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UPDATING MANAGEMENT MODELS IN TERMS OF ENTERPRISE MANAGEMENT INTELLECTUALIZATION

Abstract. The article explores the dynamics of the proportion of adult population among the Internet users and the use of information and communication technologies by enterprises in Ukraine. The different impact of digital technologies on economic development of a number of countries is considered. The dynamics of the number of scientific as well as scientific and technical studies in the structure of GDP of Ukraine is analysed. The change of the quantity of industrial enterprises that carry on innovative activity is considered. Peculiarities of the change in volumes of realized innovative products of the Ukrainian enterprises during the period of 2005-2015 are identified. Key risks and reserves of strengthening the intellectualization processes of the enterprise management systems are determined. There are formed priority tasks for management systems of enterprises in conditions of dynamic development of information and communication technologies as well as processes of intellectualization.

Keywords: intellectualization, management system, model of management, knowledge, integration, efficiency, innovation.

Formulation of the problem

The current economic outlook and management paradigm are formed through the prism of the categories of “intelligence”, “knowledge economy”, “information economy”. This leads to the occurrence of such terms of management and economic science as comprehensive globalization, the increasing role of human factors, the commercialization of the Internet, large-scale development of the intellectual potential and capital of enterprises, the use of deep institutional, technological and cultural environment.

At the same time, the current world is experiencing the best opportunities for intellectual growth in space and time due to the largest information and communication revolution in the history of mankind. After all, more than forty percent of the world's population has access to the Internet, and every day in the network there are new users that dynamically expands the boundaries of digital intellectual economy.

So, M. Castells names the modern economy informational and global. Informational, because the competitiveness of agents in an economy is determined

primarily by their ability to collect, process and use information, which is based on knowledge and global – because the principal economic activities are organized on a global scale. Informational and global efforts for the achievement of a certain level of performance and the existence of competition can only take place within a global network [1, c. 81].

V. Heyets believes that in the new economy the decisive factor is the process of accumulation and use of knowledge: “in economy the knowledge is defining the intellectual potential of the society on which it relies and which is a collection of everyday and specialized knowledge.” [4, p. 17].

Under such conditions the task of management is to ensure the ability to take advantage of rapid technological change, to overcome the traditional problems of development, to intellectualize management model (management system) and provide the growth of competitiveness.

Analysis of recent research and publications

Investigation of various aspects of the problem of formation of information economy, impact of information and communication technologies, online tools, personalized knowledge and intangible assets in the determination of competitive advantages of modern economic processes and management of enterprises finds its light in the works of such Ukrainian scientists as L. Fedulova [2], L. Melnik [6], V. Shevchenko [12], N. Shpak [13] and foreign researchers G. Kolodko [3], S. Tesyera and A. Rogera [15], T. Steward [14] and others. However, studies done by researchers insufficiently disclosed the interrelation between implementing the processes of intellectualization at national enterprises, on one hand, and obtaining economic benefits and effective management by these enterprises, on the other hand.

In fact, a study of the latest trends in the field of intellectualization of the economy and their impact on the enterprise management system will enable us to comprehend and summarize the key factors of actualization of management models and the process of formation of intellectual-knowledge assets of enterprises

The purpose of the article is to analyze the dynamics of using information and communication technologies, their impact on the implementation of innovation and the risks and opportunities of the growing process of intellectualization management systems of industrial enterprises.

Presentation of the main material

The modern expansion of access to digital information and knowledge technology brings the staff of enterprises a wealth of choice and great convenience. By strengthening the integration of specialists and units, increasing efficiency and implementing innovations, such access opens the opportunities to enterprises management and employees of which they were previously denied.

For example, digital databases and payment systems, new technologies entering the labour market, e-commerce, work in the Internet or in the field of business processes outsourcing, electronic document management, digital system identification expand access to public and private services etc.

To provide maximum access to digital technology and intellectual-knowledge databases within enterprises, we need investments in the development of service infrastructure and intellectualization of processes that will improve the speed of decision making, subsystem integration, online planning and forecasting of economic activities, will stimulate the intellectual and professional partnerships from the research and development areas and establish effective criteria and forms of motivation and regulation.

Companies will be able to get the maximum benefit out of the processes of intellectualization of the management systems and reforms in the information and communication sector provided they are continuously stimulating intellectual activities of the staff, improving business environment in the units, investing into training and retraining and socio-cultural sphere, as well as improving labor conditions and safety, and promoting effective governance.

Without this foundation, availability of individual information and communication implementations will provide neither the growth of productivity nor the change of the management model.

Comprehensive intellectualization of all spheres of public life in Ukraine, economic activities of enterprises and their management systems is spreading much slower than individual elements of information, communication and digital technologies. Accordingly, the achievements of the intellectual-knowledge economy – the wider benefits for the development of enterprises from the use of technologies – are lagging

behind in times or whole decades in comparison with the developed countries of the world. In post-industrial countries the integration of intellectual potential of the staff of the enterprises and information and communication technologies to deliver sustainable economic growth create opportunities for the production of innovative products, increase the effectiveness of management. However, the combined effect of the Ukrainian enterprises from the use of these possibilities, is much lower than expected and is unevenly distributed in terms of scale of enterprises and economic activities. To gain competitive advantage from the use of information and digital technologies, most of the enterprises need to overcome the “intellectualizing gap” that persists, particularly in the area of access to electronic databases via the enterprise Internet and in the status of “closed” models of management. However, large-scale introduction of digital technologies is not able to ensure the high efficiency of the management system of enterprises. To maximize the potential of the digital revolution, the country's government and businesses need to implement systematically the “analog extensions”: to improve the legislation that ensures competition between economic entities in all national markets, strictly ensure the accountability of public institutions, allow the qualification of the staff of the enterprises in accordance with the requirements of a new intellectual-knowledge economy, dynamically upgrade the management system.

Digital technologies – Internet, mobile phones and other means of collection, storage, analysis and exchange of information in digital format – are spreading rapidly. In developing countries the number of households possessing a mobile phone is more than 70 %, in Ukraine more than 88 % [19]. Over the last ten years the number of Internet users in Ukraine grew up in almost four times: in 2005 it was 15 %, and at the beginning of 2016, according to an expert estimation, reached 62 % of the adult population of Ukraine (Fig. 1).

The proportion of users among people aged 18-39 years in Ukraine has reached 91 %, this is according to a survey by Kyiv International Institute of Sociology [16]. According to sociologists, the number of Internet users continues to grow faster than it was predicted. The main axes of the differences in Internet development in Ukraine remain unchanged, it is the age and type of settlement. As before, there is a linear inverse relationship between age and use of the Internet. The younger he or she is, the higher is the Internet penetration. The use of the Internet varies significantly depending on region of residence. Most households with a home connection is observed in

Kyiv (78 %), while in Kirovohrad region the number is nearly 2.5 times less.

On the other hand, among the surveyed enterprises of Ukraine in 2015 95.2 % used computers in their activities (in 2011 it was 87.7 %). The share of enterprises having access to the global Internet was 98.0 % (in 2011 – 86.2 %) from the total number of enterprises that used computers (Fig. 2).

Out of the total number of enterprises that used computers, 62,0 % (60,6 %) used in-house computer networks, while enhanced internal

computer networks were used by almost every seventh enterprise. However, the number of employees of enterprises that used computers in their work constituted 34.5 % (28.2 %). Comparing internationally, Ukraine is in the segment of the countries with low GDP per capita; slightly higher than the world average index of implementing digital technologies by businesses – 0.41 (world average being 0.39) and the index of digitalisation of people – 0.67 and 0.71, respectively (Fig. 3).

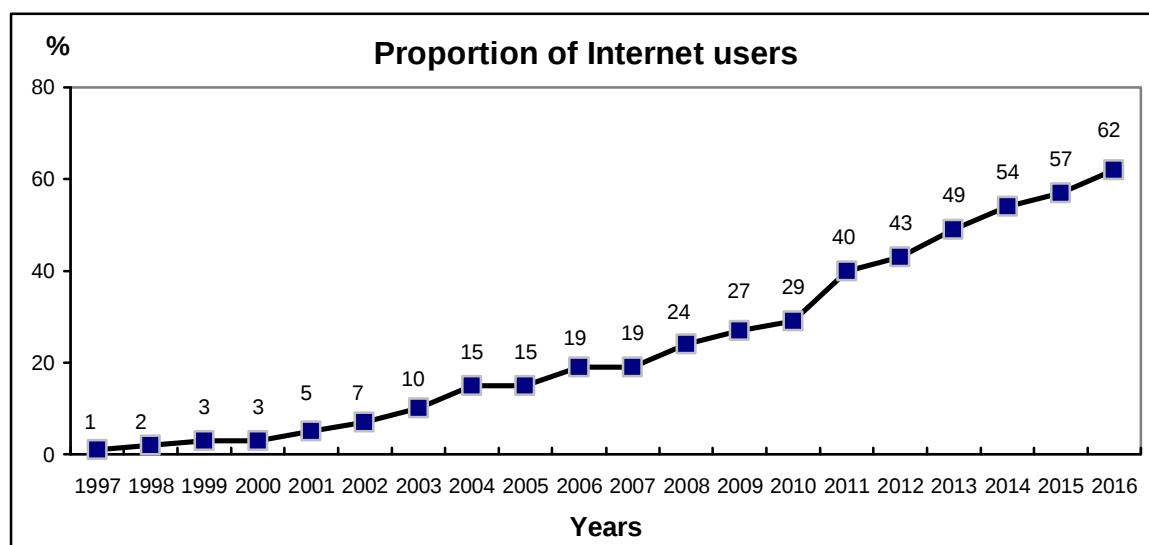


Fig. 1. The dynamics of internet users among the adult population of Ukraine

Note: The author constructed it on the basis of source [16].

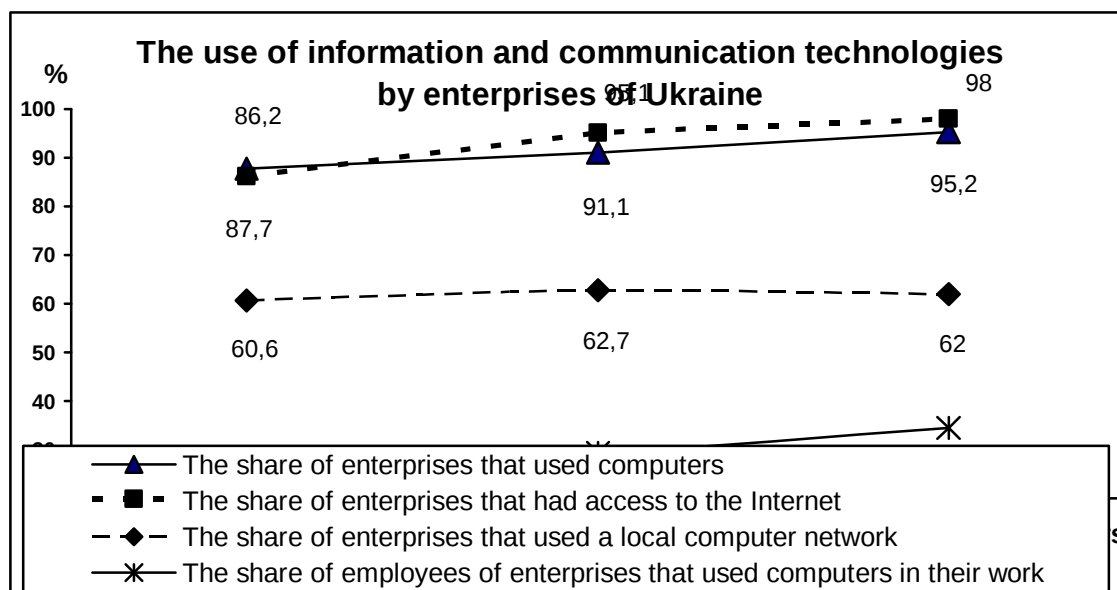


Fig. 2. Dynamics of the use of information and communication technologies by enterprises in Ukraine for the period 2011–2015, %

Note: The author constructed it on the basis of source [17].

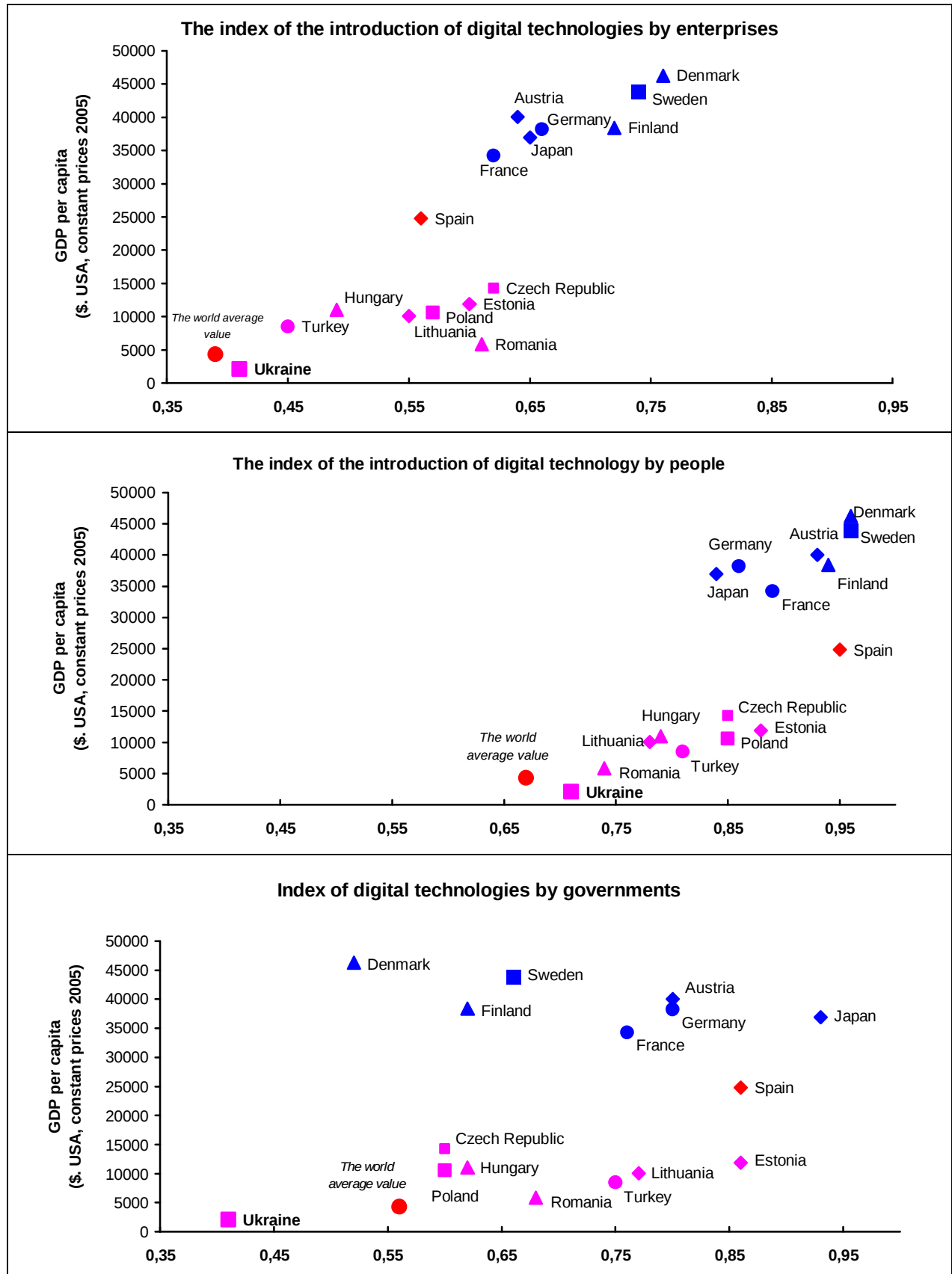


Fig. 3. The proliferation of digital technologies in a number of countries in the world

Note: The author constructed it on the basis of source [18].

The features of the world information progress indicate that at present communication networks bring together businesses, staff and individual specialists much faster, more systemically and functionally than ever before. The digital revolution offers opportunities and benefits not only to individuals in the field of efficient and convenient communication, information, free digital products but also to socio-economic systems.

However, technology can be a driving force of entrepreneurship and management transformation only when it is part of a more systematic and comprehensive process of intellectualization of the enterprise activities on the way to their dynamic competitiveness. It is the system of digital identification of growth of intellectual capital of companies, combined with mechanisms of motivation to acquire new knowledge. It allows to solve complex information and knowledge problems expanding functional and professional relationships. And, therefore, it forms the adequate tools for management to ensure integration between subsystems, units and levels of management. The portal of the local computer network of the enterprise integrates with the global Internet, systems of enterprise e-Commerce, recruiting and training of staff, and payment and stock banking platforms, financial and fiscal systems. These systems, combined with the creative ideas of development, significantly reduce coordination costs and thus continually improve the efficiency of management systems. The information and communication platform enables the efficient use of savings from the rapid exchange of knowledge and experience in space and time, individualization of performance objectives and localization of the workplace, achieved through online communication and automation. This allows creating large-scale innovations in the operating and management systems of enterprises.

The creation and transfer of knowledge, strengthening the integration between management levels, subsystems, units and personnel, introduction of innovations and comprehensive improvement of the management efficiency are the main intellectualization process mechanisms components to be used by enterprises for building their competitive advantages.

In fact, as it is rightly noted by scholars [5, p. 11], qualitatively new role of knowledge in economic performance has led to “new organizational and managerial solutions in the field of acquisition, distribution, storage, and distribution of knowledge, shaping it to the form that is suitable and convenient for internal use”. Thus, a common phenomenon in the modern

economy is the presence in the enterprise management structure of such staff positions as Vice-President on Intellectual Capital Management, Director of Knowledge Management, Director of Intangible Assets Management, Intellectual Assets Manager, head of the department of Human Resource Development and Knowledge Management etc. [5, p. 11]. Hence, one of the new duties of such managers is to bring ideas and innovations to the company's personnel who have no direct contact with the knowledge community.

These processes, as the scientist believes, have led to significant changes in the sphere of employment, its structure and content: development of non-traditional forms of employment and work organization – remote employment; reduction of the share of workers employed in the manufacture of a standard mass of material goods and an increase in those concerned with the provision of information, advisory and innovative services; increase in the proportion of workers of new knowledge-intensive professions; reduction of standard, massive, stereotyped operations and increase of the role of innovative creative work; the growing importance of physical and mental health of staff, their socio-psychological and moral-ethical qualities; individualization of the economically active human; changes in components of human resource management [5, p. 12].

At the same time, the dynamic growth and impact of new knowledge and information technologies on the amount of scientific and technical work in the structure of GDP of Ukraine, the number of industrial enterprises engaged in innovation activities, as well as the dynamics of sales of innovative products of Ukrainian enterprises so far do not justify the expectations from such change (Fig. 4–6).

It should be noted, that despite the significant strengthening of relationships between enterprises, scientific organizations, universities of Ukraine, the rate of productivity growth, intelligence capacity and innovation in products, the number of researchers, the number of authors of intellectual property rights at the national level have steadily reduced, and some parameters have shown a dynamic decline.

Despite the fact that the elements of the knowledge economy and digital technology are changing the way of thinking and labor there is observed polarization among enterprises – especially between different economic activities and markets, but also increasingly among enterprises with different number of personnel.

Updating Management Models in Terms of Enterprise Management Intellectualization

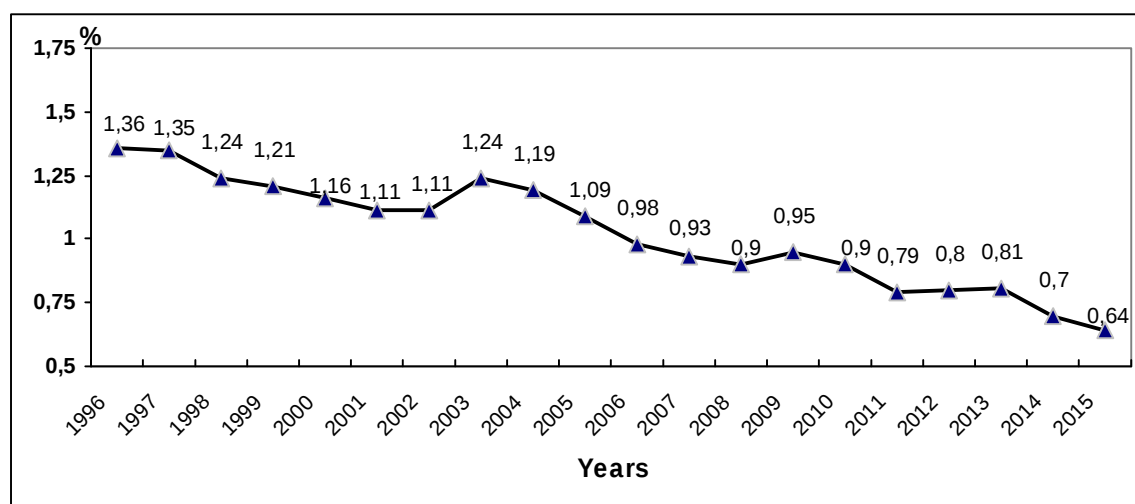


Fig. 4. The proportion of the volume of scientific and technical work in Ukraine's GDP

Note: Constructed by the author on the basis of sources [7-11].

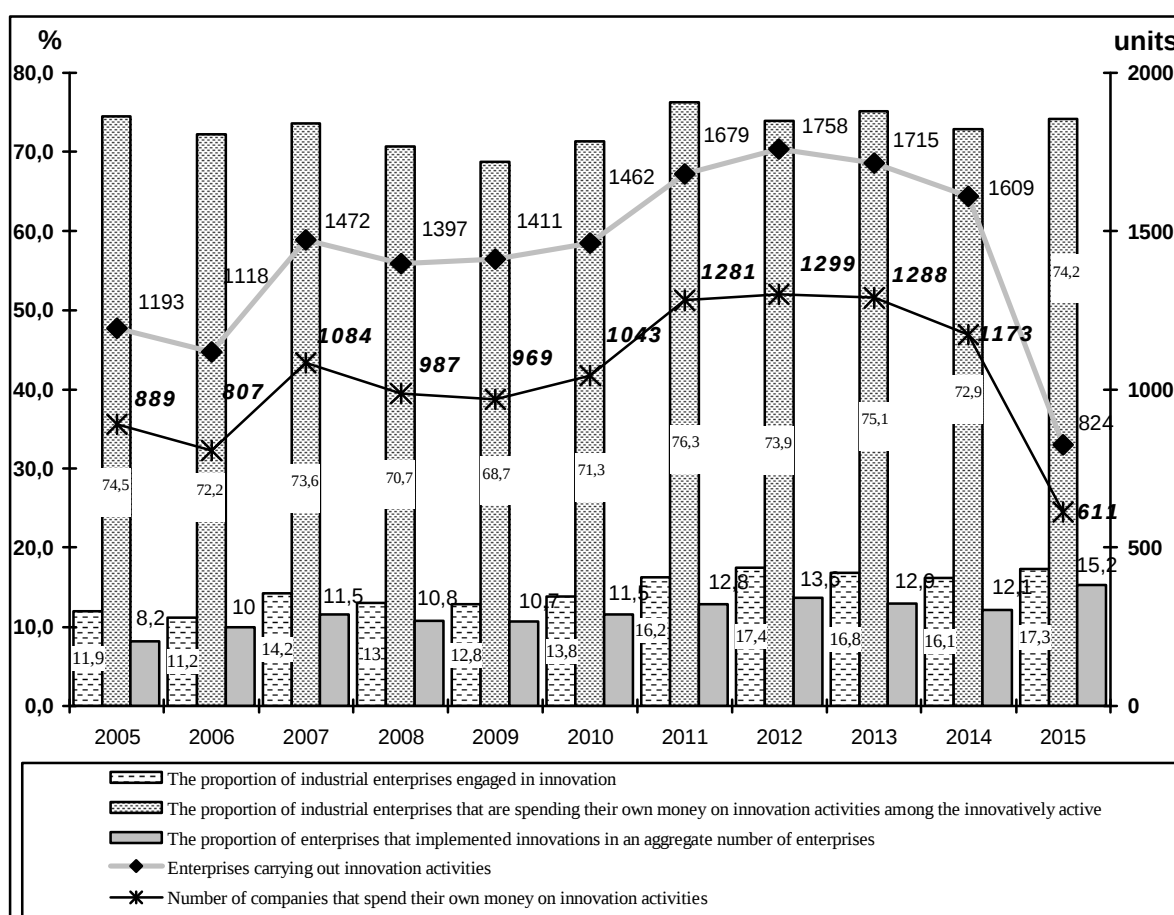


Fig. 5. ¹Dynamics of the number of industrial enterprises engaged in innovation activity, financed by their own funds in 2005–2015

Note: Constructed by the author based on sources [8–12]. ¹ Starting with the report for 2015 – legal entities of economic activities in the industry with the number of employees 50 people or more. Due to changes in organization and the state statistical observation of innovation activities of industrial enterprises a direct comparison of the data for 2015 with similar data for previous years is incorrect.

And, although the number of enterprises engaged in innovation activities is slowly growing, the proportion of those who spend money on the acquisition of the scientific research works and knowledge with product, process and non-technological (organizational) innovation is

reduced. Unstable is the number of enterprises which finance innovation activities from external sources. These tendencies persist, though not through deficit of intellectual and knowledge products or digital technologies, but contrary to them.

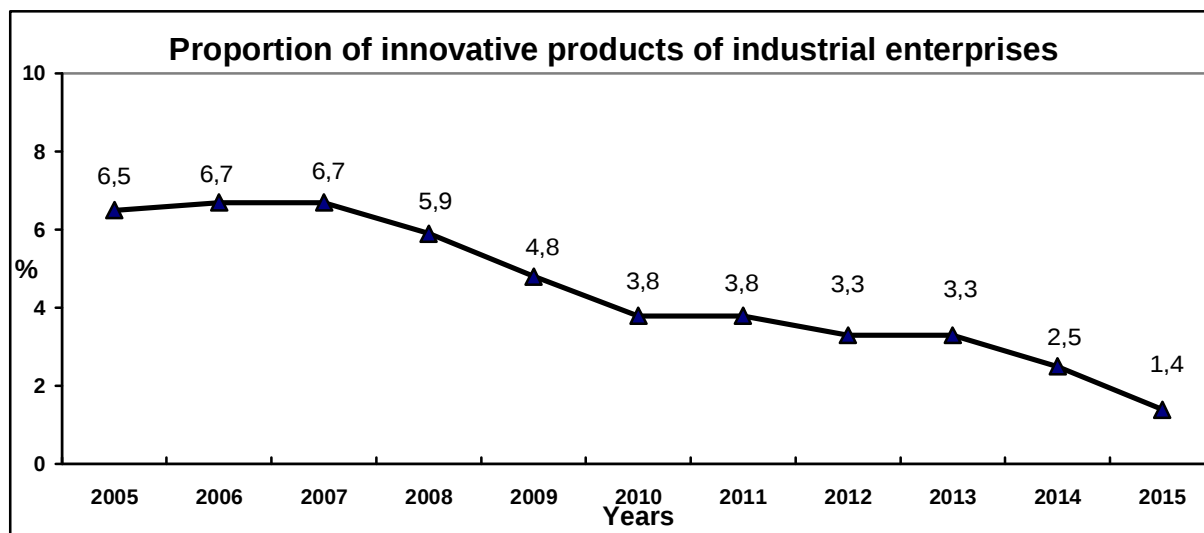


Fig. 6. The dynamics of sales of innovative products in the total volume of industrial products, percents

Note: Constructed by the author, based on sources [8–12].

Thus, the process of intellectualization among the national enterprises is spreading, but the economic benefits and the efficiency of management due to intellectualization is not. Why? Among the key reasons we can highlight the following.

Firstly, almost 80 percent of industrial enterprises employing 61.8 percent of all employed workers are not so far engaged in innovation activities and, therefore, can not use or play any significant role in the process of intellectual-knowledge and digital economy.

Secondly, many of the anticipated benefits from the processes of intellectualization are reduced to nothing by the risks generated by the oligarchic-clan, non-competitive model of the national economy and management (Fig. 7). On the one hand, a number of companies are not very active in the processes of intellectualization or innovation, because their competitive advantage is obtained from such sources as: a monopoly position in the market; lobbying regulatory acts; imperfection of transfer pricing; offshore schemes and corrupt connections with the authorities and justice and

the like. And as the economy of the Internet contributes to the natural and artificial monopolies, the lack of a competitive business environment leads to increasing concentration in the markets. It is beneficial for established businesses that have the right connections and minimize their risks due to the economy of scale, but it restricts the growth of knowledge, distribution of the gains of the digital revolution and intellectual development of personnel.

Note that in terms of the types of economic activities, enterprises are faced with the increasing polarization of labour markets and growing inequality because new knowledge, technologies and intellectual capital, on the one hand, complement the available more qualified work of employees and, on the other hand, they replace the standard labor operations forcing many workers to compete for low paid jobs. In the management systems of enterprises these processes rapidly maximize individualization of workplaces in terms of their technological and functional content, instead of deepening their integration and expanding their multi-functionality.

Updating Management Models in Terms of Enterprise Management Intellectualization

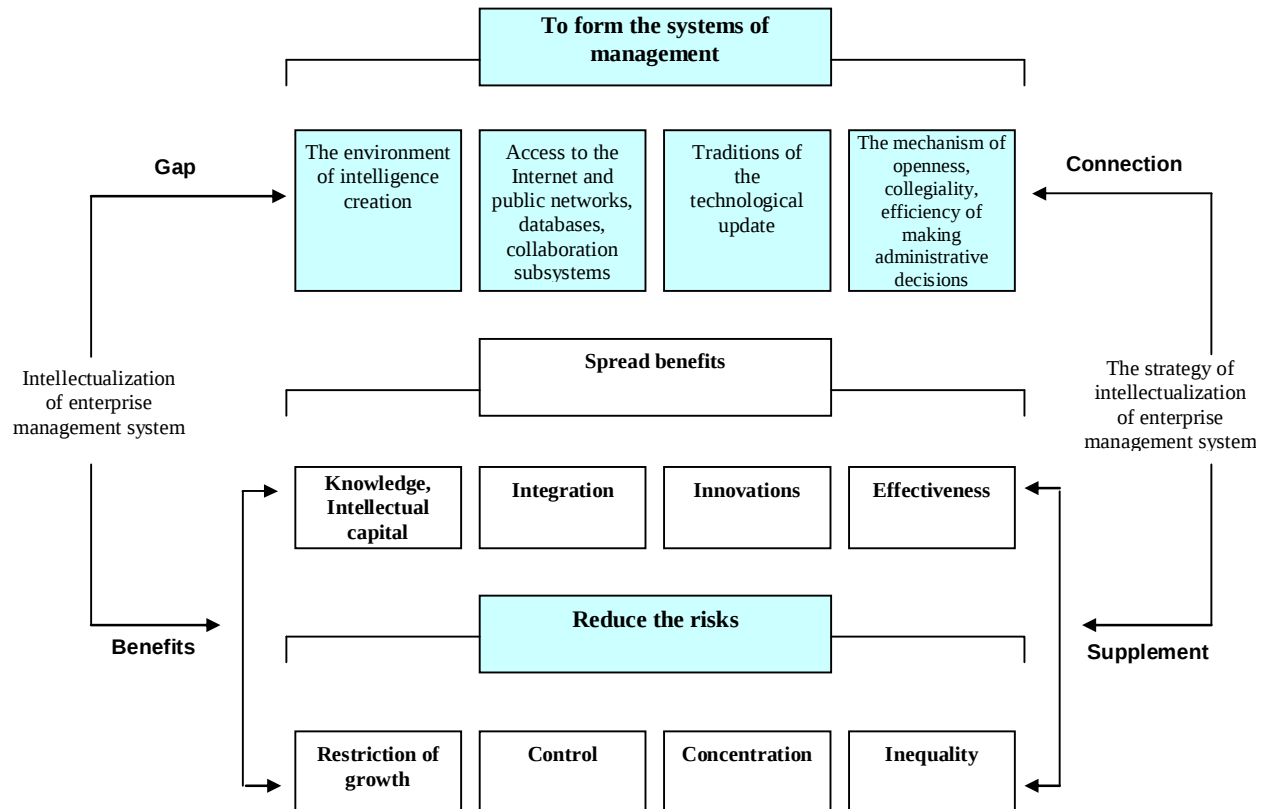


Fig. 7. Risks and opportunities of strengthening the processes of intellectualization of of enterprises management systems

Note: Formed by the author

In the management systems there is observed no generated environment of intellectual creation, effective instruments of accountability and coordination between levels of management, sub-systems and units. Under such conditions, investments in the development of digital technologies or personnel will increase exclusively the influence of managerial elites.

This can lead to the subordination of the enterprise policies to the interests of the institutional establishment and to strengthening of authoritarian control over the personnel. This is evidenced by great differentiation in payment between top management and middle level managers as well as technical and operational personnel.

Competitive economic growth is possible through increasing productivity, intellect-intensive jobs empowering employees and intellectualization of the tools of management technologies. Such approaches will really motivate to work more efficiently and organize and coordinate the processes with better quality. These are the areas of

enterprise activities where investments in intellectualization will provide particularly significant benefits.

To get the most benefits from intellectualization, you need a deeper understanding of the nature of interaction between the intellectual and technological component and other factors that are important for the development of management designated as “analog supplements”. Intellectual technologies can make solutions to common management problems with a large volume of transactions less costly, much more efficient and convenient for personnel. But most of the functions, tasks and tools of management have aspects that cannot be automated or computerized.

Their implementation requires intelligence, thought, idea, intuition and discretion of the manager. If the intellectual technologies are used for automation of functions without a corresponding improvement of supplements, they may not provide a large-scale impact. Intellectualization can generate new management models, being advantageous for management

systems and personnel. But this is not possible in places where the process of management is conservative due to the absence of intellectual environment for creating management innovations. Intellectual technologies can increase the productivity of managers and employees. This does not concern those who do not have enough skills and knowledge required for implementation of these technologies and who are not motivated to use them creatively. Intellectual technologies help monitor the presence of managers and employees in the workplace, monitor operating activities, electronic paperwork and improve the overall performance. But this is not relevant for cases where there is no accountability of management systems and units to their higher and lower levels of management.

Considering the logics of the above said, key priorities for management systems should be:

- *formation of intellect-creating environments* where there would emerge platforms (Internet chat rooms, groups, online sites) for discussion, creation, and transfer of intellectual products;

- *widespread access to the Internet and open networks and databases* of companies for all the intellectually active personnel;

- *creation of tradition among the personnel in terms of creativity, intellectual activity and initiative* aimed at dynamic technological update of operating activities;

- *formation of mechanism of openness, collegiality, efficiency* of management decision-making and discussion of the strategic alternatives on the basis of innovation-oriented thinking of leaders.

Providing information and technological capabilities, in parallel it is necessary to develop a strong institutional and motivational analogous foundation, which will combine:

- *regulatory framework*, creating a dynamic intellectual and proprietary environment that will allow intelligence media, creative intelligence groups, management systems, and departments to evaluate legally the created intellectual product, identify the objects of intellectual property rights, generate motivational mechanisms, as well as to fully use the intelligent products and digital technologies for competition and future innovations;

- *classifier of intelligence competencies and skills* that will allow managers and employees

to capitalize on opportunities in the field of intellectual creation, in particular, to provide Internet training for personnel development;

- *accountable management subsystems* that should be targeted and use intellectual products, media platforms, Internet technologies to increase the participation, rights and opportunities of the staff in corporate life.

Conclusions and perspectives of further research

These additional factors concerning favorable knowledge and intellectual environments, valuable human capital and effective management constitute a solid foundation for the economic and social effectiveness of the development of enterprises, ensuring their competitiveness. Therefore, the factors that facilitate intellectualization, such as integrated intelligent information services, digital identification to intellectual property rights, corporate intellectual and social networks and open knowledge base data will spread the benefits to all operational and business, social and economic activities of enterprises as well as their stakeholders. At the same time, they will strengthen the relationship between intellectual capital and its additions in the strategic dimension. These trends will form the basis for the development of management models that are appropriately modern and competitive. Further studies should develop the integration mechanism of enterprises management subsystems components based on management intellectualization.

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