynamics. It should be noted that when determining the sequence of inclusion of factors in the analytical model, if there is a multiplicative or multiple dependence, some conditions should be observed. So, first of all, the model includes the so-called resource (extensive) factors, which, in comparison with others, are primary, and then every next factor that is logically related to the previous one. In the above formula (4), the first place is given to the coefficient for covering total liabilities with own capital (ratio of shareholders' equity to liabilities), reflecting the structure of financing sources and is primary. The second place is taken by the factor - the debt burden ratio (the ratio of total liabilities to current assets), which is associated with the first circumstance that the value of total liabilities is used to calculate it. In third place in the factor, the model is the coefficient of servicing total assets with variable costs (asset cost), the denominator of the value of total assets, that is also a resource indicator associated with the previous factor. Finally, the fourth factor is the load factor of current assets (the reciprocal of the ratio of their turnover), which is a kind of "quality" indicator, reflecting the inverse of the turnover rate of current assets.

The reason that the last place in the analytical model is assigned to the quality indicator is that when calculating the influence of each factor using common factor analysis methods (chain substitutions, absolute and relative differences), a multiplicated effect of the combined effect on the effective indicator of all factors included in the model (the so-called "indecomposable" residue), the value of which subjectively refers to the effect of the last factor.

The mixed-type four-factor model presented above reflects the nature of the relationship between the marginal profitability of sales and the factors included in it, considering the objective nature of their influence on the effective indicator, namely, inversely proportional dependence. With the first factor (the coefficient of covering total liabilities with equity), profitability is inversely related: the higher its value, the less the effect of financial leverage is used, the less borrowed financial resources are used; therefore, the lower the profitability. The second factor (leverage ratio) also has an opposite effect on profitability, as it is a characteristic opposite in value to the coefficient of coverage of liabilities with current assets (otherwise – potential solvency). The third factor's impact, asset cost on profitability, is also inversely proportional since its growth is undesirable. With a faster increase in prices than asset growth, profit is reduced at a quicker pace, which will negatively affect sales' marginal profitability. The fourth factor, the load fac-

tor of current assets, is the inverse ratio of their turnover. Therefore, growth will mean a slowdown in turnover, which reduces profit and profitability (Table 2).

Table 2. *Calculation of the Influence of Factors on Marginal Profitability.*

Index	Shorthand	Plan	Report	±D	±D, %
1. Profit margin, thousand rubles	P_{MARG}	1017	1298	281	27,63
2. Sales revenue, thousand rubles	N	28095	33212	5117	18,21
3. Marginal profitability	$ROS_{MARG_{x3}}$	3,620	3,908	0,288	7,96
4. Total variable cost, thousand rubles	VC	27078	31914	4836	17,86
5. Period average balance value of current assets, thousand rubles	$\overline{CA}$	8289	9984	1695	20,45
6. Period average balance value of total liabilities, thousand rubles	$\overline{TL}$	9650	10862	1212	12,56
7. Period average balance value of total assets	$\overline{TA}$	15632	17336	1704	10,90
8. Period average balance value of shareholders' equity	$\overline{E}$	5982	6474	492	8,22
9. Equity current ratio	$\dfrac{\overline{E}}{\overline{TL}}(x_1)$	0,6199	0,5960	-0,0239	-3,86
10. Debt ratio	$\dfrac{\overline{TL}}{\overline{CA}}(x_2)$	1,1642	1,0879	-0,0763	-6,55
11. Total assets maintenance ratio by variable costs	$\dfrac{VC}{\overline{TA}}(x_3)$	1,7322	1,8409	0,1089	6,28
12. The current assets load ratio	$\dfrac{\overline{CA}}{N}(x_4)$	0,2950	0,3006	0,0056	1,90
13. The impact of factors on marginal profitability, % – total:	ΔROS_{MARG}	-	-	0,288	-
Including due to changes: 13.1. Equity coverage ratio	$\Delta ROS_{MARG_{x1}}$	-	-	1,433	-
13.2. Debt ratio	$\Delta ROS_{MARG_{x2}}$	-	-	6,223	-
13.3. Total assets maintenance ratio by variable costs	$\Delta ROS_{MARG_{x3}}$	-	-	-5,568	-
13.4. Current assets load ratio	$\Delta ROS_{MARG_{x4}}$	-	-	-1,800	-

Source: *Developed by the Authors.*

The calculations of the influence of each of the four factors on marginal profitability were made by the method of chain substitutions:

1. $\Delta ROS_{MARG_{x1}} = \{1 - [(1 + 0,5960) \cdot 1,1642 \cdot 1,7322 \cdot 0,2950]\} - \{1 - [(1 + 0,6199) \cdot 1,1642 \cdot 1,7322 \cdot 0,2950]\} = 1,433\%$.

2. $\Delta ROS_{MARG_{x2}} = \{1 - [(1 + 0,5960) \cdot 1,0879 \cdot 1,7322 \cdot 0,2950]\} - \{1 - [(1 + 0,5960) \cdot 1,1642 \cdot 1,7322 \cdot 0,2950]\} = 6,223\%$.

3. $\Delta ROS_{MARG_{x3}} = \{1 - [(1 + 0,5960) \cdot 1,0879 \cdot 1,8409 \cdot 0,2950]\} - \{1 - [(1 + 0,5960) \cdot 1,0879 \cdot 1,7322 \cdot 0,2950]\} = -5,568\%$.

4. $\Delta ROS_{MARG_{x4}} = \{1 - [(1 + 0{,}5960) \cdot 1{,}0879 \cdot 1{,}8409 \cdot 0{,}3006]\} - \{1 - [(1 + 0{,}5960) \cdot 1{,}0879 \cdot 1{,}8409 \cdot 0{,}2950]\} = -1{,}800\%$.

Check:

$\Delta ROS_{MARG_{x1}} + \Delta ROS_{MARG_{x2}} + \Delta ROS_{MARG_{x3}} + \Delta ROS_{MARG_{x4}} + 1{,}433 + 6{,}223 + (-5{,}568) + (-1{,}800) = 2{,}288\% = \Delta ROS_{MARG}$

According to the table, the actual profit margin ability exceeded the planned one by 0.288%. It reached the level of 3.908%, while the model's factors influenced this process in different ways. The calculations made it possible to identify a significant multidirectional effect of two factors. The debt burden ratio had a positive effect, due to which the profit margin ability could have a value of 6.223% higher than the achieved level. However, the variable asset servicing ratio of variable assets had a negative effect, "blocking" the positive effect of the debt ratio and reducing the profit margin ability by 5.568%.

A mixed but less significant effect on the dynamics of profit margin ability was exerted by the coefficient of coverage of liabilities with own capital, which led to its growth by 1.433%, and the load factor of current assets, which reduced profitability 1.800%.

In general, the influence of all four factors on the dynamics of profit margin ability was positive, but at the same time, identifying and measuring the impact of each of them gives a detailed picture to the company's management for making appropriate adjustments to the budget of the next planning period and making management decisions aimed at containing negative processes in the future.

Thanks to the methods of factor analysis and the methodology of deterministic multifactorial modeling, it becomes possible to carry out calculations of the influence of various factors not only in retrospect but also to apply this methodological approach to the procedures for predicting the impact of initial budget indicators on the performance of operational activities in the future.

In modern conditions of saturation of highly competitive markets and the lack of sufficient positive dynamics of demand, pricing is a tool with which a manufacturing company can maintain, and in some cases, increase the share of its presence in the market, thereby contributing to the formation of marginal and operating profit (Lawrenz and Oberndorfer 2018). The enterprise pricing policy should comprehensively consider the influence of various factors – market, economic, industrial, financial, organizational, and not shift only to market price trends or cost structure management.

To create efficiency of the system for managing pricing policy parameters, the so-called "value pricing" method is relevant, which allows a manufacturing company to generate operating profit at a faster pace by achieving a profitable value-to-cost ratio, subject to the best ratio between the value of the products sold and the costs on its production (Du and O'Connor 2018). The value approach allows the company to get a real idea of the costs and their structure, profit, and factors and provide control over changes in price indicators and sales volumes on financial results in general (Dailey 2004; Gerasimenko 2007).

The method under consideration provides a ranking of costs associated with the production and sale of products by variables and fixed and allows you to analyze, evaluate, and predict operating indicators based on the relationship of the volume of production, the magnitude and structure of costs, and operating profit.

To generate data on variables and fixed costs, it is necessary to build an appropriate management accounting system to obtain objective information not only about their total values but specific characteristics per unit of specific types of products, as well as the profit margin ability in terms of types of products, areas of production activity, responsibility centers, etc. (Dolan and Simon 2005; Zaykina and Nasretdinova 2016).

In our opinion, for value pricing, the most optimal model of the cost accounting method is NIFO (next-in, first-out) – an estimate of the used resources at the price that will have to be paid tomorrow to replenish the reserve of resources spent today.

Pricing based on the cost approach is to establish a lower price limit for a unit of production based on the aggregate of all costs and expenses incurred by the enterprise, starting from which, it is possible to plan a premium level, the restriction of which is determined by the maximum parameter of the market price at which these products can be sold.

To better meet customer expectations and market price changes, pricing should include a phased formation scheme - from the maximum price list for single purchases to the lowest possible price that allows you to respond to competitors' actions. At the same time, profitability standards at all price levels should reflect the relevant indicators of business profitability and be available to management in making decisions (Fairlie and Fossen 2018). The pricing system should include volume changes necessary to compensate for the price factor's impact on each price change.

The lower price limit is variable costs, but the company needs to reimburse all costs, including fixed costs, and make a profit. The method that allows you to connect pricing with financial targets and manage them in real-time is the margin analysis method, according to which the price of the product compensates for the elements of variable costs, forming a profit margin, which, in turn, is a source of covering fixed costs and obtaining the necessary level of operating profit and profitability. It is possible to solve the problem of determining sales volumes' changes to balance the influence of volume and price using a marginal approach and break-even analysis. In cases of changes in sales volumes, prices, or costs, an advance forecast and adjustment of changes necessary to increase revenue, profit, and margin can be performed by factor analysis.

In cases of changes in sales volumes, prices, and costs, an advance forecast and adjustment of changes necessary to increase revenue, profit, marginal, and operating profitability can be performed based on factor analysis.

In pricing, the pricing method based on accounting for marginal costs is called the marginal cost method. This method involves considering the price of products in terms of variable (marginal) costs. This method's application is based on the principle of profit margin, due to which fixed costs are reimbursed. The marginal cost method is more complex than the full cost method, as it focuses on a multi-factor approach to pricing. In the case of its use, the enterprise should evaluate the potential sales volume in the context of assortment price parameters. The marginal cost method is advisable to apply in situations where the enterprise has sufficient production capabilities, provided that the achieved volume of product sales fully compensates for fixed costs, and also provided that the company realizes the task of optimizing the price line by varying their parameters for individual types of products, individual orders, contracts, etc. (Wei and Lan 2019).

Besides, this method is relevant when the company implements a price component to increase its market share, while prices are set at a lower level than competing companies.

When constructing prices based on the full cost, the company is limited in flexible changes in prices. Besides, the distribution of fixed costs by type of product may distort data on the product's real level of profitability. Since when constructing prices based on only variable costs, the company runs the risk of not fully covering the total costs, to build a multifunctional and flexible system of pricing, within its structure, it is necessary to distinguish not only variable and fixed operating costs, but also profit margin, which should compensate for other fixed costs associated with the functions of product sales and the general management system (commercial and administrative expenses). The minimum specific indicator of the part of the price necessary to cover commercial and administrative expenses can be determined based on the company's financial statements.

To implement the proposed approach to the justification of price parameters, a production company was chosen whose fixed costs for the reporting year amounted to 32.49% (Table 3) of the total revenue from sales. Therefore this value will be the minimum level of projected profit margin when setting threshold price values.

Table 3. *Calculation of the Unit Fixed Costs Indicator.*

Index	Standard period	Reporting period	±Δ	Growth ratio, %
1. Sales revenue, million rubles	81741	79919	-1822	97,8
2. Total production expenses, million rubles	41034	41625	591	101,4
3. Fixed business and management expenses, million rubles	24740	25964	1224	104,9
4. The relative share of business and management expenses in sales revenue, %	30,27	32,49	2,22	107,3

Source: *Developed by the authors.*

For possible price changes, it is necessary to calculate the specific cost elements' particular indicators – specific variables, specific constants, and the specific profit margin in the product's price. The higher the level of profit margin for a particular type of product, the more maneuver the company has in reducing costs to increase sales (Table 4).

Table 4. *Unit Price Elements.*

Index	Sum, rubles	Relative share in the price, %
1. Variables	220	22,68
2. Total fixed manufacturing costs	324	33,40
3. Fixed business and management expenses	315	32,47
4.Profit margin	750	77,32
5. Unit price	970	100,00

Source: *Developed by the authors.*

At the next stage, it is necessary to determine the criteria for evaluating decisions in the field of pricing, that is, to determine the level of operating margin standard, which is one of the main issues of pricing. It is necessary to determine the minimum, current, and desired level of operating profitability and calculate the relevant indicators of sales profitability, cost-effectiveness, and the amount of sales revenue necessary to achieve the desired level of profitability, based on the available resource capabilities of the manufacturing enterprise. The calculations are as follows:

Calculations are made according to the following formulas:

1. Profit margin: $PM_{min} = (ROA_{min} \times TA) / S \times 100$

where:

PM – profit margin;

ROA – return on assets (the ratio of profit (revenue minus all expenses and before interest on capital and taxes) to the total value of assets);

TA – total assets;

S – sales profit;

2. Return on costs: $PTC = PM / (1 - PM) \times 100$,

where:

PTC – profit to cost;

3. Revenues to achieve a given level of profitability:

Revenue = Gross input × (PTC + 1)

Next, the minimum, current and desirable indicators of the ratio of profitability, gross profit, and costs are determined (Table 5).

Table 5. *Break-Even Point Calculation According to Reporting Data.*

Index	Standard period	Reporting period	±Δ	Growth ratio, %
1. Sales revenue, million rubles	81741	79919	-1822	97,8
2. Total expenses, million rubles	41034	41625	591	101,4
3. Fixed selling and administrative costs, million rubles	24740	25964	1224	104,9
4. Breakeven point, million rubles	59718	63331	3614	106,1

Source: *Developed by the authors.*

For the minimum level of profitability, you can take the level of profitability necessary to reach the breakeven point:

$ROS = PM = (ROA \times TA) / S \times 100$

$ROS\ min = PM_{marg} = (T - FC) / S = (63,331 - 41,625$ million rubles$) / 63,331$ million rubles $= 0,34\%$;

$ROA = ROS / 100 \times S / TA = 41 / 100 \times 63,331$ million rubles $/ 117,470$ million rubles $= 18,5\%$;

$PTC = 0,41 / (1 - 0,41) = 52,14\%$.

The current (reporting, actually achieved) and desirable indicators are calculated similarly.

Current performance:

PM = 47,9%;

ROA = ROS/100 ×S/TA = 47,9 /100 × 79,919 million rubles / 117,470 million rubles = 32,6%

PTC = 0,479 / (1 – 0,479) = 69,2%;

Indicators required to achieve (Table 6):

PM = 50%

ROA = ROS / 100 ×S / TA = 50 /100 × 83,250 million rubles / 117,470 million rubles = 35,4%;

PTC = 0,5 / (1 – 0,5) = 100%.

Table 6. *Calculation of Indicators of the Ratio of Profit to Costs.*

Cost level	ROS (PM), %	ROA, %	PTC, %	S, mln.rub.
Minimum	34,3	18,5	52,14	63,331
Current	47,9	32,6	92,00	79,919
Desirable	50,0	35,4	100,00	83,250

Source: *Developed by the authors.*

Next, you need to add an extra charge corresponding to the level of profitability to the expense portion. It is necessary to calculate several price levels - with minimal profitability, current, and target profitability (Table 7).

Table 7. *Calculation of Indicators for Several Levels of Price Offers.*

Expenses	Rubles per 1 unit of production	Specific indicator in the price,%
Variable cost	220	-
Fixed cost	324	-
Minimum profit level	115	34,27%
Profit level 1	284	34,27%
Profit level 2	500	47,92%
Profit level 3	707	56,52%
Minimum price	335	
Price for profit level1	828	-
Price for profit level2	1 044	-
Price for profit level3	1 251	-
Standard price	1 675	-

Source: *Developed by the authors.*

Thus, in the structure of the price, some influences are considered:

- Cost elements (variable and fixed);
- Average and specific cost indicators;
- Profit margin and its particular level;
- Options of mark-up levels corresponding to the financial indicators of the company.

Price options calculated with different margins are the deviation levels from the standard price list and allow the company management to decide on possible discounts based on the generated data on the profitability of specific transactions. Moreover, all the necessary financial calculations and possible parameters of price changes can be prepared in advance (Yamori et al. 2017). Thus, the management of the company gets the opportunity to make decisions regarding price dynamics, knowing the financial parameters of transactions, and focusing on its relevance to the goals of the manufacturing enterprise.

Conclusions and Further Research

The study presented universal methods for factor analysis of profit margin and profitability and calculated the influence of various factors on them using two multifactor models – profit margin and profit margin ability provide ample opportunities to use them to manage the operating activities of a manufacturing company (Franklin and Marshall 2019). As a result of retrospective calculations, the most significant factors that influenced the dynamics of profit margin and profitability were identified. Using similar models to predict the possible impact of various factors on the effectiveness of the company's operating activities in the coming budget period is justified.

The versatility of multivariate performance modeling is based on a marginal approach using historical data. It allows the user to assess the impact of various factors in the practice, the most important price. The proposed algorithms are also relevant to the following tasks:

- Formation of a pricing policy for the future when developing operating and financial budgets in conditions of significant volatility of market prices;
- Determination of measures to optimize sales policy;
- Justification of proactive measures aimed at minimizing financial losses;
- Prevention of negative trends to reduce market share and reduce business risks (Chen and Waters 2017).

Acknowledgments

References

4.   AKOLZINA, M.N. The place of factor analysis in the system of complex economic analysis of an enterprise. *New Science: Theoretical and Practical View,* 2016, 11(1), 38-40.

5.   ALAM, A., UDDIN, M., and YAZDIFAR, H. Financing behavior of R&D investment in the emerging markets: The role of alliance and financial system. *R&D Management*, 2019, 49(1), 21–32. DOI: https://doi.org/10.1111/radm.12303.

6.   ANDRONICEANU, A., GHERGHINA, R., and CIOBANASU, M. The interdependence between fiscal public policies and tax evasion. *Administratie si Management Public*, 2019, 32, 32–41. DOI: https://doi.org/10.24818/amp/2019.32-03.

7.   APCHERCH, A. *Management Accounting: Principles and Practice.* Ya.V. Sokolova& I.A. Smirnova, Eds., 2002, Moscow: Finansy i statistika.

8.   BEHUN, M., GAVUROVA, B., TKACOVA, A., and KOTASKOVA, A. The impact of the manufacturing industry on the economic cycle of European Union countries. *Journal of Competitiveness*, 2018, 10(1), 23–39. DOI: https://doi.org/10.7441/joc.2018.01.02.

9.   BELÁS, J. and SOPKOVÁ, G. A model of entrepreneurial orientation. *Transformation in Business & Economics*, 2016, 15(2B), 630–645.

10.   BERKOWITZ, P., MONFORT, P., and PIEŃKOWSKI, J. Unpacking the growth impacts of European Union Cohesion Policy: Transmission channels from Cohesion Policy into economic growth. *Regional Studies*, 2020, 54(1), 60–71. DOI: https://doi.org/10.1080/00343404.2019.1570491.

11.   BERNSTEIN, L.A. *Analysis of financial statements: Theory, practice and interpretation*, 1996, Moscow: *Finance and statistics*.

12.   BLACK, J. *Economics: Explanatory Dictionary: English-Russian*, I.M. Osadchaya, Ed., 2000, Moscow: INFRA-M, Ves Mir.

13.   CALIENDO, M. and KRITIKOS, A. S. "I Want to, But I Also Need to": Start-Ups resulting from opportunity and necessity. In E. Lehmann, & M. Keilbach (Eds.) *Industrial organization to entrepreneurship*, 2019, 247–265. Springer, Cham. DOI: https://doi.org/10.1007/978-3-030-25237-3_23.

14.   CERQUA, A., and PELLEGRINI, G. Are we spending too much to grow? The case of Structural Funds. *Journal of Regional Science*, 2018, 58, 535–563. DOI: https://doi.org/10.1111/jors.12365.

15.   CHEN, J. and WATERS, G. Firm efficiency, advertising and profitability: Theory and evidence. *The Quarterly Review of Economics and Finance*, 2017, 63, 240–248. DOI: https://doi.org/10.1016/j.qref.2016.04.004.

16.   CHEN, K., and CHANG, L. Research on the effectiveness of financing constraint measure of investment-cash flow sensitivity. *Friends of Accounting*, 2019, 23, 137–142. DOI: https://doi.org/10.3969/j.issn.1004-5937.2019.23.024.

17.   CIEŚLIK, A. and MICHAŁEK, J.J. Firm-level determinants of direct and indirect exports: Empirical evidence for C.E.E. and M.E.N.A. countries. *Economic*

Research-Ekonomska Istraživanja, 2018, 31(1), 982–996. DOI: https://doi.org/10.1080/1331677X.2018.1436452.

18. DAILEY, D.L. *Effective pricing is the basis of competitive advantage*, 2004, Moscow: Vilyams.
19. DAL, V.I. *Explanatory Dictionary of the Russian Language*, 2016, Moscow: EKSMO.
20. DMITRIYEV, D.V. *Explanatory Dictionary of the Russian Language*, 2003, Moscow: Publishing House Astrel.
21. DOLAN, R.J. and SIMON, G. *Effective pricing*, 2005, Moscow: Ekzamen.
22. DRURY, C. *Management and Cost Accounting*, 2012, 6th ed., Moscow: Yuniti-Dana.
23. DU, K. and O'CONNOR, A. Entrepreneurship and advancing national level economic efficiency. Small *Business Economics*, 2018, 50(1), 91–111. DOI: https://doi.org/10.1007/s11187-017-9904-4.
24. FAIRLIE, R. W. and FOSSEN, F. Opportunity versus necessity entrepreneurship: Two components of business creation. *CESifo Working Paper Series*, 2018, 6854. DOI: https://doi.org/10.2139/ssrn.3132357.
25. FRANKLIN, D. and MARSHALL, R. Adding co-creation as an antecedent condition leading to trust in business-to-business relationships. *Industrial Marketing Management*, 2019, 77, 170–181. DOI: https://doi.org/10.1016/j.indmarman.2018.10.002.
26. GAVUROVA, B., BEHUNOVA, A., TKACOVA, A., and PERZELOVA, I. The mining industry and its position in the economic cycle of the EU countries. *Acta Montanistica Slovaca*, 2017a, 22(3), 278–286.
27. GAVUROVA, B., VIRGLEROVA, Z., and JANKE, F. Trust and a sustainability of the macroeconomic growth insights from dynamic perspective. *Journal of Security and Sustainability Issues*, 2017b, 6(4), 637–648. DOI: https://doi.org/10.9770/jssi.2017.6.4(9).
28. GERASIMENKO, V.V. *Managing company pricing policy*, 2007, Moscow: EKSMO.
29. HORNGREN, C., FOSTER, J., and DATAR, S. *Management Accounting*, 2008, Saint Petersburg: Piter.
30. ILINA, A.V. and ILYSHEVA, N.N. *Management Accounting*, 2016, Yekaterinburg: Izdatelstvo Uralskogo universiteta.
31. KERIMOV, V.E. *Management Accounting*, 2017, 8th ed. Moscow: Dashkov & K.
32. KLJUČNIKOV, A., KOZUBÍKOVÁ, L., and SOPKOVÁ, G. The payment discipline of small and mediumsized enterprises. *Journal of Competitiveness*, 2017, 9(2), 45–61. DOI: https://doi.org/10.7441/joc.2017.02.04.
33. KOZUBIKOVA, L., KOTASKOVA, A., DVORSKY, J., and KLJUCNIKOV, A. The impact of political factors' perception on suitability of international business environment: The case of startups. *Economics and Sociology*, 2019, 12(1), 61–79. DOI: https://doi.org/10.14254/2071-789X.2019/12-1/3.
34. KUSMIATI, E., MASYITA, D., FEBRIAN, E., and CAHYANDITO, M.F. The People Power: Identifying the Key Success Factors of Cooperative in Indonesia. *Review of Integrative Business and Economics Research*, 2019, 8, 157-168. Available from:

http://sibresearch.org/uploads/3/4/0/9/34097180/riber_8-s3_15_t19-108_157-168.pdf.

35. LAWRENZ, J. and OBERNDORFER, J. Firm size effects in trade credit supply and demand. *Journal of Banking & Finance*, 2018, 93, 1–20. DOI: https://doi.org/10.1016/j.jbankfin.2018.05.014.

36. LEBEDEV, K. N. Problems of factor analysis based on the methods of deterministic factor analysis (problems of science "economic analysis"). *Ekonomicheskaya teoriya, analiz, praktika,* 2012, 3, 96-105.

37. LONG, H., JIANG, Y., & ZHU, Y. Idiosyncratic tail risk and expected stock returns: Evidence from the Chinese stock markets. *Finance Research Letters*, 2018, 24(2), 129-136.

38. MALYSHENKO, V.A. and GONCHAROVA, A.N. Proceedings from the conference "Economic Science in the 21st Century: Questions of Theory and Practice." *Methodological aspects of the in-depth factor analysis as part of a comprehensive financial analysis*, 2015, 5-13, Publishing house LLC, Approbation.

39. MOTA, A., BRAGA, V., and RATTEN, V. Entrepreneurship motivation: Opportunity and necessity. In V. Ratten, P. Jones, V. Braga, & C. Marques (Eds.) *Sustainable entrepreneurship. Contributions to management science*, 2019, Springer, Cham. DOI: https://doi.org/10.1007/978-3-030-12342-0_8.

40. NIKOLAYEVA, O.Ye and SHISHKOVA, T.V. *Classical management accounting*, 2017, 3rd ed. Moscow: Lenand.

41. PHELPS, B. *Performance measurement system as an important element of management*, 2004, Dnepropetrovsk: Balance Business Books.

42. RAHMAN, A., TVARONAVICIENE, M., SMRCKA, L., and ANDRONICEANU, A. The effect of Bank Competition on the cost of credit: Empirical evidence from the Visegrad Countries. *Acta Polytechnica Hungarica*, 2019, 16(4), 175–195. DOI: https://doi.org/10.12700/APH.16.4.2019.4.9.

43. SATORI, M., MEGANTARA, E.N., PRIMIANA, I.F., and GUNAWAN, B. Review of the influencing factors of integrated waste management. *International Journal of Geomate*, 2018, 48(15), 34-40. DOI: https://doi.org/10.21660/2018.48.55459.

44. SHEREMET, A. D. *Management Accounting*, 2000, Moscow: ID FBK-PRESS.

45. SHIM, J.K. and SIEGEL, J.G. *Methods of cost management and cost analysis*, 1996, Moscow: Filin.

46. URBANO, D. and APARICIO, S. Entrepreneurship capital types and economic growth: International evidence. *Technological Forecasting and Social Change*, 2016, 102, 34–44. DOI: https://doi.org/10.1016/j.techfore.2015.02.018.

47. URBANO, D., APARICIO, S., and AUDRETSCH, D. B. The effect of entrepreneurial activity on economic growth. In Institutions, entrepreneurship, and economic performance. *International studies in entrepreneurship*, 2019, 41. Springer, Cham. DOI: https://doi.org/10.1007/978-3-030-13373-3_4.

48. USHAKOV, D.N. *Explanatory Dictionary of the Russian Language*, 2000, Moscow: Publishing House Astrel.

49. WALSH, J. and WINSOR, B. Socio-cultural barriers to developing a regional entrepreneurial ecosystem. *Journal of Enterprising Communities: People and Places in the Global Economy*, 2019, 13(3), 263–282. DOI: https://doi.org/10.1108/JEC-11-2018-0088.

50. WANG, J., MAIER, S., HORN, R., HOLLÄNDER, R., and ASCHEMANN, R. Development of an Ex-Ante Sustainability Assessment Methodology for Municipal Solid Waste Management Innovations. *Sustainability*, 2017, 9(10), 3208. DOI: https://doi.org/10.3390/su10093208.

51. WEI, Y.D., and LAN, Y.Z. Financial association and enterprise's financing contract. *Communication of Finance and Accounting*, 2019, 36, 96–102. DOI: https://doi.org/10.16144/j.cnki.issn1002-8072.2019.36.019.

52. WITTMAN, H., DENNIS, J., and PRITCHARD, H. Beyond the market? New agrarianism and cooperative farmland access in North America. *Journal of Rural Studies*, 2017, 53(2), 303-316. DOI: https://doi.org/10.1016/j.jrurstud.2017.03.007.

53. WU, J., ZHU, J., GOLD, J., and FANG, H. Lending facilities versus banking service: unbalanced bank lending to SMEs in China. *International Journal of Business and Globalisation*, 2018, 20(3), 328-353. DOI: https://doi.org/10.1504/IJBG.2018.091509.

54. YAMORI, N., HARIMAYA, K., and TOMIMURA, K. Corporate governance structure and efficiencies of cooperative banks. *International Journal of Finance & Economics*, 2017, 22(4), 368-378. DOI: https://doi.org/10.1002/ijfe.1593.

55. YUAN, L. and XU, T. Does the financing mode affect the technological innovation of enterprisesempirical evidence from the world bank's survey of Chinese enterprises. *Journal of Macro-Quality Research*, 2019, 7(3), 111–128. DOI: https://doi.org/10.13948/j.cnki.hgzlyj.2019.03.008.

56. ZAYKINA, K. A. and NASRETDINOVA, E.S. Pricing strategy as a tool for competition. *Molodoy uchenyy,* 2016, 11(115), 742-744.

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