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State policy of the investment processes development on the market of IT services: analytical and strategic aspects of implementation in Ukraine

Abstract

Introduction. The globalization of the world economy, the rapid development of information and digitization objectively determine the dynamism of the priority areas for the investment projects implementation in the field of IT. Therefore, the governmental structures should regularly update the list of priority projects for state support, particularly in Ukraine, which is in crisis economic situation increasing its own dependence on external capital, technologies, products (services).

The purpose of the study is to substantiate the analytical and strategic aspects of implementation of the state policy of investment processes development in the Ukrainian market of IT services.

Methods. As the methodological basis of the study the expert and statistical methods (for instance, Delphi, M. Kendall and B. Smith methods; Gallup Institute methodology; Pearson's rule; Harrington's scale etc.), systematic and structural analysis, the theories of economic growth, the modern concepts of transitional economic systems are used.

Results. The theoretical and methodological fundamentals and features of state regulation of the investment processes in the market of IT services are generalized. Using the Delphi method, an analytical study of the investment security of the IT services market subjects and the effectiveness of the state policy in this field are conducted. Accordingly, a number of IT companies which are the leaders of the Ukrainian market in the development, implementation and sales of information and communication products have been selected for our research in 2018-2020 (Ciklum, DataArt, Sigma Software, GlobalLogic, EPAM, N-iX, 2Event.com, Skelia, Intellias, Lohika). The M. Kendall and B. Smith method is used to determine the validity and objectivity of evaluation according to Pearson's rules. The Gallup Institute methodology is used to justify the sampling size of IT enterprises.

With reference to the investment development of the Ukrainian market of IT services, the impact of macroeconomic factors, the needs, the accessibility and the impediments of attracting investments, the

development of investment infrastructure, the level of financial security and investment management, the prospects for state policy implementation are characterized. Quality and capability of business infrastructure elements in IT services market and high level of tax burden have been named by the experts as the factors of the macroeconomic environment with the very high level of influence on the security of investment.

The scheme of strategic approaches and the consistent implementation of state policy of the investment processes development in the market of IT services are developed. The levels of implementation of the state policy of investment processes development in the IT services market are interpreted by using the Harrington's scale. The main tasks, tools, means and priorities of the state policy of investment processes development in the IT services market are determined.

Conclusion. It is proved that one of the most influential directions of state regulation of the IT services market development is the sphere of investment processes. The peculiarities of the investment process and the functioning of the IT services market affect the specifics of their state regulation updating the task of economic, financial and resource investments support. The effective state regulation of the investment process in the market of IT services should be economic in nature and directed primarily at achieving the strategic goal of creating a quality investment environment in the information technology sector.

Keywords: IT Services Market; Investment Process; State Policy; IT Sector; Digitalization; IT Company

JEL Classification: F17; F42; H11; O20

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Державна політика розвитку інвестиційних процесів на ринку ІТ-послуг: аналітичні та стратегічні аспекти реалізації в Україні

Анотація. Авторами узагальнено теоретико-методологічні основи й особливості державного регулювання інвестиційних процесів на ринку ІТ-послуг. Із застосуванням методу Дельфі проведено аналітичне дослідження інвестиційної забезпеченості суб'єктів ринку ІТ-послуг, а також ефективності державної політики в цій сфері. Для визначення достовірності й об'єктивності оцінювання використано метод М. Кендела і Б. Сміта відповідно до правил Пірсона. Для обґрунтування обсягу вибірки ІТ-підприємств застосовано методуку Інституту Геллапа.

З огляду на інвестиційний розвиток ринку ІТ-послуг України охарактеризовано вплив макроекономічних чинників, потребу, доступність і перешкоди залучення інвестицій, розвиненість інвестиційної інфраструктури, рівень фінансово-інвестиційної забезпеченості господарювання, перспективність напрямів реалізації державної політики.

Інтерпретовано рівні реалізації державної політики розвитку інвестиційних процесів на ринку ІТ-послуг за допомогою інтервальної шкали Харрінгтона. Розроблено схему стратегічних підходів і послідовної реалізації державної політики розвитку інвестиційних процесів на ринку ІТ-послуг. Визначено завдання, інструменти, засоби та пріоритетні напрями державної політики розвитку інвестиційного процесу на ринку ІТ-послуг України.

Ключові слова: ринок ІТ-послуг; інвестиційний процес; державна політика; ІТ-сектор; цифровізація економіки; ІТ-компанія.

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Государственная политика развития инвестиционных процессов на рынке ИТ-услуг: аналитические и стратегические аспекты реализации в Украине

Аннотация. Авторами осуществлен обзор теоретико-методологической основы и особенностей государственного регулирования инвестиционных процессов на рынке ИТ-услуг. С применением метода Дельфи проведено аналитическое исследование инвестиционной обеспеченности субъектов рынка ИТ-услуг, эффективности государственной политики в этой сфере. Для определения достоверности и объективности оценивания использован метод М. Кендела и Б. Смита в соответствии с правилами Пирсона. Для обоснования объема выборки ИТ-компаний применена методика Института Гэллага.

Учитывая инвестиционное развитие рынка ИТ-услуг Украины, охарактеризованы влияние макроэкономических факторов, потребность, доступность и препятствия привлечения инвестиций, развитость инвестиционной инфраструктуры, уровень финансово-инвестиционной обеспеченности хозяйства, перспективность направлений реализации государственной политики.

Интерпретированы уровни реализации государственной политики развития инвестиционных процессов на рынке ИТ-услуг с помощью интервальной шкалы Харрингтона. Разработана схема стратегических подходов и последовательной реализации государственной политики развития инвестиционных процессов на рынке ИТ-услуг. Определены задачи, инструменты, средства и приоритетные направления государственной политики развития инвестиционного процесса на рынке ИТ-услуг Украины.

Ключевые слова: рынок ИТ-услуг; инвестиционный процесс; государственная политика; ИТ-сектор; цифровизация экономики; ИТ-компания.

1. Introduction

The current global trends towards a period of total digitization of social life, social and economic relations reinforce the role of information technology sector, including IT services, in the system of government, the formation of the information society and the digitalization of the national economy. The tasks of rapid development of information of business processes in the basic branches of the economy and also the extending of technologies that provide a high productivity of labour, production efficiency, and financial and economic activity are updated. In its turn, the increased use of information technology in the state sector, the development of e-services and the infrastructure investment contribute to the wider use of information technology in the private segment and become a catalyst for their diffusion in the corporate sector.

The solution of these problems depends on the ability of IT sector to develop, produce and deliver modern high-tech IT services on the market, which is closely connected with the technical and technological modernization of its subjects, the investments in the development of material and technical, technological, information and communication, intellectual and human resources, research, marketing, etc. support as a basis for strengthening the competitive positions on the internal and external market of IT services.

2. Brief Literature Review

The problems of state regulation of investment processes development have been studied in scientific works of scientists such as M. Maung, M. Shedden, Y. Wang and C. Wilson (2019), J. Li, Z. Yongjie, X. Feng and Y. An (2019), R. Desbordes and S.-J. Weic (2017), R. Francioni and R. Schwartz (2017), A. Presbitero (2016), B. Korutaro and N. Biekpea (2013), S. Casellia, E. Garcia-Appendinib and F. Ippolitoc (2013), G. Hovakimian (2011), D. Klonowski (2010), S. R. Thompson (2008), Anderson (2006), F.-S. Hung (2005).

The scientists such as L. Pilorget and T. Schell (2018), J. Alcácer, J. Cantwell and L. Piscitello (2016), A. Lahtela and M. Jäntti (2010), L. Willcocks and M. Lacity (2006), examine in their works the functioning and government regulation of the IT services market.

However, the field of IT services and the peculiarities of its functioning and development make it necessary to find new mechanisms and harmonize existing ones; as well as instruments and means of state regulation of the investment process for the further qualitative development and realization of the potential of the IT services market in the national economy.

It is worth noting that despite the considerable volume of research by both Ukrainian (T. Vasylytsiv et al. (2020), O. Vlasyuk (2016)) and foreign scholars in the investment sphere (N. Karlson, C. Sandström and K. Wennberg (2020), R. Francioni and R. Schwartz (2017), D. Klonowski (2010), R. Thompson (2008), S. Anderson (2006)), the concept of the investment process requires further study.

The corresponding assertion is also confirmed by the fact that the interpretation of the investment process is not identified in scientific monographic studies, in the subjects of which there is a phrase «investment process». In particular, we should refer to the works by M. Maung, M. Shedden, Y. Wang and C. Wilson (2019), D. Curran (2017), R. Desbordes and S.-J. Weic (2017), B. Korutaro and N. Biekpea (2013), where the investment process is equated with investment activity, investment sphere, or investment.

There is often an attempt to interpret the investment interactions as an investment process. Such features can be traced, for instance, in the study of J. Li, Z. Yongjie, X. Feng and Y. An (2019), it is noted that «... the investment process involves the interaction of subjects (investors), objects, relationships between them and the environment in which they interact», or in the work of S. Casellia, E. Garcia-Appendinib and F. Ippolitoc (2013), where the investment process is considered in the context of the interaction of national and foreign financial institutions, private investors on the one hand, and enterprises of various forms of ownership, on the other hand, with regard to investment for the modernization of production, acquisition of initial capital, improvement of economic efficiency and realization of socially significant projects.

Additionally, there are approaches where the investment process is limited to the activity of institutional investors, although it is not precluded that it relates to the investment activity not only at the micro but also at the macroeconomic level. These are the research results presented by A. Whittle (2020), A. Presbitero (2016), F.-S. Hung (2005), G. Hovakimian (2011) and others. In the most generalized form, the views of these scholars can be formulated as follows: «the investment process is usually related to the activities of institutional investors, whose constituents are the implementation of investment strategies in the course of achieving the main strategic goals and the overcoming of limits in the investment activity».

It should be noted that the theoretical and methodological characteristics of the investment processes in the field of information and communication technologies have not become as widespread as in the studies of the investment activity in general in the whole system of the national economy. For instance, there are a number of studies where, on the contrary, the creation of IT products or the provision of relevant services by IT companies are considered by scientists, for example D. Bailey and L. Propris (2019), L. Pilorget and T. Schell (2018), A. Lahtela and M. Jääntti (2010), L. Willcocks and M. Lacity (2006), as a direction of the investment activity or directly as the investment capital, which is further divided into strategic and long-term.

3. The purpose of the article is to substantiate the analytical and strategic aspects of implementing the state policy of the investment process development on the Ukrainian market of IT services.

4. Methodology

In the context of improving the effectiveness of state regulation of the investment process development on the market of IT services, it is important to identify the factors that contribute to and hinder the growth of investment activity.

An expert survey is conducted to clarify the conclusions on the investment security of entities on the IT services market, the effectiveness of public policy in this field, as well as the preliminary identification of promising directions to improve the public policy and, actually, the enhancement of investment support in the IT sphere. Particularly, the Delphi method is chosen for the systematization and processing of expert assessments, by means of which the representative expert group is rationally formed, the expert estimation is well-arranged, and the materials of the questionnaires are processed to a high standard.

Concurrently, the coefficient of concordance (C_c) proposed by M. Kendall and B. Smith is used to summarize the results of the expert assessment of public policy in the analysed sphere, which allows us to define the influence of the parameters involved in the analysis on the degree of objectivity of the expert assessment (Formula (1)).

$$C_c = \frac{\sum_{j=1}^n r_j^2}{\frac{1}{12} \times \left[e^2 \times (n^3 - n) - e \times \sum_{i=1}^m K_i \right]}, \quad (1)$$

where:

r_j is the quadratic deviation of the rank sum of i -th estimated parameters from their mean;

e is the number of experts;

n is the number of estimated parameters;

$\sum_{i=1}^n K_i$ is the hypothetical sum of the i -th ranks, defined by the experts under the condition of agreement of their opinions.

Then, the calculation of the hypothetical rank sum of the estimated parameters of state policy in the analysed sphere is made by using the following Formula (2):

$$K_i = \sum_{n=1}^i (t_n^3 - t_n), \quad (2)$$

where:

t_n is the number of related n -parameters in each evaluation group.

The criterion X^2 (Formula (3)) is calculated to evaluate the significance of parametric relationships:

$$X^2 = \frac{\sum_{j=1}^m r_j^2}{\frac{1}{12} \times \left[e \times n \times (n+1) - \frac{1}{n-1} \times \sum_{i=1}^n K_i \right]}. \quad (3)$$

In order to interpret the analytical evaluation results of the quality of state regulation of the investment process on the market of IT services, Harrington's scale is applied, which consists of five interval assessments (Table 1).

Table 1:
Harrington's interval scale

Integral levels	Numeric intervals
Very high	8.01-10.00
High	6.31-8.00
Average	3.71-6.30
Low	2.01-3.70
Very low	0.00-2.00

Source: Compiled according to Harrington (1965)

5. Results

5.1. Characteristics of state regulation of the investment process on the Ukrainian market of IT services

The state and trends of the Ukrainian market of IT services are predominantly favorable for the intensification of the investment process. The volume of disbursed capital investments in 2019 amounted to 727.6 million euros (at the average exchange rate of 28.95 UAH / EUR), which was 3.5% of the total amount of investments in the state's economy (State Statistics Service of Ukraine, 2020). By comparison, in Russia this indicator is significantly higher and amounted to 9.7 billion euros (at the average exchange rate of 72.41 RUB/ EUR), but in the context of national investment, the share of investment in the IT sector as well as in Ukraine does not exceed 3.5% (Federal State Statistic Service of Russia, 2020).

It should be noted that since the beginning of 2020 there were positive changes in the investment of IT sector in Ukraine. Thus, in the first quarter of 2020, the volume of the sectoral capital investments over the same period of the last year increased by 31.2% (from 123.0 million euros (at the average exchange rate of 31.02 UAH / EUR) to 161.4 million euros (27.60 UAH / EUR)). Also during this period, the total investment share of IT sector in Ukraine increased from 3.5% to 5.8%. By comparison, in Russia the rate of IT sector investment decreased significantly - by 27.4% over the same period and the total investment share of IT sector decreased by 1.8 %.

However, compared with the European countries and the United States, the investment activity of the Ukrainian IT companies is lower and, accordingly, the sector does not have the necessary resources to ensure the sufficient level of international competitiveness (Table 2).

We are convinced that the market of IT services in Ukraine is able to develop the investment potential at a swift rate. This tendency is confirmed by preserving the positive dynamics in the

Table 2:
Characteristics of investment attractiveness of the Ukrainian IT services market and some selected countries in 2019

Indicators	Ukraine	EU-28	USA	Russia
Investment volume, EUR billion	0.7	18.1	59.9	9.7
Share of IT sector in GDP, % (GDP, EUR billion)	4.0 (137.3)	3.9 (13918.1)	5.1 (18375.1)	0.9 (1486.2)
Volume of IT products, EUR billion	9.5	700.1	891.1	20.9
Export of IT services, EUR billion	2.3	145.5	26.1	8.9
Number of IT companies, in millions	0.17	1.78	0.56	0.13
Share of employed in the market, % (total number of employed in the country, in millions)	1.7 (16.6)	3.7 (240.7)	2,6 (156,9)	1.8 (71.4)

Source: Compiled by the authors using data by State Statistics Service of Ukraine (2020), Eurostat (2020), OECD (2020), and Federal State Statistic Service of Russia (2020)

market in terms of capital investment (the growth was 2.5 times in the 2014-2019 period), the sales (2.6 times), the exports (74.4%), the number of enterprises (55.9%), the level of business profitability (14.7%), the number of employed people (1.7%).

There are a significant number of impediments in the investment processes development in the Ukrainian market of IT services which need to be eliminated during the improvement of state policy in the analyzed area. Accordingly, a number of IT companies (Ciklum, DataArt, Sigma Software, GlobalLogic, EPAM, N-iX, 2Event.com, Skelia, Intellias, Lohika) have been selected for the analytical research (IT Ukraine Association, 2020), which are the leaders of the Ukrainian market in the development, implementation and sales of information and communication products (Annex A). Accordingly, of the total number of respondents, 40.0% are representatives of medium-sized enterprises, 60.0% are representatives of small enterprises, of which 50.0% represent micro-enterprises.

The sample of IT companies is substantiated by means of the methodology of the Gallup Institute, which agrees to rationally poll 1.0% of the selected respondents, with the error of the poll not exceeding 3.0%. At the same time, when sampling 2.0%, the error will not exceed 1.0%.

The study was conducted in the 2018-2020 period, which allowed forming a sufficient information base to objectivize the groups of factors in determining the levels of their impact on investment processes in the IT services market, including Ukraine. Calculations of coefficient of concordance (0.837), criterion X^2 (37.5) indicate the high degree of agreement among expert judgments and the sufficient reliability of the obtained results. According to Pearson coefficient for $n-1$ degrees of freedom, the agreement among expert opinions and the notably static significance of the assessment results of the state investment processes on the IT services market can be argued at the 99.0% credible level.

It is found out that the most important factors hindering the security of the investment process are the low quality and capacity of the elements of business infrastructure on the IT services market (the average rating of this factor on the scale from zero (total absence of impact) to one (maximum impact) was 8.12), the high level of tax burden (8.06) and the complexity of procedural aspects of starting a business entity and beginning commercial operations (7.09) (Table 3).

Table 3:
Evaluation results of the impact of macroeconomic environment factors on the economic security of investing in the Ukrainian IT services market, 2018-2020

Impact Levels	Factors	Expert Ratings (0-10)*
Very high	Quality and capability of business infrastructure elements in IT services market	8.12
	High level of tax burden	8.06
High	Procedural aspects of starting a business entity and beginning commercial operations	7.09
	Quality of the legal framework of business operation	6.78
	Demand for IT services domestically and internationally	6.52
Medium	Ability to guarantee an adequate level of profitability	6.08
	Level of negative impact of corruption	5.22
Low	Spread of the shadow segment on the IT services market	3.65
	Level of raiding on the IT services market	3.43
	Ability of IT companies sufficient level of economic security	3.09
Very Low	Protection against economic infringement of rights and abuse on the IT services market	1.97
	High concentration of access to the IT services market	1.90

Note: Weighted average score for the period of study is given.

Source: Compiled by the authors on the basis of the expert survey

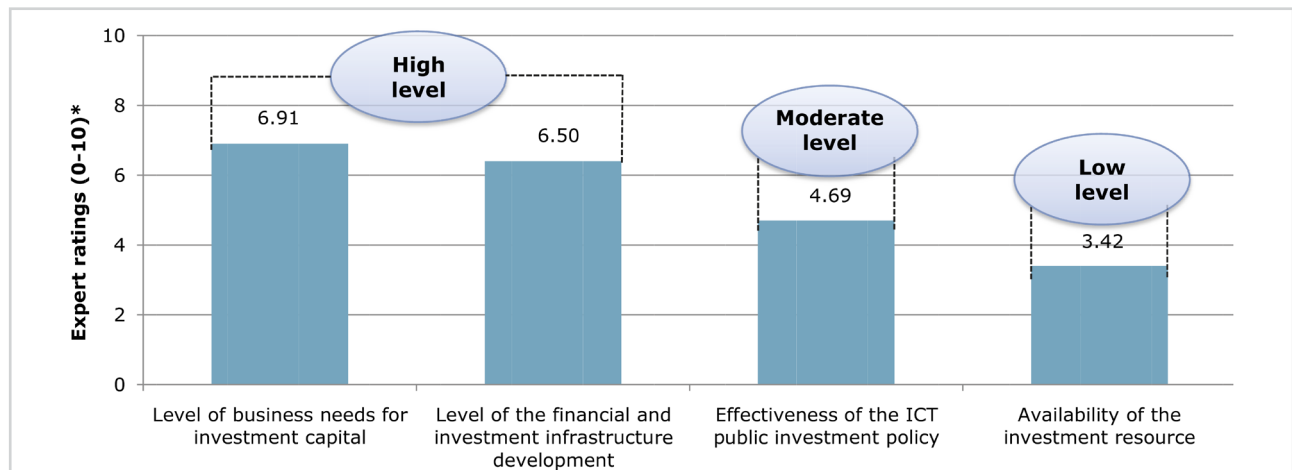
According to the averaged data (Figure 1), there are reasons to argue for a relatively high level of IT business needs for investment resources, against the background of the high difficulty of an access and the cost of attracting investments, as well as the weakness and low effectiveness of the public investment policy.

So, it is found out that business entities are generally provided with their own financial resources and are sufficiently financially sound to support their current activities (the average estimate of this factor was 7.01), have all the facilities to guarantee minimum business profitability (5.74), and to some extent are capable of providing to an affordable extent capital investment in capacity expansion (for the IT product creation) (5.24) (Table 4). However, the level of dependence on external financing for starting and running a business (6.44) and the need to comply with quality parameters of the financial management (4.93) are also high.

It is legitimate to conclude that there is a high level of the need for investments in Ukraine's IT services market that is limited in scope and low in accessibility, but, at the same time, financial conditions (at the micro-level) are sufficient to intensify the investment process in the industry.

This is confirmed by the fact that the absence of financially viable investors, managers and specialists of economic entities on the IT services market is identified as the main obstacle to the formation of a proper investment resource for further development (Table 5). This reason is averaged at 8.82.

In addition to this factor, other significant reasons - the disadvantages of the investment environment on the IT services market remain as follows: limited internal resources for investment



Note: Weighted average score for the period of study is given.

Figure 1:
Assessment results of the need and availability of investments, the investment infrastructure development and the effectiveness of the state investment policy on the Ukrainian IT services market, 2018-2020

Source: Compiled by the authors according to the expert survey results

Table 4:
Assessment results on financial and investment security of the IT services market in Ukraine, 2018-2020

Levels of security	Factors	Expert ratings (0-10)*
High	Level of the enterprise financial stability	7.01
	Level of the influence of external financing on starting and running a business	6.44
Moderate	Possibility of guaranteeing business minimum profitability	5.74
	Availability of investment in capacity IT expansion	5.24
	Quality of the financial management	4.93
Low	Availability of banking financial and credit and operating security	3.62
	Level of current external and internal financial debts	3.34
	Level of the influence of the hryvnia exchange rate	2.15
Very low	Impact of the securities market on the functioning of entities on the IT services market	1.89
	Influence of the guarantee and surety market on the development of entities in the IT industry	1.34

Note: Weighted average score for the period of study is given.

Source: Compiled by the authors on the basis of the expert survey

activity support (8.21), a small number of elements of the investment support system (8.19), the availability of a significant list of additional payments and losses while implementing investment projects (7.44), low security of business and protection of property and assets of IT entities (7.19). Thus, it can be stated that two groups of reasons are separated. Firstly, there are significant shortcomings of the institutional investment environment and, secondly, the lack of investment resources in the industry and in the country as a whole.

Table 6 presents the assessment results of the most promising areas in which the state policy of improving the investment security of Ukrainian entities on the IT services market should be implemented first.

Hence, the dominant direction of public policy in the analysed area is to guarantee an adequate level of investment and investors' security. Investment security is indeed a key prerequisite for their implementation. It is about the development of a favourable and healthy investment environment in this segment of the Ukrainian market. This implies, first of all, improving the quality of the business environment on the IT services market, simplifying the conditions for doing business and attracting investment (8.23), and increasing the number and capacity of the elements of capital investment infrastructure (7.79).

In the context of improving the state policy of development of the investment process on the Ukrainian IT services market, it is promising to focus on the development of a complex

Table 5:
Assessment results on the main causes of difficulties in attracting investment by business entities on the Ukrainian IT services market, 2018-2020

Levels of difficulties	Factors	Expert ratings (0-10)*
Very high	Limited number of viable investment entities	8.82
	Limited internal resources for investment activity support	8.21
	Small number of elements of the investment support system	8.19
High	Substantial list of additional payments and losses while implementing investment projects	7.44
	Poor security of business and protection of property and assets of IT entities	7.19
Moderate	Non-formation of the system of purchase and sale of intellectual assets	6.17
	Difficulty in the access to high-quality information and consulting support of realization of investments into business development	4.66
Low	High cost of attracting additional resource support for projects on the IT business development and expansion	3.54
	Lack of competencies in the investment management field for full attraction and efficient use of investments	3.47
	Non-formation of domestic IT business entities as integral property investment complexes	2.77

Note: Weighted average score for the period of study is given.

Source: Compiled by the authors on the basis of the expert survey

Table 6:
Assessment results on the promising directions of the implementation of the state policy to improve the investment support of entities on Ukraine's IT services market, 2018-2020

Levels of significance	Factors	Expert ratings (0-10)*
Very high	Guaranteeing the investment process security	8.59
	Development of financial and credit support institutions for IT start-ups	8.42
	Improving the quality of the business environment on the IT services market, simplifying the business environment and attracting investment	8.23
High	Increasing the number and improving the capacity of investment infrastructure elements	7.79
	Entering the market and increasing the volume of activity of institutional investors, joint venture institutions	7.42
	Availability of tools of budget and fiscal support for innovative and technological projects of domestic entities of the IT services market	6.64
	Increasing the volume of external (outside the country) demand for domestic IT services	6.62
	Introduction of programs for private and public financial and resource assistance to domestic IT manufacturers	6.49
	Reducing the level of organizational obstacles and improving financial and economic support to attract modern advanced technologies, equipment and machines to the internal IT market	6.44

Note: Weighted average score for the period of study is given

Source: Compiled by the authors on the basis of the expert survey

of institutions of financial and investment support for the subjects of the IT sphere. This refers to the development of institutions of financial and credit support for «IT start-ups» (8.42), the availability of tools of budget-funded and fiscal support for innovation and technological projects of domestic subjects on the IT services market (6.64), the implementation of programs of both private and public financial and resource assistance to domestic IT manufacturers (6.49).

5.2. Directions to improve state regulation of the investment process on the market of IT services

Thus, the main goal of state regulation of the investment activity development on the market of IT services should be considered the improvement of the course of all stages of the investment process. Beyond doubt, such a purpose should determine the formation of strategic measures and actions aimed at intensifying the investment activity on the Ukrainian IT services market (Kutsyk and Protsykevych, 2018). Therefore, the conceptual and strategic logic of state regulation in the analysed sphere takes the form shown in Figure 2.

It can be stated that high motivation to invest is based on three key tenets: 1) high efficiency (achievable through tax regulation), 2) budget-funded and fiscal support (due to the implementation of budgetary instruments), and 3) investment security (backed by security instruments) (Havlovska, Rudnichenko, and Lisovskyi, 2019; Vasylytsiv and Lupak, 2016). We stand on the fact that the first two components in Ukraine, as of today, are not as important as the third one. In turn, the basic direction of public policy is to improve the activity of governmental structures in the aspect of investment security.

Achieving definite strategic guidelines of the state policy of investment processes development in the IT services market depends on a number of factors, which conditioned the carrying out of a regression analysis in which the dependent variable is the amount of capital investment per employee in the analysed area. The obtained regression equation took the following form:

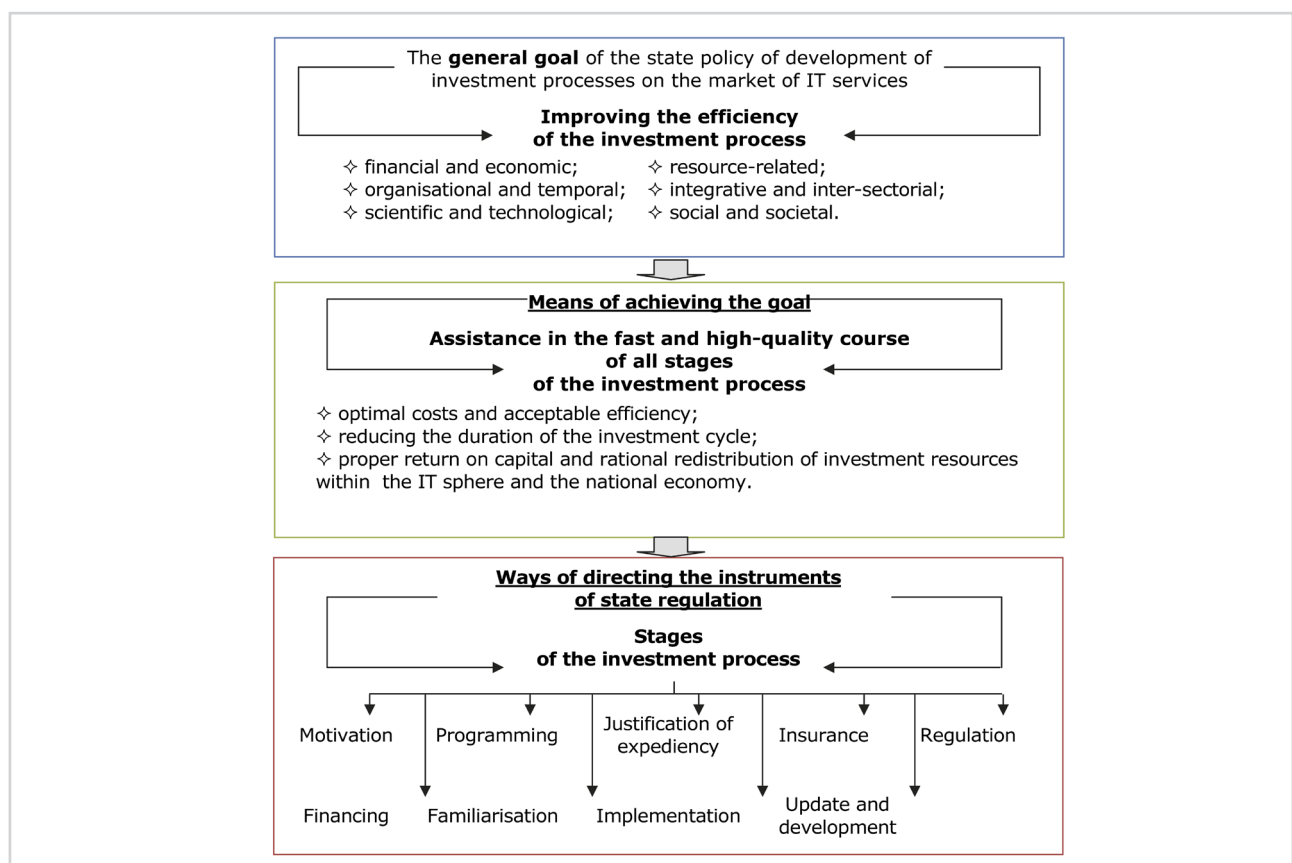


Figure 2:

Conceptual and strategic logic and consecution of the state policy of development of investment processes on the market of IT services

Source: Compiled by the authors

$$y = -31.1802 + 0.1837x_2 + 0.2751x_5 + 0.6052x_8 + 0.1351x_9 - 0.1154x_{11}, \quad (4)$$

$$R = 0.8405 \quad R^2_{adj} = 0.7245 \quad F(5.024) = 62902 \quad Std. Er. = 15.984$$

where:

- y is the capital investment per employee;
- x_2 is the costs of innovation per employee involved in research and development;
- x_5 is the average monthly salary;
- x_8 is the number of small enterprises per 10 thousand people of the current population;
- x_9 is the volumes of imports of IT services per enterprise;
- x_{11} is the number of innovatively active enterprises per capita.

The obtained values of the regression coefficients are statistically significant (accurate), which is confirmed by the correlation and determination coefficients, the *F*-test, the Standard error that are within satisfactory limits.

However, no statistically significant relationship was found between the dependent variable «capital investment per employee» and such independent variables as the share of profitable enterprises (x_1), the level of profitability (loss) of operating activities (x_3), the number of employees per one enterprise (x_4), the ratio of registered unemployed to the number of employed (x_6), the share of households with Internet access (x_7), the volume of exports of IT services per enterprise (x_{10}). This gives grounds to conclude that at present in the market of IT services in Ukraine there is no direct link between the efficiency of enterprises and their investment attractiveness. Accordingly, investors are more willing to cooperate not with efficient enterprises, but with individuals who represent certain investment projects.

Taking into account certain strategic approaches, motivation of investment activity, forecasting and strategic programming, justification of the feasibility of investment projects and their insurance, search for sources of investment financing, simplification of the regulation of investment projects, acceleration of capital investment implementation processes and introduction of their results, increasing motivation to upgrade and develop investment facilities are the directions of state regulation of the investment process on the market of IT services (Figure 3).

Achieving quality positive shifts in these functional and structural spheres is closely linked to the areas of development of the market of IT services and its impact on the digitalization of Ukraine's

Stages in the investment process as a regulatory area									
Elements of regulation	Motivation of investment activity	Investment forecasting and programming	Justification of the feasibility of investments	Investment insurance	State regulation of the investment process	Financing of investments	Development of investments	Commissioning of the investment object	Investment renovation and development
Tasks of state regulation	<i>Formation of investment environment with high investment efficiency</i>	<i>Ensuring planned and manageable implementation of investment projects</i>	<i>Directing the investment resource into important socio-economic spheres of investment</i>	<i>Strengthening the security of investment processes</i>	<i>Simplification of the state administration and control over investment processes</i>	<i>Impact on volume increase and improvement of investment structure</i>	<i>Ensuring rational use of investment resources, reducing the level of investment cost</i>	<i>Facilitating rapid and high-quality implementation, bringing investment projects to the operational stage and investment returns</i>	<i>Stimulation of technological modernization of investment results</i>
Regulation tools	<ul style="list-style-type: none"> ➢ taxation; ➢ budgetary; ➢ safety 	<ul style="list-style-type: none"> ➢ organizational ➢ informational 	<ul style="list-style-type: none"> ➢ public-private partnership; ➢ infrastructure 	<ul style="list-style-type: none"> ➢ insurance; ➢ diversification 	<ul style="list-style-type: none"> ➢ regulatory; ➢ administrative and controlling 	<ul style="list-style-type: none"> ➢ financial and credit; ➢ institutional 	<ul style="list-style-type: none"> ➢ institutional; ➢ image-psychological 	<ul style="list-style-type: none"> ➢ organizational and administrative; ➢ market 	<ul style="list-style-type: none"> ➢ taxation; ➢ innovative and technological
Policy tools	<ul style="list-style-type: none"> → provision of tax benefits, deferrals; → support for socio-economically significant investment projects 	<ul style="list-style-type: none"> → consulting support; → preliminary preparation of investment projects 	<ul style="list-style-type: none"> → development of investment infrastructure on the IT services market 	<ul style="list-style-type: none"> → budget support for investment insurance projects; → formation of proposal of investment projects 	<ul style="list-style-type: none"> → simplifying regulatory and permitting procedures; → transition to electronic monitoring and control over the implementation of investment projects 	<ul style="list-style-type: none"> → creation of IT parks, other sites of cooperation and cross-sectoral integration with participation of IT subjects 	<ul style="list-style-type: none"> → elimination of transaction costs of the investment process; → creation of databases of reliable investors, customers and executors of investment projects in IT 	<ul style="list-style-type: none"> → Simplifying and improving the efficiency of the administration of the acceptance and operation of investment facilities; → stimulating customer demand for investment products on the IT services market 	<ul style="list-style-type: none"> → development of cooperation of IT subjects with venture structures, innovation firms

Priorities and areas for investment

- ✓ Introduction of management information systems in basic economic activities; expansion of the economic information sector;
- ✓ Development of e-governance;
- ✓ Implementation of projects in the field of the development of the information society;
- ✓ Development of information and communication infrastructure;
- ✓ Implementation of projects in the fields of bioinformatics and IT applications in medicine and genetics; automation of design and processing of large data sets; quantum and optical technologies; simulation, robotics, machine training, predictive modelling in the social and human sciences, security in the information society, etc.

Figure 3:
Government guidelines and instruments for investment process development on the IT services market of Ukraine

Source: Compiled by the authors

economy, as further formation of a single information space for the distribution of electronic services by the specified types of economic activity, as well as on the basis of integration of information systems, providing wider access to databases, creating conditions for the spread of electronic services (Protsykevych, 2018). At the same time, it seems appropriate to include to the most expected results of the state policy in this sphere the improvement of the system of management and legal regulation of the investment processes on the IT services market, development of the state legal information system, creation of the state information system with comprehensive information on administrative procedures, introduction of a new integrated public finance management information system, which enables to create the tools for making sound management decisions, aimed at improving the efficiency and effectiveness of budgetary management, improving the quality of transport services, efficiency and safety of transportation, creation of centralized motor transport service systems, information exchange and document circulation, digitization of educational process in schools and universities, development and implementation of automated accounting systems, processing and analysis of information on financial transactions, subject to special control, related to the receipt or legalization of income, including shady or «gray» sources.

Globalization of the world economy, the rapid development of information and digitalization objectively determine the dynamism of the priority areas for the implementation of IT investment projects. Therefore, state bodies should regularly update the list of priority projects for state support. To do this, it is important to create an appropriate information platform to record the opinion of research institutes, industry associations, leading IT companies, investors, customers, development institutes and representatives of leading technology platforms in the information and technology intensive areas of economic activity. Changes in the list of strategically important investment projects on the IT services market should simultaneously be strategically aligned with the training system of the staff and specialists.

6. Conclusions

The IT services market is a set of relations between entities that create and entities that consume IT services. At the same time, the volume of the market and the activity of its entities are determined by the business environment, investment and financial resources, and the efficiency of functioning and rationality of structural characteristics are determined by the system of regulating the IT services market with its formal, informal and organizational components.

The obtained analytical results of the study allow suggesting that increasing the scale and efficiency of the investment process in the IT services market despite the creation of a transparent competitive environment and the action of market self-regulation factors requires a quality government policy, primarily focused on forming incentives for investment, creating a favorable investment climate and investment environment, improving the structure of sources of the attraction and use of investment resources with the achievement of strategic objectives of the IT market development and their positive impact on the public and socio-economic development of the country.

Given the fulfillment of the goal of the state policy of investment processes development in the IT services market, a healthy competitive environment is formed with a high level of motivation to invest in promising projects in the IT services market and related economic activities, as the country simplifies organizational, technical and administrative investment conditions, eliminates «bottlenecks» in the investment process system. To do this, a set of tools of state programming the most acceptable for the relevant stage of the investment process is used.

Therefore, at this stage of this market development and the implementation of investment projects within it, it refers to the state policy of investment processes, the expected results of which will include, firstly, the elimination of shortcomings and thus stimulation of investment activity and, secondly, increasing the efficiency of both individual components and investment activities.

It is necessary to understand the progressive trends according to which it is possible to predict the directions of increasing the investment activity of IT market participants and what role the state will play in order to realize the necessary strengthening of the quality of investment relations. It is clear that in any approach to public investment policy in a particular market the most difficult aspect is always to justify the sources and means of attracting investment resources. Even with a perfect investment environment, in the absence of capital, investment projects are doomed to failure and cannot receive adequate funding. On the other hand, businesses in the IT services market need to understand that the cost and potential of attracting investment from different sources for different representatives of the IT sector also vary significantly.

Accordingly, there is an important conclusion about the prospects of forming a system of differentiated approaches in the framework of state policy to stimulate the intensification of the investment process in the domestic market of IT services. At the same time, the basic ways of solving strategic tasks should not be discarded. The point is that the executive should intensify its work on specialization not in certain areas of institutional regulation, but on the introduction of a full range of tools and means to strengthen investment activity in the IT services market. It is clear that the introduction of a comprehensive and system-differentiated approach can provide a significant improvement in investment relations in the analyzed market, to attract and use capital resources to a greater extent, and so on.

Annex A:

IT companies-leaders in the market of IT services of Ukraine

IT-companies	Office	Partners	Contact
Ciklum	Ukraine, USA, Great Britain, Switzerland, Denmark, Israel, Belarus, Romania, Pakistan	Microsoft Gold Partner, Automation Anywhere, Magento Business Solution Partner, Google Partner Advantage Program, NVIDIA Service Delivery Partner	https://ciklum.com
DataArt	Ukraine, USA, Poland, Great Britain, Germany	Microsoft Gold Partner, AiCure, OmniComm, ClinicAll	https://dataart.ua
Sigma Software	Ukraine, USA, Poland, Sweden, Australia	Volvo, SAS, Dan Ads, IGT, Formpipe, infobric, KNORR-BREMSE	https://career.sigma.software
GlobalLogic	Ukraine, USA, Argentina, Israel, Great Britain, Poland, Slovakia, etc.	Volvo, Ericsson, Continental, HP, The economist, Herbalife, Roku	https://globallogic.com
EPAM	Ukraine, USA, Belarus, Great Britain, Germany, Poland, Sweden, Switzerland, etc.	Acquia, Adobe, Aprimo, Censhare, Coveo, Episerver, Google Apigee, Magento, SAP CX, SDL, Salesforce Commerce Cloud, Sitecore, Translations.com	https://epam.com
N-iX	Ukraine, USA, Poland, Sweden, Bulgaria	Lebara, Gogo, Currencycloud, Fluke Corporation, OpenText, RateSetter, Travelport Locomote, TuneIn, Deutsche Post, etc.	https://n-ix.com
2Event.com	Ukraine, Poland, Belarus, Kazakhstan	Eventbrite, Ticketforevent, Timepad, Bizzabo, Attendfy, Omyconf	https://2event.com
Skelia	Ukraine, USA, Poland, Great Britain, Netherlands	Azure, salesforce, React, siticore, Microsoft Dynamics, python, ANGULAR	https://skelia.com
Intellias	Ukraine	Soreco, SEP, Core banking solutions, swissclick.com, MAGIX, e-fon, adswizz, FTS	https://intellias.ua
Lohika	Ukraine	Instartlogic, Okta, BuzzFeed, Tidemark, Openet, Skype	https://lohika.com.ua

Source: Compiled by the authors

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