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INDUSTRIAL AND MANUFACTURING ENGINEERING IN DIGITAL LEGAL PROCEEDINGS IN THE ASIA-PACIFIC REGION: A NEW LEVEL OF QUALITY BASED ON DATA, BLOCKCHAIN AND AI

Abstract: *The purpose of this paper is to determine the influence of the factors of industrial and manufacturing engineering on quality of services that are provided in digital legal proceedings of the Asia-Pacific region, based on Big Data, blockchain, and AI. The authors model the influence of the factors of industrial and manufacturing engineering on quality of legal proceedings in countries of the Asia-Pacific region with the help of correlation analysis. Simplex method is used for determining the optimal influence of the factors of industrial and manufacturing engineering on quality of legal proceedings in countries of the Asia-Pacific region. It is determined that the potential of increase of quality of services of digital legal proceedings based on managing the factors of industrial and manufacturing engineering is more vivid in developing countries (33.55%) than in developed countries (9.36%). The authors reflect a new view on the prospects of development of legal proceedings – from the position of consumers' interests' protection, emphasizing on quality of the provided public services. Due to this, a new, alternative approach to state management of development of the legal proceedings system is developed; instead of increase of regulation, it envisages de-regulation and marketization of legal proceedings. An original approach to managing the quality of services of digital legal proceedings is offered, which is based on managing the factors of industrial and manufacturing engineering.*

Keywords: *Industrial and Manufacturing Engineering; Digital legal proceedings; Asia-Pacific region; Big Data; Blockchain; AI; Quality; Quality management.*

1. Introduction

In the modern market economy, legal proceedings are a public service, the most important criterion of which is quality. In the aspect of the internal environment of an economic system, quality of legal

proceedings determines the level of the business environment's favorability for development of entrepreneurship and acceleration of economic growth. In the aspect of protection of rights for intellectual property objects, quality of legal proceedings influences the innovative activities'

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attractiveness for business. In the aspect of globalization, quality of legal proceedings influences the economy's investment attractiveness. However, the scientific notion of quality of legal proceedings – as an economic category – has not yet been formed, which hinders its research, measuring, and management.

In the conditions of intensive digital transformations of modern economic systems in the process of the Fourth industrial revolution, a perspective direction of improving the practice of legal proceedings is its digitalization. The concept of digital legal proceedings is in the process of formation. Main attention is paid to effectiveness of legal proceedings in government's interests. The most important advantage of digital legal proceedings from the government's positions is reduction of state budget's expenditures for financing of the judicial system. Uncertainty as to the consequence of transition of legal proceedings in the digital form for consumers is preserved.

The existing approach to studying digital legal proceedings from government is not only “narrow” (unilateral) – it does not conform to the modern realities of the market economy, in which the primary interests are consumers' interests in the context of wide marketization. A striving for reduction of the financial provision of legal proceedings creates high risks for their quality. In case of insufficient financing, public services, which are provided in the process of legal proceedings, could become less accessible due to reduction of the number of the judicial system workers, and thoroughness and level of justice of court decisions could decrease.

Thus, competitiveness of legal proceedings – as a manifestation of the systemic and integrated normative & legal provision of its mandatory character – should be evaluated by government by the criterion of effectiveness (reduction of financing) and by consumers by the criterion of quality.

Increase of quality of legal proceedings' services requires a new scientific & methodological approach to studying digital legal proceedings, which allows determining causal connections between digitalization of production and its results (consequences) for quality.

This approach is developed, and the gaps of the concept of quality of services, which are provided in the process of legal proceedings, are filled in this paper. The working hypothesis is as follows: during increase of quality of services, which are provided in the process of legal proceedings, an important role belongs to the factors of industrial and manufacturing engineering, which determine technological provision of the process of provision of services and the use of breakthrough digital technologies: Big Data, blockchain, and AI.

The purpose of this research is to determine the influence of the factors of industrial and manufacturing engineering on quality of services, which are provided in digital legal proceedings in the Asia-Pacific region, based on Big Data, blockchain, and AI. For achieving the set goal, a range of the following tasks are solved:

- determining the characteristics of quality of services, which are provided in legal proceedings, and selecting the indicators of official statistics, which allows measuring (evaluating) the quality of the studied services;
- determining the factors of industrial and manufacturing engineering in legal proceedings and finding their influence on the characteristics of quality of their services;
- evaluating the potential of the factors of industrial and manufacturing engineering in stimulating the improvement of characteristics of quality of legal proceedings' services;
- developing scientific and practical recommendations for state

management of digitalization of legal proceedings for increasing the quality of provided services.

After Introduction, a literature overview on the studied topic is performed. Part one is devoted to modeling of influence of the factors of industrial and manufacturing engineering on quality of legal proceedings in countries of the Asia-Pacific region. Part two is devoted to determining the optimal influence of the factors of industrial and manufacturing engineering on quality of legal proceedings in countries of the Asia-Pacific region. Part three contains policy implications for managing the factors of industrial and manufacturing engineering for increasing the quality of legal proceedings in countries of the Asia-Pacific region. Then, conclusions of the research are given.

2. Literature review

General issues of industrial and manufacturing engineering are studied in the work Sachdeva et al. (2019) – the authors show the recent achievements in the sphere of industrial machine-building. Nguyen and Nguyen (2018) study benchmarking of industrial engineering programs. Saukko et al. (2020) reflect the problems of inter-organizational cooperation and preconditions in industrial engineering projects. Muir and Haddud (2018) consider additive production in machine-building and pharmaceutical industry by the example of spare parts supply.

The theory and practice of legal proceedings as an economic category and services of legal proceedings as economic benefits are considered in the work Hughes et al. (2018), where the author show insider deals and fraud, as well as judicial solutions for economic disputes. Tang et al. (2018) analyze the issues of cooperation in interdisciplinary, civil, and court proceedings. Allen (2017) studies the problem of money laundering and decision of court of appeal. Roth et al. (2019) study

the rules of the US Supreme court on administrative law.

Hurd et al. (2019) consider the Supreme Court's decisions on the scheme of responsibility according to the federal laws on securities. Neto (2020) reconsiders the UN Convention on the Rights of Persons with Disabilities in practice and perform a comparative analysis of the role of courts. Pattnaik et al. (2018) perform a mapping of critical factors of success in effective judicial management by the example of the thematic studied on India. Mustapha et al. (2019) present a practice of applying to court and the Consultative council of experts on financial regulation in Nigeria.

Inshakova et al. (2018) study the dynamics of legislative development of public-private partnership in the sphere of agricultural insurance in Russia and the USA. Inshakova et al. (2019a) consider transnational corporations as the subjects of economic activities and lawmaking in the sphere of foreign trade of energy sources. Inshakova et al. (2019b), Frolova et al. (2020), Inshakova et al. (2020), Rusakova et al. (2020), Zankovsky et al. (2020) analyze the participation of international organizations and integration unions in development of the legal regulation of external trade of energy sources.

Various aspects of applying the leading technologies - Big Data, blockchain, and AI – in the process of the Fourth industrial revolution and transition to Industry 4.0 are studied in multiple works of the modern authors. Dagilienė and Klovienė (2019) study the motivation for using Big Data and Big Data analytics in external audit. Aibinu et al. (2019) consider data analytics and Big Data in a construction project and assets management.

Pan et al. (2018) study the management of anomalous data and Big Data analysis by the example of an application for data on disabilities. Fernando et al. (2018) analyze the influence of Big Data analytics and methods of data protection on efficiency of

the services supply chains. Ragulina (2019) outlines the priorities of development of Industry 4.0 in the modern economic systems with different progress in formation of the knowledge economy.

Ragulina et al. (2019) develop a methodology of criterial evaluation of the consequences of the 21st century industrial revolution. Popkova (2019) outlines the preconditions for formation and development of Industry 4.0 in the conditions of the knowledge economy. Popkova et al. (2019) form a model of state management of economy based on the Internet of Things. Popkova and Parakhina (2019) offer recommendations for managing the global financial system based on AI and describe its opportunities and limitations. Popkova and Gulzat (2020a) study the opposition of the digital society and AI in the technological revolution of the 21st century.

Popkova and Gulzat (2020b) consider the contradiction of the digital economy from the positions of public well-being and cyber threats. Popkova and Zmiyak (2019) substantiate the priorities of digital personnel training for Industry 4.0 in view of social and technical competencies. Popkova and Sergi (2019) specify the essence of the digital economy, opposing complexity and diversity to rationality. Popkova and Sergi (2018) determine the influence of Industry 4.0 and other innovations on development of the Russian economy. Sergi (2019) studies digital technologies, smart cities, and regional development in modern Russia.

The issues of determining and managing the quality of digital services are also studied in the existing publications. Khan et al. (2019) determine the interconnection between personal innovativeness, quality of digital resources and general convenience of use with satisfaction of users by the example of Pakistan. Behmer and Jochem (2019) suggest conducting organizational planning for managing quality in the age of digital

technologies. Devetyarova et al. (2020) study the institutionalization of successful marketing practices of digital universities based on quality management in modern Russia. Gritsuk et al. (2020) offer an innovative approach to managing the products' quality in the digital economy based on intellectual accounting and audit.

The performed literature overview allows stating that the level of scientific elaboration of the set problem's components is high. At the same time, gap analysis shows three fundamental gaps in the system of accumulated scientific knowledge. The first gap is that the concept of digital legal proceedings does not envisage a clear definition of its essential characteristics, which allow measuring the quality of provided services.

The second gap consists in uncertainty of the influence of the factors of industrial and manufacturing engineering, which determine the use of Big Data, blockchain, and AI, on quality of services in digital legal proceedings. The third gap is poor elaboration of the experience of digital legal proceedings in the Asia-Pacific region, though countries of this region – developed and developing ones – are peculiar for prominent achievements in the sphere of digitalization of economy in the aspect of industrial and manufacturing engineering – which opens large opportunities for quality management in digital legal proceedings based on leading technologies: Big Data, blockchain, and AI.

Thus, the problem of industrial and manufacturing engineering in digital legal proceedings of the Asia-Pacific region, as a factor of quality based on Big Data, blockchain, and AI, is not sufficiently studied in the existing literature and requires further elaboration.

3. Materials and methodology

As a result of analysis of the contents of research literature and the existing statistics on the topic of legal proceedings, three basic

characteristics of the provided services' quality are distinguished:

- Independence of legal proceedings as the indicator of objectivity and making of court decisions during resolution of economic disputes;
- Effectiveness of the legal framework in the complex regulatory acts as the indicator of justice of court decisions during resolution of economic disputes;
- Effectiveness of resolution of disputes as the indicator of legality

of court decisions during resolution of economic disputes.

The statistical data on all three indicators could be found in Global Competitiveness Report 2019, which was compiled by the World Economic Forum (2020). The offered characteristics specify the concept of digital legal proceedings, supplementing it with the scientific treatment of quality of provided services. For better representation, the offered treatment is shown in Figure 1.



Figure 1. The treatment of quality of digital legal proceedings' services.
Source: developed and compiled by the authors

The factors of quality of legal proceedings that determine the capabilities and the level of their digitalization from the positions of industrial and manufacturing engineering are as follows:

- Use of Big Data, blockchain and, AI – as the indicator of using the leading technologies of Industry 4.0 in economy;
- Digitalization of public services (including legal proceedings) as the indicator of technologocial mode within which public services are provided;
- Level of cyber security as the indicator of security of digital legal proceedings' services.

The above indicators are calculated within World Digital Competitiveness Ranking – 2019, prepared by IMD (2020). For the empirical purposes of the research, it is performed by the example of the Asia-Pacific region. Its uniqueness consists in the large number of progressive developed and developing countries. This allows conducting the research in view of these categories of countries and determining the differences between them. Countries of the Asia-Pacific region are studied according to the list by ThoughtCo (2020) and Wikipedia (2020).

The research objects include 7 developing countries and 7 developed countries of the Asia-Pacific region from World Digital Competitiveness Ranking – 2019.

The values of Digital Competitiveness Ranking of these countries are shown in Figure 2.

As shown in Figure 2, though the Asia – Pacific region – similarly to the global economy – is peculiar for high values (from

New Zealand to the USA), the specifics of the studied region consist in the fact that developing countries also show a very high level of digital competitiveness. As is seen, China exceeds Japan by digital competitiveness.

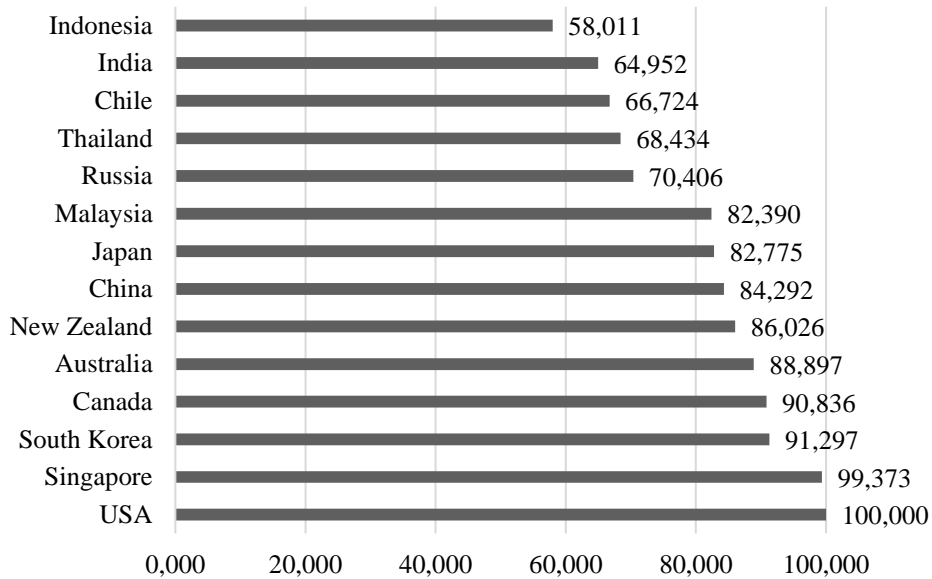


Figure 2. Digital competitiveness of developed and developing countries of the Asia-Pacific region in 2020.

Source: compiled by the authors based on IMD (2020)

The statistics of results and factors of industrial and manufacturing, which influence the quality of digital legal proceedings’ services, in 2020 in developed countries are shown in Table 1, and in developing countries in Table 2.

The research is performed in three stages, with the help of a complex of methods. Stage one envisages modeling of the influence of the factors of industrial and manufacturing engineering on quality of legal proceedings in countries of the Asia-Pacific region with the help of correlation analysis. For developed and developing countries (separately), the models of multiple linear regression of the form

$$y = a_1 + b_1 * x_1 + b_2 * x_2 + b_3 * x_3 \text{ and}$$

$y = a_2 + b_4 * x_4 + b_5 * x_5 + b_6 * x_6$ are built, where a – constant, and b – coefficients with variables x, which reflect the level of change of y in case of increase of x by 1.

As a results that characterize the quality of legal proceedings are measured in points (the more the better), and industrial and manufacturing engineering, as the factors of quality of legal proceedings, are measured in positions (the higher the better), the positive influence of the factors on results is achieved with negative values of coefficients b with variables x. Also, for each regression model a correlation coefficient is calculated – multiple R, which shows the measure of change of y that is explained by the change by all x in the model.

Table 1. Results and factors of industrial and manufacturing engineering, which influence the quality of digital legal proceedings' services in developed countries in 2020.

Country	Results that characterize quality of legal proceedings, points 1-100			Industrial and manufacturing engineering as the factors of quality of legal proceedings, positions 1-63		
	Judicial independence	Efficiency of legal framework in challenging regulations	Efficiency of legal framework in settling disputes	Use of big data and analytics	E-Government	Cyber security
-	y ₁	y ₂	y ₃	x ₁	x ₂	x ₃
USA	70.4	66,2	71.2	6	11	34
Singapore	77.4	59.4	86.6	15	7	6
South Korea	48.8	40.7	53.2	40	3	23
Canada	77.4	56.0	61.7	13	23	18
Australia	82.9	50.4	59.8	28	2	39
New Zealand	89.2	66.2	71.2	21	8	25
Japan	86.5	57.6	69.0	63	10	41

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

Table 2. Results and factors of industrial and manufacturing engineering, which influence the quality of digital legal proceedings' services in developing countries in 2020.

Country	Results that characterize quality of legal proceedings, points 1-100			Industrial and manufacturing engineering as the factors of quality of legal proceedings, positions 1-63		
	Judicial independence	Efficiency of legal framework in challenging regulations	Efficiency of legal framework in settling disputes	Use of big data and analytics	E-Government	Cyber security
-	y ₄	y ₅	y ₆	x ₄	x ₅	x ₆
China	58.2	51.5	51.9	12	50	16
Malaysia	68.7	63.0	69.0	9	40	20
Russia	37.2	34.6	41.4	31	28	44
Thailand	49.7	38.6	53.5	37	53	30
Chile	66.7	45.8	52.3	52	35	52
India	54.8	50.3	51.8	30	58	37
Indonesia	52.2	49.3	51.1	8	61	27

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

At stage two, the optimal influence of the factors of industrial and manufacturing engineering on quality of legal proceedings in countries of the Asia-Pacific region is determined. Based on the obtained

regression models, simplex method is used for determining the target values of variables x for achieving the maximum possible values of variables y₁ and y₂.

This allows, firstly, determining the target

growth of the factors of industrial and manufacturing engineering for maximizing the qualities of digital legal proceedings' services. Secondly, determining the potential of increase of quality of digital legal proceedings' services based on managing the factors of industrial and manufacturing engineering.

At the third stage, scientific and practical recommendations for managing the factors of industrial and manufacturing engineering are developed for increasing the quality of legal proceedings in countries of the Asia-Pacific region, with the help of analysis, synthesis, induction, and deduction.

4. Results

4.1. Modeling of influence of the factors of industrial and manufacturing engineering on quality of legal proceedings in countries of the Asia-Pacific region

For modeling the influence of the factors of industrial and manufacturing engineering on quality of legal proceedings in countries of the Asia-Pacific region, let us use the results of regression analysis (Table 3).

Table 3. Regression dependence of the results on the factors of industrial and manufacturing engineering on quality of legal proceedings in countries of the Asia-Pacific region in 2020.

Regression statistics		Developed countries			Developing countries		
		y ₁	y ₂	y ₃	y ₄	y ₅	y ₆
Multiple correlation (R)		0.3506	0.5605	0.4498	0.3086	0.6102	0.5549
Constant (a)		63.39	53.88	79.28	67.82	60.19	71.63
Coefficient with	x ₁ /x ₄	-0.03	-0.23	-0.08	0.28	-0.20	0.14
	x ₂ /x ₅	0.51	0.35	-0.11	-0.07	-0.02	-0.11
	x ₃ /x ₆	0.33	0.21	-0.32	-0.51	-0.20	-0.53

Source: calculated and compiled by the authors

According to the calculations (Table 3), independence of legal proceedings in developed countries of the Asia-Pacific region is by 35.06% (moderate correlation dependence) is explained by the influence of the factors of industrial and manufacturing engineering. The onle factor of industrial and manufacturing engineering that positively influences this characteristic of quality is activity of use of Big Data, blockchain, and AI; improvement of its position in the global ranking by 1 position leads to increase of independence of legal proceedings by 0.03 points.

Effectiveness of the legal framework of in complex regulatory acts is by 53.88% (high correlation dependence) explained by the

influence of the factors of industrial and manufacturing engineering. The only factor of industrial and manufacturing engineering that positively influences this characteristic of quality is activity of use of Big Data, blockchain, and AI; improvement of its position in the global ranking by 1 position leads to increase of effectiveness of the legal frameworks in complex regulatory acts by 0.23 points (more vivid influence than in the previous case).

Effectiveness of solving disputes is by 44.98% (moderate correlation dependence) explained by the inflicene of the factors of industrial and manufacturing engineering. All three factors of industrial and

manufacturing engineering influence it in a positive way. Improvement of the position in the ranking of use of Big Data, blockchain, and AI by 1, effectiveness of dispute resolution grows by 0.08 points.

Improvement of the position in the ranking of digitalization of public services (including legal proceedings) by 1 leads to increase of effectiveness of dispute resolution by 0.11 points. Improvement of the position in the ranking of cyber security by 1 leads to increase of effectiveness of dispute resolution by 0.32 points.

In developing countries of the Asia-Pacific region, independence of legal proceedings is by 44.98% (moderate correlation dependence) explained by the influence of the factors of industrial and manufacturing engineering. This characteristic of quality is influenced positively by such factors of industrial and manufacturing engineering, as digitalization of public services (including legal proceedings) and the cyber security level.

Improvement of the position in the ranking of digitalization of public services (including legal proceedings) by 1 position leads to increase of independence of legal proceedings by 0.07 points. Improvement of the position in the ranking of the level of cyber security by 1 position leads to increase of independence of legal proceedings by 0.51 points.

Effectiveness of the legal framework in complex regulatory acts is by 61.02% (high correlation dependence) explained by the influence of the factors of industrial and manufacturing engineering. All three factors of industrial and manufacturing engineering influence it in a positive way. Improvement of the position in the ranking of activity of use of Big Data, blockchain, and AI by 1 leads to increase of effectiveness of legal framework in complex regulatory acts by 0.20 points.

Improvement of the position in the ranking of digitalization of public services (including legal proceedings) by 1 leads to increase of

effectiveness of legal framework in complex regulatory acts by 0.02 points. Improvement of the position in the ranking of the cyber security level by 1 leads to increase of effectiveness of legal framework in complex regulatory acts by 0.20 points.

Effectiveness of dispute resolution is by 55.49% (high correlation dependence) explained by influence of the factors of industrial and manufacturing engineering. This characteristic of quality is influenced positively by such factors of industrial and manufacturing engineering as digitalization of public services (including legal proceedings) and the cyber security level.

Improvement of the position in the ranking of digitalization of public services (including legal proceedings) by 1 leads to increase of effectiveness of dispute resolution by 0.11 points. Improvement of the position in the ranking of the cyber security level by 1 leads to increase of effectiveness of dispute resolution by 0.53 points.

Thus, influence of the factors of industrial and manufacturing engineering on quality of services of digital legal proceedings in developing countries is by 8.29% higher in the relative expression. Average correlation in developing countries equals 49.12%, and in developed countries – 45.36%. In developed countries, the universal (influencing all characteristics of quality) factor of industrial and manufacturing engineering is activity of use of Big Data, blockchain, and AI – but its average influence (coefficient) is small, constituting 0.11 points. The most vivid influence (0.32 points) – though only on one characteristic of quality (effectiveness of dispute resolution) – is performed by the cyber security level.

In developing countries, independence of legal proceedings under the influence of the factors of industrial and manufacturing engineering grows by 0.29 points on average; effectiveness of legal framework in complex regulatory acts - by 0.14 points; effectiveness of dispute resolution – by 0.32

points. Such factors as digitalization of public services (including legal proceedings) and the cyber security level, which has the highest average influence (0.41 points) on quality of services digital legal proceedings, are universal.

4.2. Determining the optimal influence of the factors of industrial and manufacturing engineering on quality of legal proceedings in countries of the Asia-Pacific region

For determining the perspectives of quality management of legal proceedings in countries of the Asia-Pacific region based on the factors of industrial and manufacturing

engineering, we shall use the results of optimization with the help of simplex method (Table 4).

As shown in Table 4, management of the factors of industrial and manufacturing engineering allows increasing the average quality of digital legal proceedings from the positions of independence by 1.07% (up to 76.90 points) in developed countries of the Asia-Pacific region. This requires increase (improvement of the position in the ranking) of activity of use of Big Data, blockchain, and AI by 96.24%. In this case, effectiveness of legal framework in complex regulatory acts will grow by 10.36%, up to 62.51 points.

Table 4. Optimization of influence of the factors of industrial and manufacturing engineering on quality of legal proceedings in countries of the Asia-Pacific region in 2020.

Developed countries				Developing countries			
Variable	Average value in 2020	Target value within optimization	Growth of target value as compared to 2020, %	Variable	Average value in 2020	Target value within optimization	Growth of target value as compared to 2020, %
x ₁	26.57	1.00	-96.24	x ₄	25.57	25.57	0.00
x ₂	9.14	9.14	0.00	x ₅	46.43	1.00	-97.85
x ₃	26.57	26.57	0.00	x ₆	32.29	1.00	-96.90
y ₁	76.09	76.90	1.07	y ₄	55.36	74.31	34.23
x ₁	26.57	1.00	-96.24	x ₄	25.57	1.00	-96.09
x ₂	9.14	9.14	0.00	x ₅	46.43	1.00	-97.85
x ₃	26.57	26.57	0.00	x ₆	32.29	1.00	-96.90
y ₂	56.64	62.51	10.36	y ₅	47.59	59.76	25.59
x ₁	26.57	1.00	-96.24	x ₄	25.57	25.57	0.00
x ₂	9.14	1.00	-89.06	x ₅	46.43	1.00	-97.85
x ₃	26.57	1.00	-96.24	x ₆	32.29	1.00	-96.90
y ₃	67.53	78.77	16.64	y ₆	53.00	74.64	40.84

Source: calculated and compiled by the authors

Effectiveness of dispute resolution could be increased by 16.64% (up to 78.77 points) due to management of the factors of industrial and manufacturing engineering. For this, activity of use of Big Data, blockchain, and AI should be increased by 96.24%, digitalization of public services (including legal proceedings) - by 89.06%, and the cyber security level – by 96.24%.

Management of the factors of industrial and manufacturing engineering could allow increasing the quality of digital legal proceedings from the positions of independence by 34.23% (up to 74.31 points) in developing countries of the Asia-Pacific region. This requires increase (improvement of the position in the ranking) of digitalization of public services (including

legal proceedings) by 97.85% and the cyber security level – by 96.90%. In this case, effectiveness of dispute resolution will grow by 40.84%, up to 74.64 points.

Effectiveness of legal framework in complex regulatory acts could be increased by 25.59% (up to 9.76 points) due to managing the factors of industrial and manufacturing engineering. For this, activity of using Big Data, blockchain, and AI should be increased by 96.09%, digitalization of public services (including legal proceedings) - by 97.85%, and the cyber security level - by 96.90%.

Thus, the potential of increasing the quality of services of digital legal proceedings based on managing the factors of industrial and manufacturing engineering is more vivid in developing countries (33.55% on average) than in developed countries (9.36% on average). Target growth of the factors of industrial and manufacturing engineering for maximizing the quality of digital legal proceedings' services in countries of both categories is close to 100% - that is, double increase of all factors is needed.

4.3. Policy implications for managing the factors of industrial and manufacturing engineering for increasing the quality of legal proceedings in countries of the Asia-Pacific region

The perspectives of increasing the quality of legal proceedings in countries of the Asia-Pacific region based on managing the factors of industrial and manufacturing engineering, which have been determined with the help of optimization, allow determining the target landmarks of the state policy in this direction and determining their significance and ranking them by the level of priority, in view of the specifics of the distinguished categories of countries.

In developed countries, significance of managing the factors of industrial and manufacturing engineering for increase of the quality of digital legal proceedings'

services is moderate (the potential is moderate as well). Therefore, managing the factors of industrial and manufacturing engineering should be considered as an additional measure of increase of quality of digital legal proceedings' services.

The main measure could be development of digital skills with the participants of the process of digital legal proceedings or expansion of financing of digital legal proceedings. Specifying the main measure requires further studies which go beyond the topic of this paper.

In developing countries, significance of managing the factors of industrial and manufacturing engineering for increasing the quality of digital legal proceedings' services is high (the potential is also high). Therefore, managing the factors of industrial and manufacturing engineering should be considered as the main measure of increasing the quality of digital legal proceedings' services.

It should be noted that priority of managing the factors is equal in developed and developing countries. The top-priority factor industrial and manufacturing engineering for the management purposes is the cyber security level. As economies of developed countries, including countries of the Asia-Pacific region, have high investment attractiveness, financing of the projects of increase of cyber security should be performed with the foundation on venture (private) investments.

In developing countries, a more flexible approach to financing of increase of cyber security is required. As developing countries have a deficit of state budget and their investments attractiveness is low, it is recommended to use the mechanism of public-private partnership. This will allow reducing the risks and expenditures for the government and private investors in case of achievement of the results that are similar to the developed countries' results. Cyber security is a component of the digital economy's basic infrastructure. That's why

it is necessary to raise the general level of cyber security in the economic system. Also, it is necessary to develop special technologies of cyber security for digital legal proceedings.

The second top-priority factor for the management purposes is such factor of industrial and manufacturing engineering as activity of use of Big Data, blockchain, and AI. This requires measures in three spheres. 1st sphere: increase of the level of digital competency of personnel which are involved in legal proceedings based on the requirements to self-education and based on corporate (organization and financed by the government) advanced training.

2nd sphere: increase of the level of digital literacy of population, so it could freely use the services of digital reproduction and obtaining advantages from them. For this, mastering the skills of obtaining digital legal proceedings' services should be included in the national courses of advanced digital training for population. 3rd sphere: development and implementation of specialized apps for using Big Data, blockchain, and AI in digital legal proceedings.

Also it is necessary to select a variant of financing of legal proceedings' digital modernization. One of the variants of preservation of legal proceedings' services as non-profit benefits, provided by the government on the terms of a monopoly. In this case, the main burden is put on the state (federal or regional) budget. The second variant envisages the transfer of financial burden on consumers of digital legal proceedings' services; it will be higher than standard state duties on legal proceedings' services. A drawback of this variant is that digital legal proceedings' services will not be accessible for mass consumers.

Another variant envisages state de-monopolization of legal proceedings and formation and development of the system (regional network) of private digital legal proceedings. This will allow distributing the

burden on financing of digital modernization of legal proceedings between private investors and consumers. A drawback of such variant is high risks for quality of services. That's why strong state monitoring and control over private digital legal proceedings within licensing of their activities will be needed.

The third top-priority factor is digitalization of public services (including legal proceedings). Development of e-government systems is one of the most actively promoted directions of stimulating the progress of the digital economy. However, the main attention during realization of this direction is paid to increase of accessibility of other public services – e.g., healthcare, education, tax administration, registration of property rights, and social and retirement insurance. They should also include digital legal proceedings.

5. Discussion

Thus, unlike the most of the existing publications on the topic of improving the practice of legal proceedings, which focus on the issue of increasing the effectiveness of legal proceedings by reduction of its financing, this paper reflects a new view of the prospects of development of legal proceedings – from the position of protecting the interests of consumers, focusing on quality of provided public services. This allowed developing a completely new and alternative approach to state management of development of the system of legal proceedings, which, instead of increase of regulation, envisages de-regulation and marketization of legal proceedings.

As a result of ensuring the customer-oriented character of legal proceedings, they will become more adapted to the digital economy and consumer society which sets high requirements to legal proceedings. These requirements grow under the influence of globalization (exchange of successful international experience). The significance

of the performed research and its contribution to science consist in development of the scientific methodology of managing the process of digital modernization of the practice of legal proceedings for increasing the quality of provided services based on managing the factors of industrial and manufacturing engineering.

The specified essence and characteristics of quality of legal proceedings' services allow for government and public monitoring and control of its customer-oriented approach. The practical value of the performed research consists in the fact that the shown prospects and developed applied recommendations for managing the factors of industrial and manufacturing engineering could be used in the practice of state management of increase of quality of legal proceedings' services in countries of the Asia-Pacific region.

The additional scientific and theoretical significance of the research consists in substantiating the differences in the potential of increase of quality of digital legal proceedings' services based on managing the factors of industrial and manufacturing engineering in developed and developing countries. This allows developing and implementing different strategies of managing these factors in view of the specifics of developed and developing countries for maximizing the effectiveness of state regulation of these factors.

6. Conclusion

The results of the performed research allow for the following conclusions. Firstly, the concept of managing the quality of services in legal proceedings has been specified by determining its essential characteristics, measured with the help of the official statistics: independence of legal proceedings, effectiveness of legal framework in complex regulatory acts, and effectiveness dispute resolution. Based on the determined

characteristics, a treatment of quality of digital legal proceedings' has been offered.

Secondly, the factors of industrial and manufacturing engineering in legal proceedings and their influence on the characteristics of their services' quality in countries of the Asia-Pacific region have been determined. It has been proved that quality of digital legal proceedings' services in developed countries is explained (49.12%) by the factors of industrial and manufacturing engineering to the largest extent than in developing countries (45.36%) – though these factors are important in countries of the both categories.

Thirdly, evaluation of the potential of the factors of industrial and manufacturing engineering in stimulating the improvement of the characteristics of quality of legal proceedings' services has been performed. The evaluation has shown that potential of increase of quality of digital legal proceedings' services based on managing the factors of industrial and manufacturing engineering is more vivid (more than three times) in developing countries (33.55%) than in developed countries (9.36%).

Fourthly, it has been proved that managing the factors of industrial and manufacturing engineering for increasing the quality of digital legal proceedings' services developed, and in developing countries should have equal priority. The top-priority factor is the level of cyber security. Then come activity of use of Big Data, blockchain, and AI and the digitalization of public services (including legal proceedings). The scientific and practical recommendations are offered for state management of all the above factors.

As a result of the performed research it is possible to conclude that the factors of industrial and manufacturing engineering have an important role in increase of quality of digital legal proceedings' services, ensuring a new level of quality of these services based on Big Data, blockchain, and AI. In developing countries, management of

these factors should be the main measure of increasing the quality of digital legal proceedings' services, and in developed countries – an additional measure. In countries of the both categories, management of other significant factors of quality of digital legal proceedings' services is required.

Focus on the factors of industrial and manufacturing engineering is a limitation of the performed research, as it ignores other

factors, of which many could be rather significant, especially in developed countries of the Asia-Pacific region. That's why the perspectives of future studies are connected to studying other factors of quality of digital legal proceedings' services – in particular, the factor of digital society's development.

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