

Ihor Halysia

E-mail: igalica@ukr.net

Doctor of Economics , Full Professor of National
University of Food Technologies

ORCID ID: 0000-0002-1276-5743

Kyiv, Ukraine

Oleksii Oleksiuk

E-mail: oleksiuk@kneu.edu.ua

Doctor of Economics, Full Professor
of Kyiv National Economic University named after Vadym Hetman

ORCID ID: 0000-0002-3407-6201

Kyiv, Ukraine

Olha Prokopenko

E-mail: prokopenko.olha.w@gmail.com

Doctor of Economics, Full Professor
Sumy State Makarenko Pedagogical University

ORCID ID: [0000-0003-1362-478X](https://orcid.org/0000-0003-1362-478X)

Sumy, Ukraine

Giorgi Abashidze

E-mail: g.abashidze@bntu.edu.ge

Assistant of Batumi Navigation Teaching University

ORCID ID: 0000-0002-3233-6890

Batumi, Georgia

Tamara Berezianko

E-mail: tvb-nuft@i.ua

Doctor of Economics, Full Professor
National University of Food Technologies

ORCID ID: 0000-0001-9228-4239

Kyiv, Ukraine

<https://doi.org/10.46361/2449-2604.10.1.2023.40-47>

THE FOURTH INDUSTRIAL REVOLUTION AND STRATEGIC REGULARITIES OF MANAGEMENT AND COMPETITIVENESS IMPROVEMENT OF ECONOMIC ENTITIES¹

Abstract: *A virtual intellectual economy is being formed due to the Fourth Industrial Revolution. The main characteristics of this economy are the virtualization of the whole social and economic life, an*

¹ The authors inform the reader that the priority and copyright of this scientific work are confirmed by registration with the State Intellectual Property Service of Ukraine № 71871 dated 06.02.2017 and by the certificate № 102300 dated 3 February 2021 of the State Enterprise "Ukrainian Institute of Intellectual Property".

increase in the share of intellectual spheres of economic management in the real economy, intellectualization of mainly non-intellectual spheres of economic management. The development of the virtual-intellectual economy transforms the management of socio-economic systems and, first of all, of economic entities. New regularities of enterprise management emerge acceleration of the impact of the subject of activity on the object of activity, the impact of the subject of management activity on the object of management activity and event-driven management densification.

Keywords: *virtual intellectual economy, knowledge diversification, event-driven development densification, event-driven management densification.*

JEL classification: *O33, O35, L86*

იპორ ჰალიცია

E-mail: igalica@ukr.net

ეკონომიკის დოქტორი, პროფესორი
სურსათის ტექნოლოგიების ეროვნული უნივერსიტეტი

ORCID ID: 0000-0002-3407-6201

კიევი, უკრაინა

ოლექსიი ოლექსიუკი

E-mail: oleksiuk@kneu.edu.ua

ეკონომიკის დოქტორი, პროფესორი
ვადიმ ჰეტმანის სახელობის კიევის ეროვნული

ეკონომიკური უნივერსიტეტი

ORCID ID: 0000-0002-3407-6201

კიევი, უკრაინა

ოლჰა პროკოპენკო

E-mail: prokopenko.olha.w@gmail.com

ეკონომიკის დოქტორი, პროფესორი
სუმის სახელმწიფო მაკარენკოს პედაგოგიური უნივერსიტეტი

ORCID ID: [0000-0003-1362-478X](https://orcid.org/0000-0003-1362-478X)

სუმი, უკრაინა

გიორგი აბაშიძე

E-mail: g.abashidze@bntu.edu.ge

ასისტენტი, ბათუმის ნავიგაციის სასწავლო უნივერსიტეტი

ORCID ID: 0000-0002-3233-6890

ბათუმი, საქართველო

თამარა ბერეზიანკო

ეკონომიკის დოქტორი, პროფესორი, სურსათის

ტექნოლოგიების ეროვნული უნივერსიტეტი

ORCID ID: 0000-0001-9228-4239

კიევი, უკრაინა

მეოთხე ინდუსტრიული რევოლუცია და ეკონომიკის სუბიექტების მართვისა და კონკურენტუნარიანობის სტრატეგიული კანონზომიერებები

ვირტუალური ეკონომიკის ჩამოყალიბება განპირობებული მეოთხე ინდუსტრიული რევოლუციით. ამ ეკონომიკის ძირითადი მახასიათებლებია მთელი სოციალური და ეკონომიკური

ცხოვრების ვირტუალიზაცია, ეკონომიკური მართვის ინტელექტუალური სფეროების წილის ზრდა რეალურ ეკონომიკაში და ეკონომიკური მართვის არაინტელექტუალური სფეროების ინტელექტუალიზაცია. ვირტუალურ-ინტელექტუალური ეკონომიკის განვითარება გარდაქმნის სოციალურ-ეკონომიკური სისტემების მართვის პროცესს. თავს იჩენს საწარმოთა მართვის ახალი კანონზომიერებები და მენეჯმენტის ახალი მოდელები, რომლებიც რადიკალურად ცვლის არსებულ მიდგომებს.

საკვანძო სიტყვები: ვირტუალური ინტელექტუალური ეკონომიკა, ცოდნის დივერსიფიკაცია, მოვლენებზე ორიენტირებული განვითარების დენსიფიკაცია, მოვლენებზე ორიენტირებული მენეჯმენტის დენსიფიკაცია.

Introduction and review of literature

Civilization is steadily entering the stage of the Fourth Industrial Revolution. Moreover, this is a natural process generated by the objective development of scientific and technological progress. Cyber-physical systems, in interaction with information-communication technologies of higher order, change the whole way of life and economic behavior of individuals and society. At the same time, they are the determinants of fundamental changes in the economic development of production systems at different levels. A virtual intellectual economy is actively beginning to take shape under their influence. This economy leads to changes like governance at the macro-, meso and micro levels. These transformations concern the nature of enterprise management as the primary and elementary economic agent under current conditions.

At present, general theoretical studies of the virtual intellectual economy have already been conducted, and its main regularities and characteristic features have been identified. The role of creativity and management innovation in Ukraine's economy is shown [1,2]. However, today the problem of changing the nature of enterprise management in the virtual intellectual economy is entirely unexplored.

The study aims to examine the basic strategic patterns of enterprise management in an intelligent virtual economy. In the research process, system analysis and synthesis methods were applied.

Intelligent virtual economy

The modern economy is undergoing cardinal and systemic transformations caused by the spread of information and communication technologies, the virtualization of consumer behavior, the unification of values and needs, and their intersegmental diffusion. New forms of intellectual competition are increasingly emerging, and a new type of economy - the virtual intellectual economy - is beginning to take shape.

A virtual intellectual economy (starting now referred to as VIE) is an economy where [3]:

- the limiting importance of the factors of space and time disappears or is substantially weakened;
- the share of predominantly intelligent economic spheres in the total volume of economic spheres (output and turnover) increases;
- the share of intelligence operations in the predominantly non-intellectual spheres of management will increase.

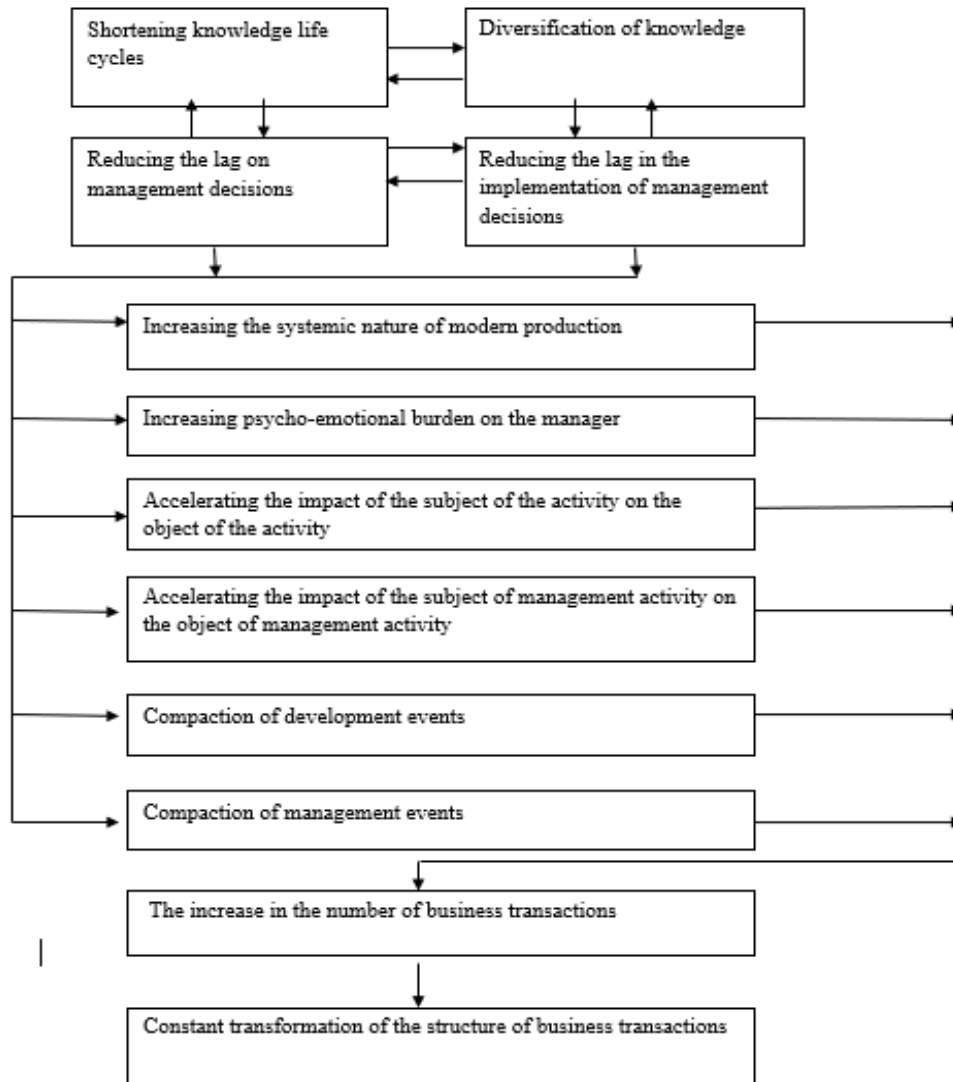
Moreover, the latter two patterns are formed due to the industrialization and automation of intellectual labor and activity. The industrialization of intellectual labor is a process in which machines can perform sets of intellectual operations without the participation, or with the participation or partial participation, of an individual (group of individuals). In other words, it is a stage in development where it becomes possible for machines to carry out a large or even overwhelming part of intellectual labor.

The automation of intellectual labor and activity is a process where complex intellectual tasks, consisting of millions of intellectual operations, can be performed entirely ("turnkey") by machines without any input from an individual (groups of individuals). For more details about VIE, see [1,2].

The most fundamental changes caused by VIE are in the management systems of socio-economic processes. These changes are occurring at all levels: macro, meso and micro. Nevertheless, first and foremost, they concern economic entities. The concept of "economic entity" is being transformed, depriving the familiar term of its intrinsic characteristics, such as independence, organizational isolation and resource limitation. In today's world, businesses with remote workplaces are successfully developing. Today's companies involve suppliers and customers in resource planning, forming integrated product supply chains.

These changes take place in several directions and lead to the emergence of strategic regularities of enterprise management in the virtual intellectual economy. It is appropriate to consider them in more detail. The system of strategic management regularities that emerge in the virtual intellectual economy is presented in Figure 1.

Figure 1. The system of strategic regularities of enterprise management



regularity of shortening knowledge life cycles. The life cycle of knowledge, essential for effective management decision-making, is shortened. It means that the period during which knowledge is relevant and is not replaced by new knowledge is gradually reduced. It dramatically increases the intellectual burden on managers at all levels. In order to work effectively, they need to update their professional knowledge constantly. Moreover, knowledge from the "next life cycle" is, as a rule, more voluminous, more complex and based on a different methodological basis than the knowledge from the "previous life cycle". It, in turn, increases the intellectual burden on managers at all levels.

The regularity of knowledge diversification. There is a diversification of knowledge necessary for making effective management decisions. In current conditions, it is necessary to use information from different fields of knowledge and scientific directions within one field of knowledge to make effective managerial decisions. It dictates an entirely different approach to personnel management. No single individual can be a super-specialist in different areas of even one field of knowledge. Therefore, combining specialists with different qualitative and quantitative knowledge is necessary to achieve a positive synergy in management.

Reducing the lag on management decisions. It lies in the fact that all things being equal, the lag required for management decisions is reduced in a virtual intellectual economy. It means that managers of enterprises have to make more and more managerial decisions per unit of time. The complexity of these managerial decisions remains relatively high over time, but in many cases, it increases. It is an additional factor in the increasing intellectual and psycho-emotional burden on managers as they carry out their professional activities.

The regularity of lag reduction for the implementation of management decisions. Equally important is that all other things are equal, and the lag for implementing management decisions is reduced. It is due to the acceleration of communication processes, the mobility of consumer behavior patterns, and the high information saturation of space. Thus, the manager has to effectively implement more and more management decisions per unit of time.

The regularity of increasing the systemic nature of modern production and management. An essential result of the virtual intellectual economy is a significant increase in the systemic nature of modern production and management. Pre-industrial production is dozens, maximum hundreds of system-forming links. Industrial production is thousands, tens and sometimes hundreds of thousands of system-forming links. Modern production (incredibly high-tech) is represented by hundreds of thousands and millions of system-forming links.

It should be noted that processes such as modularization and micro-processing are now taking place in production. On the one hand, these processes reduce and aggregate system-forming links. In addition, they allow us to shift the execution of particular (and sometimes a significant part of) system-forming links "on the shoulders" of information technologies, computers and cyber-physical systems. However, at the same time, modularization and micro-processing create new system-forming links in all areas of enterprise activity.

The increasing systemic nature of modern production and management means that failure to consider even one systemic link can cause the entire enterprise to collapse and lead to severe production, technological, environmental and other consequences. It is crucial in Industry 4.0, where a systemic error can sometimes lead to irreversible consequences. Failure to account for one or more systemic relationships in cyber-physical systems integrated with modern information and communication technologies can lead to the destruction of these systems and significant socio-economic consequences at the macro level.

The regularity of increased psycho-emotional burden on managers at all levels. It is understandable that the psycho-emotional burden on managers at all levels of management of an enterprise, as we have already mentioned, increases dramatically in the context of VIE. Nevertheless, this is particularly true of top managers. Management has always been a "stressful" job. However, in the context of VIE, the "stressfulness" of management increases tens and hundreds of times. Moreover, many economic entities' high-stress management level is becoming permanent. Also, in many enterprises, it concerns all levels: from line managers to the general manager.

The regularity of the acceleration of the impact of the subject of activity on the object of activity. Any actions of an individual with an ultimate goal can be considered an individual's activity.

The individual who performs these actions is the subject of the activity. The object (tangible or intangible) to which these actions are directed is the object of activity.

In the virtual intellectual economy, all things being equal:

- the potential possibility of accelerating the impact of the subject of activity on the object of activity increases significantly;

- the influence of the subject of activity on the object of activity is significantly accelerated.

These opportunities arise from the increasing virtualization of economic activity and its intellectualization. In other words, an "online economic environment" is being formed, where many economic processes (and even economic processes of particular importance) can be influenced effectively remotely.

The regularity of accelerating the impact of the subject of management activity on the object of management activity. Any activity that aims to change a socio-economic system's state or keep the system in its original state, despite internal or external influences, is a management activity.

The subject that performs this activity is the subject of management activity, and the socio-economic system to which it is directed is the object of management activity.

In the virtual intellectual economy, all other things being equal:

- the potential opportunity to accelerate the impact of a subject of management activity on the object of management activity increases significantly;

- the impact of a subject of management activity on the object of management activity is greatly accelerated.

The regularity of compaction of development events. The regularities mentioned above lead to the fact that in the present conditions, the development of events is densified. It means that in a given period, significantly more events can and do occur per unit of time than under the same conditions in the previous stages of development. That is, any business entity, all other things being equal, at the present stage needs to respond to a much greater number of challenges of the external and internal environment than it was at the previous stages of development. It, in turn, requires new approaches to management.

The regularity of compaction of management events. That is, the number of management events (at all levels: from operational to strategic) to which a manager must respond quickly increases significantly. This regularity consists of the fact that at the present stage, significantly more management events can and do occur per unit of time than under the same conditions at the previous stages of development.

The integral result of all these patterns is:

- an increase in the number of economic transactions in economic life;
- a constant transformation of the structure of economic transactions.

The question arises: how can we ensure high management effectiveness in the challenging regularities described above? From our point of view, the answer to this question is one - through high innovativeness and creativity of management, which we discussed earlier [1, 2]. In our following research papers, we will discuss the mechanisms to increase the innovativeness and creativity of management.

Conclusions

The following can be stated as a result of the study of regularities of change in enterprise management. In the modern world, a virtual intellectual economy is being formed, which is characterized by the most important features:

- the virtualization of behavior;
- the intellectualization of economic transactions;
- the intellectualization of predominantly non-intellectual spheres of economic activity.

Moreover, the intellectualization of economic life and the intellectualization of non-intellectual spheres of economic life is a direct consequence of the industrialization and automation of intellectual work and activity.

A new system of strategic regularities of enterprise management is being formed in the virtual intellectual economy, in particular: shortening of knowledge life cycles, diversification of knowledge, reducing the lag on management decisions, reducing the lag on the implementation of management decisions.

Further research in this direction should be devoted to effective mechanisms for increasing innovativeness and creativity in the management of economic entities.

REFERENCES

1. Halytsia I. (2013). Gesundheit als starker wettbewerbsfaktor in einem virtuellen geistigen managementumfeld. Journal l'association 1901 "Sepike", №3, p. 110–113.
2. Halytsia I. (2016). Strategic features of enterprise activity and management in the context of globalization . Journal L'Association 1901 “SEPIKE”, №13 , p.66-69.
3. Gechbaia B. Mushkudiani Z., (2022). Global Determinants of National Economy Competitiveness. Monograph, 2022, p., 156