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EFFECT OF INFORMATION AND COMMUNICATIONS TECHNOLOGY ON THE EFFICIENT OPERATION OF THE ORGANIZATIONAL AND ECONOMIC MECHANISM OF ENTERPRISE FIXED ASSETS MANAGEMENT

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ABSTRACT

Objective: The objective of this article is to evaluate the efficiency of internal and external information and communications technologies (ICT) required for creating an organizational and economic mechanism for managing an enterprise's fixed assets. The focus is on the interaction between humans and the means of labor within the systems. **Results:** To achieve the objective, the authors develop an organizational and economic mechanism specifically designed for the management of fixed assets in industrial enterprises using ICT. Through their research, they identify the main requirements for the structure of ICT necessary to construct the organizational and economic mechanism. **Conclusion:** In conclusion, the authors propose methods for assessing the level of development of ICT by constructing chains of same-quality and different-quality elements within the structure. The assessment is based on Bayesian intelligent technology, and a method for comparing temporal indicators is introduced to determine the need, availability, use, and level of development of ICT. To enhance the level of ICT development within an enterprise, the authors recommend maintaining the required levels of demand, provision, and utilization. They also suggest preferred values for the need, provision, and use of ICT, which can serve as benchmarks for improvement.

Keywords: Information and communications technology; Bayesian intelligent technology; Chain of interconnected elements; Provision.

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EFEITO DA TECNOLOGIA DA INFORMAÇÃO E COMUNICAÇÃO NA OPERAÇÃO EFICIENTE DO MECANISMO ORGANIZACIONAL E ECONÔMICO DE GERENCIAMENTO DE ATIVOS FIXOS DA EMPRESA

RESUMO

Objetivo: O objetivo deste artigo é avaliar a eficiência das tecnologias de informação e comunicação (TIC) internas e externas necessárias para a criação de um mecanismo organizacional e econômico para a gestão de ativos fixos de uma empresa. O foco está na interação entre humanos e os meios de trabalho dentro dos sistemas. **Resultados:** Para alcançar o objetivo, os autores desenvolvem um mecanismo organizacional e econômico especificamente desenhado para a gestão de ativos fixos em empresas industriais usando TIC. Por meio de suas pesquisas, eles identificam os principais requisitos para a estrutura de TIC necessários para construir o mecanismo organizacional e econômico. **Conclusão:** Em conclusão, os autores propõem métodos para avaliar o nível de desenvolvimento das TIC através da construção de cadeias de elementos de mesma qualidade e de qualidade diferente dentro da estrutura. A avaliação é baseada em tecnologia inteligente bayesiana e é introduzido um método de comparação de indicadores temporais para determinar a necessidade, disponibilidade, uso e nível de desenvolvimento das TIC. Para aumentar o nível de desenvolvimento de TIC dentro de uma empresa, os autores recomendam manter os níveis exigidos de demanda, provisão e utilização. Eles também sugerem valores preferenciais para a necessidade, provisão e uso de TIC, que podem servir como referência para melhoria.

Palavras-chave: Tecnologia da informação e Comunicação; tecnologia inteligente bayesiana; Cadeia de elementos interligados; Provisão.

1 INTRODUCTION

1.1 Problem Statement

A lista de afiliações deve estar logo após os nomes, uma afiliação por linha e seguir o modelo:Today, at the stage of digital development of the economy, not a single direction of operation of an industrial enterprise can do without information and communications technology (ICT) (Xinxian & Jianhui, 2022; Zhang et al., 2022). ICT is defined as a set of "software and hardware tools, production processes, and methods that collect, store, process, analyze, and distribute information to minimize the labor intensity of information resources while increasing their operational efficiency and reliability" (Gavrilov & Klimov, 2016, p. 45). Given that management is "the impact on the operation of a system, including economic, to achieve an intended goal" (Afanasyev & Postnikov, 2006, p. 112), the use of ICT in management is a modern direction of development, adoption, and implementation of managerial decisions (Slyke, 2008).

Increasing attention is being paid to the use of ICT in enterprise fixed asset

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management. This is explained by:

- the necessity of raising the efficiency of fixed assets management at all stages of their lifecycle;
- the desire to improve the quality of exploitation of a wide range of means of labor used both separately and in conjunction with each other;
- the need for up-to-date and complete information on the need for, availability, condition, functionality, and other parameters of the fixed assets used at an enterprise;
- the need for continuous monitoring and constant information updates on the labor market for possible renovation and modernization of fixed assets to achieve the provision of production processes with operational machines and equipment;
- the striving to enhance the degree of interaction between the various services of the enterprise involved in the management of fixed assets;

The process of enterprise fixed assets management assumes creating the conditions necessary for effective human interaction with the means of labor, ensuring the achievement of the required result. In this case, enterprise managers act as the subject of management, and the object of management, as a rule, are not separate types or groups of fixed assets, production lines, or property complex of the enterprise as a whole, but the "human – means of labor" interaction system (Urata et al., 2022). The efficiency of "human – means of labor" interaction must constantly increase, which implies the development of the process of enterprise fixed assets management in terms of raising the level of robotization, computerization, automation, and mechanization of production, total and factor productivity, profitability, etc. (Brodny & Tutak, 2021; Denecke & Baudoin, 2022). Ensuring the sustainable growth of efficiency of the "human – means of labor" interaction system presupposes creating an organizational and economic mechanism of enterprise fixed assets management based on the implementation and development of ICT (Shao et al., 2022).

The goal of the study is to determine the efficiency of use and the quality of ICT necessary to create an organizational and economic mechanism for managing enterprise fixed assets that provide for interaction in the "human – means of labor" systems.

1.2 Lista de afiliações

The Use of ICT in the Organizational and Economic Mechanism of Enterprise Fixed Assets Management

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The development of ICT that provide for the efficient operation of an enterprise's fixed assets calls for enhancing the quality of information flows and improving communication links for all processes occurring in "human – means of labor" interaction systems at each stage (level) of the life cycle of fixed assets (Holler et al., 2014).

Considering the structure of the organizational and economic mechanism of enterprise fixed assets management (Khlynin & Korovkina, 2016), it should be pointed out that it is advisable to include in its composition such levels of the life cycle and system processes of "human – means of labor" interaction as:

Level 1. Provision of the enterprise with fixed assets:

- capital investments;
- renewal and reproduction;
- rent (leasing);
- modernization and reconstruction;

Level 2. Exploitation of fixed assets:

- accommodation;
- loading;
- depreciation;
- amortization;
- maintenance and major repairs;
- revaluation;

Level 3. Withdrawal (decommissioning) of fixed assets:

- liquidation and decommissioning;
- disposal;
- selling;
- renting out (leasing);
- internal information flows and communication links (IIFCL);
- external information flows;
- managerial decisions.

The operation of the organizational and economic mechanism of enterprise fixed assets management through the prism of ICT use is demonstrated in Figure 1.

Creation of the organizational and economic mechanism of enterprise fixed assets management focused on the use of ICT (Figure 1) proposes the use of external information flows as an entrance to the "human – means of labor" interaction system,

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as the exit – the development of managerial decisions, and as interconnections between various intra- and inter-level system processes to – establishing IIFCL. Depending on the type of external information flows and the requirements for managerial decisions to be developed, the organizational and economic mechanism of enterprise fixed asset management is developed based on different types of ICT.

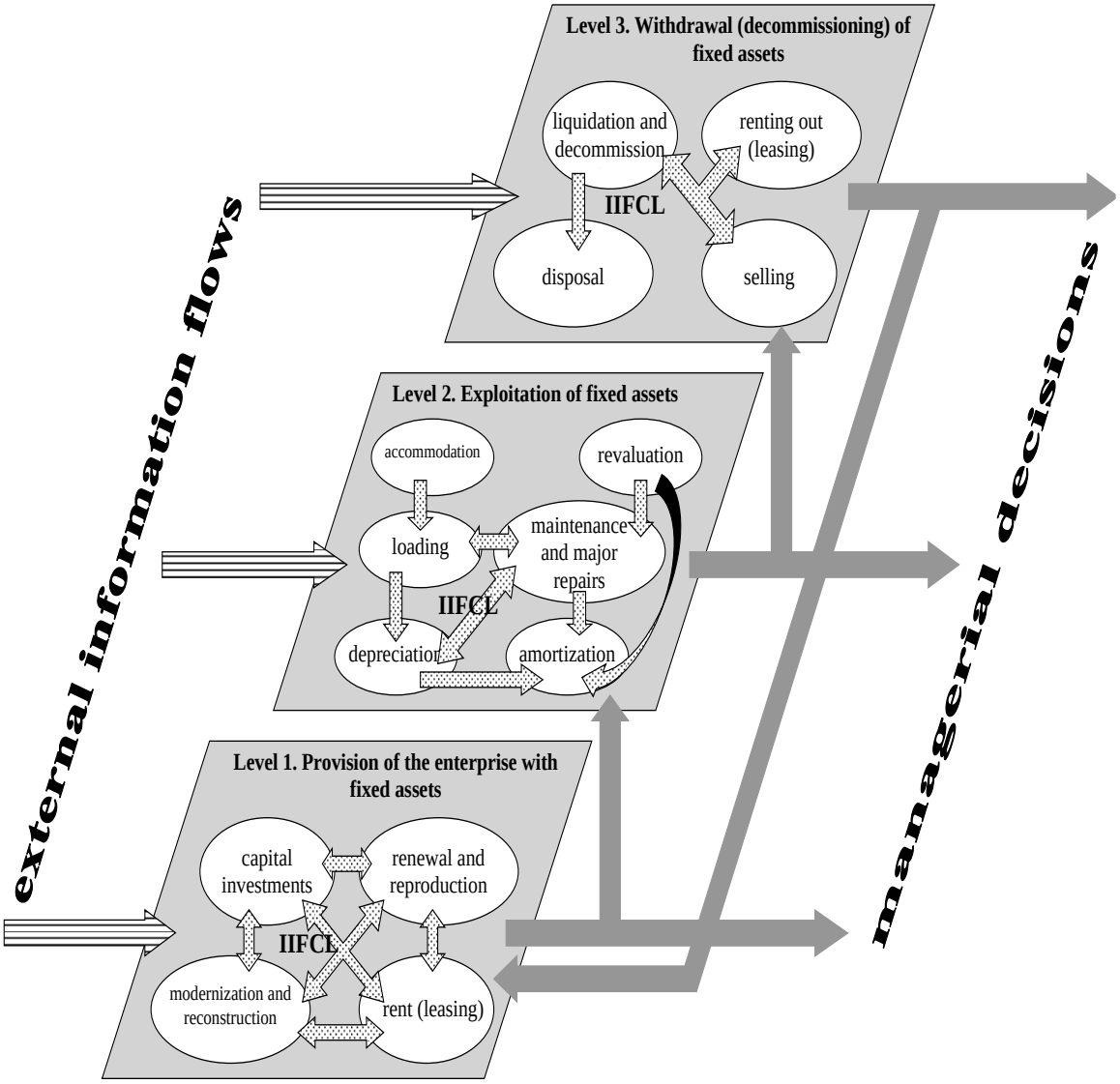

Figure 1. The use of ICT in the operation of the organizational and economic mechanism of enterprise fixed assets management*.

*The scheme of the use of ICT in the operation of the organizational and economic mechanism of enterprise fixed assets management is proposed by the authors.

The use and development of ICT for the formation of an organizational and economic mechanism of fixed assets management is given much attention, both at the state level and at the level of various enterprises and organizations. This stems from the fact that the use and development of ICT for the formation of the organizational and economic mechanisms of fixed assets management contributes to (Kupriyanov,

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2017): increased competitiveness; development of innovative activities; higher operating efficiency; growth of labor productivity; lower transaction costs; expansion of labor and capital markets; improvement of living conditions and social stability; achieving economic stability; and preservation of the environment (Cantoni & Danowski, 2015).

Expansion of the use and intensive development of ICT for the formation of the organizational and economic mechanism of enterprise fixed assets management is evidenced by several external features that characterize the structure of ICT (Evsyukov & Khlynin, 2019). The external features that define the main elements of the ICT structure include the following:

- availability of personal computers and laptops;

- availability of office equipment and peripheral devices (telephones, telefaxes, printers, scanners, photocopiers, multifunction centers, etc.);

- the use of operating systems (MS-DOS, Windows, Linux, UNIX) and standard software and applications (Microsoft Word, Excel);

- the use of specialized application software packages to solve special tasks related to the management of fixed assets at different levels of their operation;

- the existence of internal local computer networks to ensure document flow, the interaction between services and structural divisions of the enterprise, and access to shared resources, data, and knowledge banks;

- access to external global networks (Internet);

- the use of various IT services (email; search engines; websites; online interaction with various commercial and public organizations; e-commerce, including the purchase or sale of tools of various types and sizes, market research, online banking, and other financial services, etc.), and more (Shynybekov et al., 2017).

1.3 Typology and Structure of ICT

There is a great variety of ICT used in creating the organizational and economic mechanism of enterprise fixed assets management. For example, such ICT can be grouped by the complexity of communication links (Maksimov et al., 2010):

- internal ICT to manage the relationship between the various intra- and inter-level system processes that occur in the organizational and economic mechanism of enterprise fixed asset management and provide information interaction between the

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internal elements of the "human – means of labor" system. This ICT is usually implemented via a wide variety of hardware and software and involves the linking of computer equipment in internal local area networks. A possible scheme of internal ICT used to create an organizational and economic mechanism of enterprise fixed asset management is shown in Figure 2:

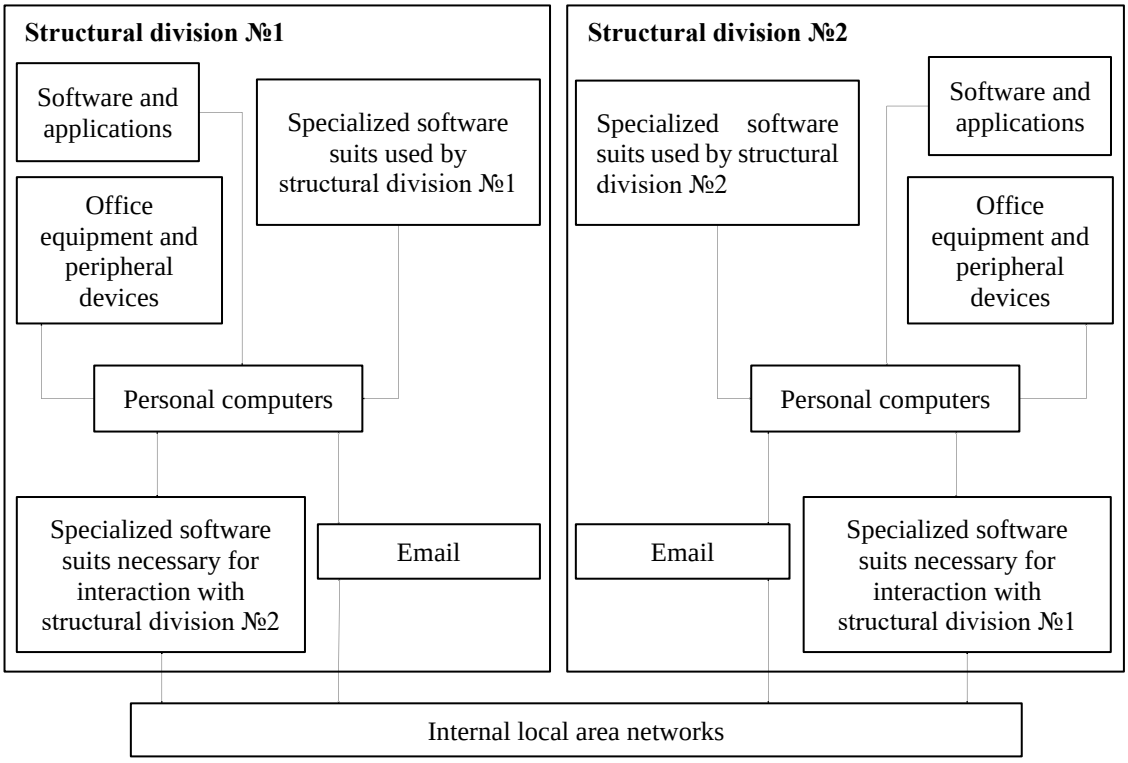

Figure 2. Scheme of internal ICT used for the formation of the organizational and economic mechanism of enterprise fixed assets management*.

*The scheme of internal ICT used for the formation of the organizational and economic mechanism of enterprise fixed assets management is developed by the authors.

- external ICT to manage external interrelations of the organizational and economic mechanism of enterprise fixed assets management, which provide information interaction with various counteragents (investors, creditors, labor market, sellers of machinery and equipment, lessors and leasers, other enterprises, public organizations, etc.). This external ICT is realized through various technical and software means and implies the connection of enterprise computer equipment to external global information networks. A possible scheme of external ICT used in the development of the organizational and economic mechanism of enterprise fixed assets management is presented in Figure 3.

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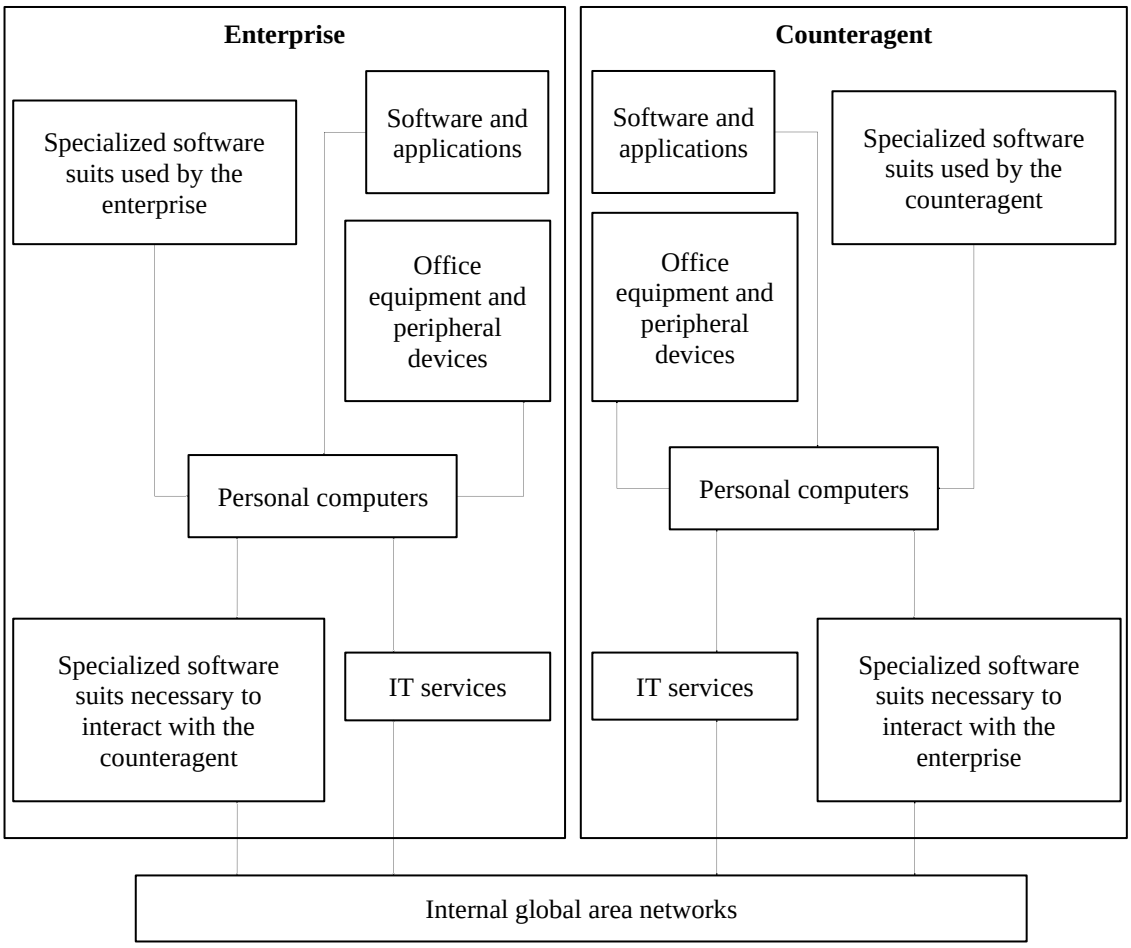

Figure 3. Scheme of external ICT used for the formation of the organizational and economic mechanism of enterprise fixed assets management*.

*The scheme of external ICT used for the formation of the organizational and economic mechanism of enterprise fixed assets management is developed by the authors.

There are certain requirements for the structure of ICT used in creating an organizational and economic mechanism of enterprise fixed asset management, which include the following:

- some elements that make up the structure of ICT must necessarily be used to form the organizational and economic mechanism of enterprise fixed assets management. Among these mandatory elements are personal computers, standard software, and basic applications (Stateynov, 2014);

- some elements in the ICT structure are not mandatory to be used for the formation of the organizational and economic mechanism of enterprise fixed assets management. For example, some types of office equipment, specialized application software packages, and e-commerce services are optional. However, the absence of such elements in the structure of ICT reduces the level of their development at the enterprise (Stateynov, 2014);

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- some elements within the ICT structure are interrelated and form a chain of elements of the structure. Possible examples of the chains of interrelated ICT elements used in forming the organizational and economic mechanism of enterprise fixed assets management are shown in Figure 4.

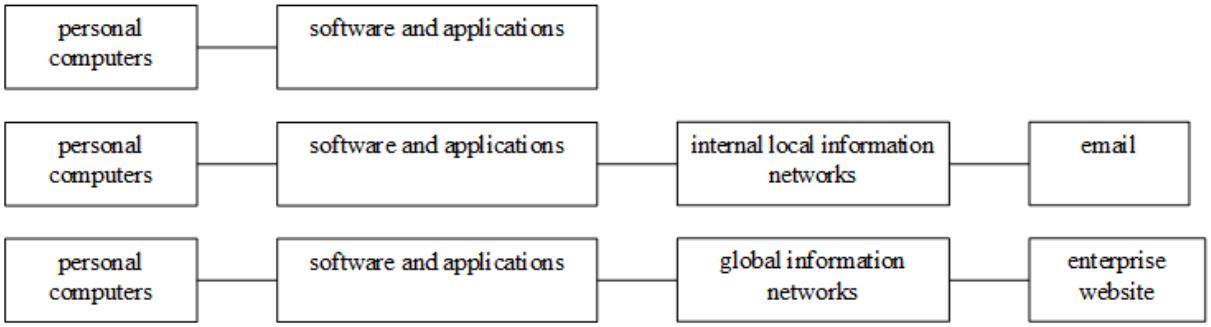

Figure 4. Chains of interrelated ICT elements used to form an organizational and economic mechanism of enterprise fixed asset management*.

*The scheme of the chains of interrelated ICT elements used to form an organizational and economic mechanism of enterprise fixed asset management is proposed by the authors.

The lack of individual interrelated elements in the structure of ICT used in building the organizational and economic mechanism of enterprise fixed assets management not only reduces the level of ICT development but may cause the inability to use ICT to manage the means of labor.

2 METHODS

2.1 Study Design

The present study assesses the efficiency of the use of ICT necessary to create the organizational and economic mechanism for managing fixed assets of the enterprise, which provide for interaction in "human – means of labor" systems.

To conduct this research, we have identified the methods of assessment and developed an organizational and economic mechanism of enterprise fixed assets management focused on the use of ICT.

2.2 Methods of Assessing the Level of Development of ICT Based on the Construction of Chains of Single-Quality and Different-Quality Structure Elements

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It should be pointed out that the level of development of ICT utilized in developing the organizational and economic mechanism of enterprise fixed assets management can be characterized by the number and length of the created chains of structure elements. Therefore, the level of development of said ICT should be determined by the method of accounting for chains of single-quality elements of the structure according to Formula 1:

$$LD_{ICT} = \frac{\sum_{i=1}^{n} k_i}{K} \quad (1)$$

where *n* is the number of possible chains of elements in the structure of ICT used to build the organizational and economic mechanism of enterprise fixed asset management;

k_i is the length of the i-th chain or the number of elements in the i-th chain of elements in said ICT structure;

K is the number of elements included in said ICT structure.

However, different types relating to the same element that forms chains can qualitatively differ from each other. Then the level of development of ICT employed in creating the organizational and economic mechanism of enterprise fixed assets management will be characterized not only by the number and length but also by the complexity of the created chains of structure elements. In this case, the level of development of the indicated ICT should be determined by the method of accounting for chains of different-quality elements of the structure according to Formula 2:

$$LD_{ICT} = \frac{\sum_{i=1}^{n} k_i \cdot c_i}{K} \quad (2)$$

where c_i is the complexity of the i-th created chain of elements in the structure of ICT involved in building the organizational and economic mechanism of the enterprise's fixed assets management.

The complexity of the formed chain of elements in the structure of ICT used to form the organizational and economic mechanism of enterprise fixed assets management depends on the complexity of each element involved in it. In turn, the complexity of each particular element in the ICT structure depends, for example, on the software version, the generation of personal computers, the type and performance of office equipment, the speed of data transmission over a local or global network, etc. The complexity of the formed i-th chain of elements of the structure of ICT used to create the organizational and economic mechanism of the enterprise's fixed assets management can be calculated by Formula 3:

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$$c_i = \frac{\sum_{j=1}^{m} c_{ij}}{m} \quad (3)$$

where *m* is the number of elements forming the i-th chain of elements in the structure of ICT used to form the organizational and economic mechanism of enterprise fixed asset management;

c_{ij} is the complexity of the j-th element included in the i-th chain of elements in said ICT structure.

The level of development of ICT used in creating the organizational and economic mechanism of enterprise fixed asset management (LD_{ICT}) calculated by one of the described methods is considered to be the higher, the closer the obtained value is to the number of possible chains of elements of said ICT structure *(n)*, and vice versa.

2.3 The Method of Comparison of Time Indicators Designed to Establish the Need for, Provision with, Use, and Level of Development of ICT

To maintain the level of development of ICT at the required level, one should promptly identify the need for, provision with, and use of ICT for the formation of the organizational and economic mechanism of fixed asset management of the enterprise (Traynev, 2013). The need for such ICT refers to a reasonable requirement of the subject of management to expand its managerial capacity, provision with the ICT signifies satisfaction of these requirements of the subject of management, and the use of the ICT means the level of realization of the management capacities by the subject of management.

Any management process, as a way of influencing the object of management to bring it to the desired state, involves the implementation of a variety of management functions, which can be grouped as follows:

- information support of management, which includes the collection, processing, and structuring of information about the object of management;

- analysis, including assessment of existing information about the object of management to develop management decisions;

- planning, including the development of management decisions to achieve the required result;

- implementation of management decisions, involving managerial impacts on the object of management that ensure its shift to the required state;

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- control and correction of management decisions, including control throughout management decisions and the introduction of changes in case of non-compliance with the requirements.

The enterprise's need for ICT used for the creation of the organizational and economic mechanism of fixed assets management is determined by the volume and complexity of the management functions performed. The more numerous and complicated the management functions performed in the "human – means of labor" interaction systems, the greater the need for the use of ICT in forming the considered management mechanism. Furthermore, the complexity of the performed functions defines the level of development and quality of the ICT employed in developing the organizational and economic mechanism of enterprise fixed assets management.

Thus, the need for ICT for the development of the organizational and economic mechanism of enterprise fixed assets management is a function of the volume and complexity of managerial tasks solved at the enterprise (Formula 4):

$$I_{need} = f(V, S) \quad (4)$$

where I_{need} is the need for ICT used for the creation of the organizational and economic mechanism of fixed assets management; V is the volume of management functions performed in the "human – means of labor" interaction systems; S is the complexity of the management functions performed in the "human – means of labor" interactions systems.

Notably, the more managerial functions need to be performed in the "human – means of labor" increaction systems, the longer time this process takes, and vice versa. The same applies to the difficulty of the management tasks performed in the "human – means of labor" increaction systems. The more complex a particular management function in said systems, the more time it takes to perform, and vice versa. Thus, the execution time of managerial functions in the "human – means of labor" interaction systems is a universal indicator that characterizes their volume and complexity (Sinatorov, 2009). The time of execution of managerial functions in the "human – means of labor" interaction systems for the period under consideration can be determined by Formula 5:

$$T_0 = \sum_{i=1}^{n} t_i \cdot V_i = \overline{t} \cdot \sum_{i=1}^{n} V_i \quad (5)$$

where *n* is the number of groups of managerial functions in the "human – means of labor" interaction systems by the time of their performance; t_i is the time of execution of the i-th group of management functions in said systems; $\overline{t}$ is the average time of performance of a managerial function in such systems; V_i is the volume (number) of

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managerial functions belonging to the i-th group in the "human – means of labor" interaction systems.

It is possible to establish the contribution of each factor (volume and complexity) to the time of performance of managerial functions in the "human – means of labor" systems of interaction for the considered period.

Contribution of the volume of management functions to their execution time in the "human – means of labor" interaction systems for the given period is determined by Formula 6:

$$\Delta T_0^V = \sum t_0 \cdot (V_1 - V_0) = \bar{t}_0 \cdot \left(\sum V_1 - \sum V_0\right) \quad (6)$$

where t_0 is the time of execution of a group of management functions in the basic ICT; $\bar{t}_0$ is the average time of performance of a management function in the basic ICT; V_1, V_0 is the volume (number) of management functions performed by the compared and basic ICT.

The contribution of the complexity of management functions to their execution time for the given period is determined by Formula 7:

$$\Delta T_0^t = \sum (t_1 - t_0) \cdot V_1 = \left(\bar{t}_1 - \bar{t}_0\right) \cdot \sum V_1 \quad (7)$$

where t_1 is the time of execution of a group of management functions in the compared ICT; $\bar{t}_1$ is the average time of performance of a management function in the compared ICT.

3 RESULTS

3.1 Differences in Methods of Accounting for Chains of Different-Quality and Same-Quality Elements of the Structure

Fundamental differences in methods of accounting for chains of different and same-quality elements of the structure to determine the level of development of ICT used in developing the organizational and economic mechanism of enterprise fixed assets management are quite evident from calculations on the example of the property management department of the enterprise, on the balance of which are the following types of elements of information and communication resources (Table 1).

Analyzing the composition of elements of the information and communication resources of the property management department of the enterprise, we should note the low level of complexity of local area networks and global information networks relating to the low speed of information flow.

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Table 1. Elements of information and communication resources on the balance sheet of the company's property complex management department

Elements of information and communication resources	Element complexity
Personal computers	0.7
Office equipment and peripheral devices	0.9
Software and applications	0.65
Local area networks	0.5
Global information networks	0.4
Email	1

Given that the majority of possible chains of elements in the structure of ICT utilized in the creation of the organizational and economic mechanism of enterprise fixed assets management use local area networks and global information networks, we draw a preliminary conclusion that the level of communication links in the "human – means of labor" interaction system is insufficient.

Both methods of identification of the level of development of ICT used in forming the organizational and economic mechanism of enterprise fixed assets management (considering same-quality and different-quality structure elements) assume establishing all the elements available for the construction of links.

For the implementation of the method of accounting for different-quality system elements, the complexity of each possible chain of ICT structure elements is established in Table 2.

As a result, it is found that the most complicated possible chains of ICT structure elements are the second and the sixth with a complexity of 0.75 and the least complicated are the seventh and eleventh chains, whose complexity amounts to 0.5833 and 0.5625, respectively.

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Table 2. Possible chains of elements of the ICT structure used in forming the organizational and economic mechanism of enterprise fixed asset management

Element of the ICT structure	Element complexity	Possible chains of elements in the ICT structure													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Personal computers	0.7	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Office equipment and peripheral devices	0.9		+		+		+			+	+			+	+
software and applications	0.65	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Local area networks	0.5			+	+	+	+					+	+	+	+
Global information networks	0.4							+	+	+	+	+	+	+	+
Email	1					+	+		+		+		+		+
Complexity of the formed chain of elements of the ICT structure		0.675	0.75	0.6167	0.6875	0.7125	0.75	0.5833	0.6875	0.6625	0.73	0.5625	0.65	0.63	0.6917

Then the level of development of the ICT used to create the organizational and economic mechanism of enterprise fixed assets management by the method of accounting for same-quality structure elements is:

$$LD_{ICT} = \frac{2+3+3+4+4+5+3+4+4+5+4+5+5+6}{6} = 9{,}5 \quad (8)$$

The result obtained by the method based on same-quality system elements indicates that the level of development of the ICT employed in forming the organizational and economic mechanism of enterprise fixed assets management can be considered above average, as 9.5 is greater than *14/2=7*.

However, the level of development of the ICT used to create the considered management mechanism calculated by the method of accounting for different-quality system elements amounts to:

$$LD_{ICT} = \frac{\begin{array}{l}2 \cdot 0{,}675 + 3 \cdot 0{,}75 + 3 \cdot 0{,}6167 + 4 \cdot 0{,}6875 + 4 \cdot 0{,}7125 + \\ +5 \cdot 0{,}75 + 3 \cdot 0{,}5833 + 4 \cdot 0{,}6875 + 4 \cdot 0{,}6625 + 5 \cdot 0{,}73 + \\ +4 \cdot 0{,}5625 + 5 \cdot 0{,}65 + 5 \cdot 0{,}63 + 6 \cdot 0{,}6917\end{array}}{6} = 5{,}8 \quad (9)$$

Thus, the value obtained by the method based on different-quality elements of the system suggests that the level of development of the ICT used to develop the organizational and economic mechanism of enterprise fixed assets management is below average, since 5.8 is less than *14/2=7*.

However, the level of development of ICT can be defined not only by the complexity of the elements and the length of the chain but also by the condition – operability – of the elements, which is not always available for quantitative assessment. In these conditions – conditions of uncertainty – it is advisable to use Bayesian

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Intelligent Technologies (BIT) based on the Bayesian Regularization Approach (BRA) (Prokopchina, 2021), which can be applied in various spheres of activity (Berezin et al., 2022) using software tools (Prokopchina, 2004).

Figures 5 and 6 present a fuzzy evaluation of the level of ICT development based on linguistic scales divided into nine classes, which gives an interval estimate of the calculation parameter.

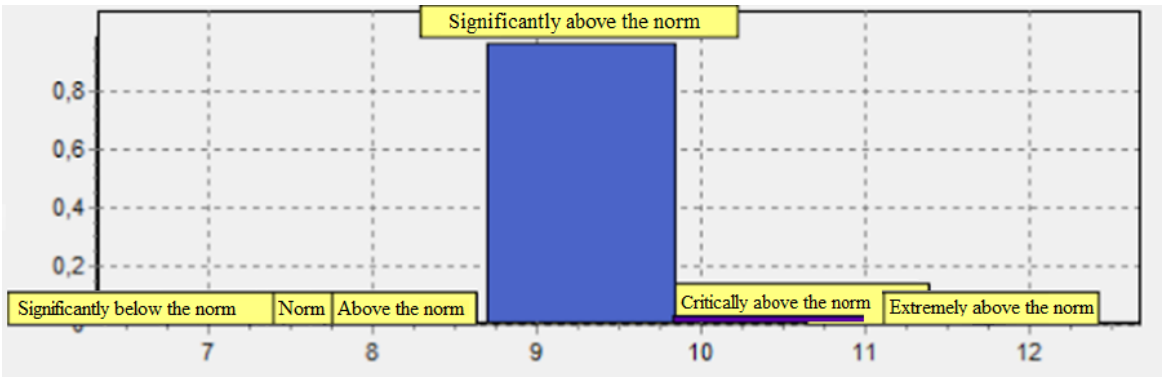

Figure 5. The level of ICT development by the method of accounting for the same-quality elements of the structure.

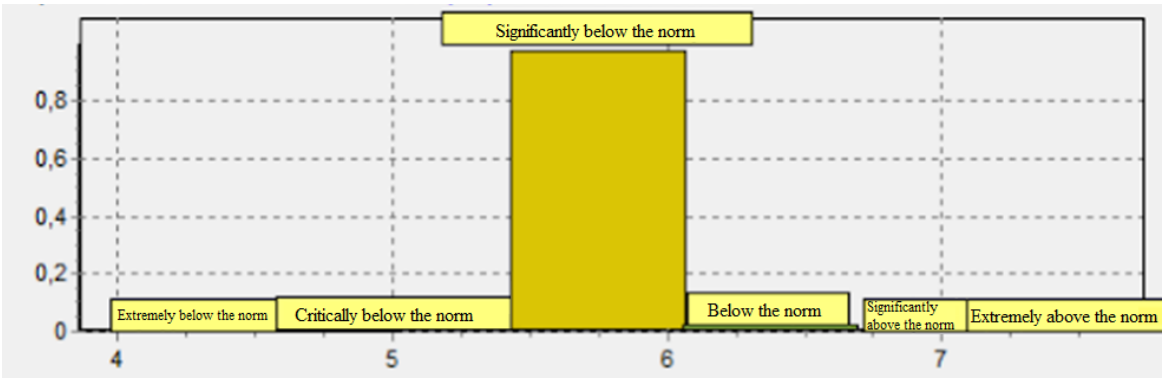

Figure 6. The level of ICT development by the method of accounting for the different-quality elements of the structure.

Thus, the seemingly satisfactory ICT used in the development of the organizational and economic mechanism of enterprise fixed assets management, according to the method of accounting for different-quality element chains, are not satisfactory, since they include elements of rather low complexity, as confirmed by the method based on same-quality chains of structure element chains. Therefore, an important managerial decision relating to the development of the ICT involved in creating the organizational and economic mechanism of enterprise fixed assets

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management is the replacement of obsolete, low-performing, and outdated elements of the ICT structure.

Operation of the enterprise in the context of the digital economy stipulates the need to maintain a high level of development of ICT used in the development of the organizational and economic mechanism of enterprise fixed assets management to meet contemporary requirements. For this, it is vital to pay attention to the development of each element in the ICT structure included in a created chain, as well as to provide for the correspondence of the level of development of each element included in such a chain.

3.2 Differences in ICT when Using the Time Characteristic Comparison Method

The ICT used to perform management functions in "human – means of labor" interaction systems differ in their level of development and quality. The higher the level of development and quality of the ICT utilized to form the organizational and economic mechanism of enterprise fixed assets management, the greater the volume and complexity of the functions they perform, which assumes a longer time to execute these management functions, and vice versa. For this reason, the time of execution of managerial functions by ICT as part of creating the organizational and economic mechanism of enterprise fixed assets management determines the need for them. In other words, the longer the time it takes the ICT to perform the managerial functions, the higher the need for these ICT (Khlynin, 2020; Korovkina et al., 2020). Then the need for ICT utilized in the development of the organizational and economic mechanism of enterprise fixed assets management is a function of the time of execution of management functions:

$$I_{need} = f(\mathrm{T}_0) = \frac{\mathrm{T}_0}{P} \qquad (10)$$

where T_0 is the time of performance of the management functions of the considered ICT involved for creating the organizational and economic mechanism of enterprise fixed assets management; P is the required time of execution of all management functions in the "human – means of labor" interaction systems.

A graphic illustration of the relationship between the need for ICT used in creating the organizational and economic mechanism of enterprise fixed assets management and the time of performance of management functions in the "human – means of labor" interaction systems is provided in Figure 6.

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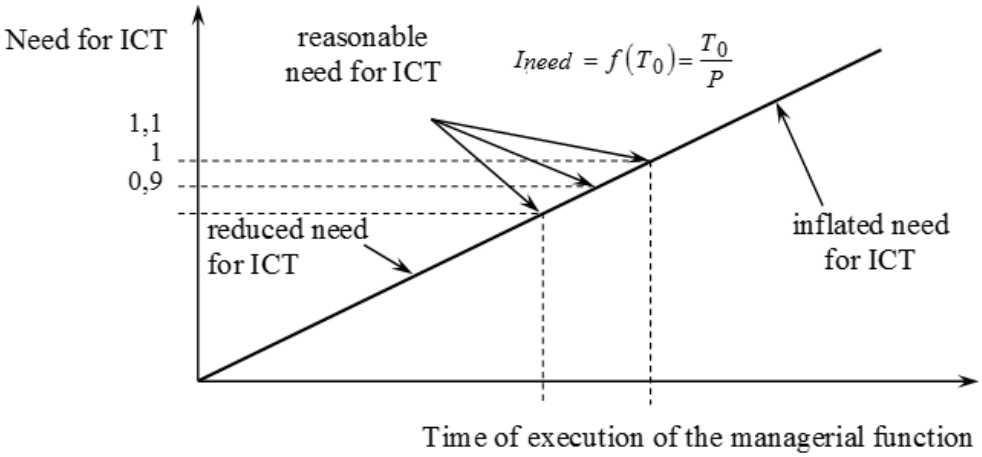

Figure 7. Dependence between the need for ICT used to form an organizational and economic mechanism of enterprise fixed assets management, and the time of execution of management functions in the "human – means of labor" interaction systems*.

*The dependence between the need for ICT used to form an organizational and economic mechanism of enterprise fixed assets management, and the time of execution of management functions in the "human – means of labor" interaction systems is proposed by the authors.

A reasonable need for the ICT used to form the organizational and economic mechanism of enterprise fixed assets management is equal or close to one. If the need for such ICT is significantly higher than one, it is considered inflated, and if it is significantly lower than one, it is low.

To assess the provision with the ICT used to form the considered organizational and economic mechanism, нhe nominal time of execution of management functions by the ICT must be compared with the time required to perform all management functions in the "human – means of labor" interaction systems (Kursky et al., 2021). Then provision with the ICT used to develop the organizational and economic mechanism of enterprise fixed assets management can be identified by the Formula 11:

$$I_{pr} = \frac{T_1}{P} \qquad (11)$$

where T_1 is the nominal time of execution of the management functions by the ICT involved in building the organizational and economic mechanism of enterprise fixed assets management.

The value of the calculated indicator equal to one indicates the full provision of the enterprise with the ICT used for the formation of the organizational and economic

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mechanism of fixed assets management. If the calculated indicator is greater than one, the enterprise's provision with the ICT of interest is higher than the required, and if it is less than one – lower than the required.

Determining the use of the ICT employed in creating the organizational and economic mechanism of enterprise fixed assets management requires comparing the actual time of execution of the management functions by the ICT with the nominal time. In this way, the use of ICT for building the organizational and economic mechanism of enterprise fixed assets management can be determined by Formula 12:

$$I_{\text{use}} = \frac{F}{\mathrm{T}_1} \qquad (12)$$

where *F* is the actual time of performance of the managerial functions by the ICT used in developing the organizational and economic mechanism of enterprise fixed assets management.

The calculated parameter equal to one indicates the full use of the capabilities of the ICT to create the organizational and economic mechanism of enterprise fixed assets management. If the value is lower than one, the capacities of the ICT are not used to the full. The level of development of the ICT utilized in forming the organizational and economic mechanism of enterprise fixed assets management calculated through comparison of their time parameters is characterized by the ratio of the nominal time of execution of management functions by the ICT and the time of execution of management functions by the best ICT. The level of development of the ICT involved in building the organizational and economic mechanism of enterprise fixed assets management is thus calculated by Formula 13:

$$L_{ICT} = \frac{\mathrm{T}_1}{max\,\mathrm{T}_0} \qquad (13)$$

The value of the parameter close or equal to one suggests that the ICT used by the enterprise to create the organizational and economic mechanism of fixed assets management is modern. In turn, if it is lower than one, the employed ICT is obsolete.

The method of comparing the time parameters of the ICT for the formation of the organizational and economic mechanism of enterprise fixed assets management should be considered not only as another way of determining the level of ICT development, but also as a way of establishing the need for, provision, and use of ICT. To implement the considered method it is necessary to establish the values of the time characteristics of the ICT used for the development of the organizational and economic mechanism of enterprise fixed assets management (Table 3).

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Table 3. Values of the time characteristics of ICT used for the formation of the organizational and economic mechanism of enterprise fixed assets management

Time characteristics	Symbol	Value, hour
The time to perform all managerial functions in the "human – means of labor" interaction systems	P	3,260
The time of management functions execution of the best ICT available on the market for ICT	$maxT_0$	4,900
The nominal time of execution of managerial functions by the ICT used to form the organizational and economic mechanism of enterprise fixed assets management	T_1	3,610
The actual time of execution of managerial functions by the ICT used to form the organizational and economic mechanism of enterprise fixed assets management	F	2,940

The values of the time characteristics of the ICT used in building the organizational and economic mechanism of enterprise fixed assets management indicate:

- inflated need for new ICT, since

$$I_{\text{need}} = \frac{4900}{3260} = 1{,}503; \quad (14)$$

- sufficient provision with ICT, since

$$I_{\text{pr}} = \frac{3610}{3260} = 1{,}107; \quad (15)$$

- low level of ICT use, since

$$I_{\text{use}} = \frac{2940}{3610} = 0{,}814; \quad (16)$$

- low level of ICT development, since

$$L_{\text{ICT}} = \frac{3610}{4900} = 0{,}737. \quad (17)$$

Proceeding from this relationship of the time characteristics of ICT, we conclude that the low level of development of the ICT employed in creating the organizational and economic mechanism of enterprise asset management should be established based not on the availability of various modern structural elements, as it is done in methods of accounting for chains of same-quality and different-quality elements of the ICT structure, but by the level of demand for them in the execution of management functions in "human – means of labor" interaction systems.

4 CONCLUSION

The considered basic parameters of the development of ICT for creating the

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organizational and economic mechanism of enterprise asset management provide an opportunity to assess the quality of the utilized ICT at any time and promptly implement the necessary measures to maintain them at the required level.

The fairly high rate of development of modern society is particularly noticeable in the field of ICT. Therefore, in order not to lose competitive advantage in this direction and to ensure the quality of the formation of the organizational and economic mechanism of enterprise fixed assets management at the required level, we recommend constantly monitoring new trends in the development of ICT and, if possible, introducing the most critical of them in the management of interaction in the "human – means of labor" systems. The key problem of maintaining a high level of development of ICT utilized in creating an organizational and economic mechanism of enterprise fixed asset management is the limited investment resources. For this reason, managers are always faced with the optimization task of selecting the best option to improve the ICT used in forming the organizational and economic mechanism of the enterprise's fixed assets management under conditions of limited investment resources. In our opinion, the degree of success in solving this problem at the enterprise defines the level of development of ICT used to develop the organizational and economic mechanism of fixed assets management.

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