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TRANSFORMATION OF THE PARADIGM OF ENTREPRENEURIAL ACTIVITY INNOVATIVE DEVELOPMENT IN THE PANDEMIC CONDITIONS

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ABSTRACT

The relevance of the topic is determined by the importance of innovative development for business entities under conditions of turbulent changes in the environment. The purpose of the article is to identify the preconditions and content of transforming the paradigm of entrepreneurial activity innovative development due to the spread of COVID-19. The historical evolution of innovative theories and concepts was analyzed, which allowed systematizing the achievements. It was determined that modern methodological bases of the problem are formed based on educational concepts and the general theory of innovation. The characteristic of the "innovation" definition was supplemented by a fifth advantage, which is the ability to identify commercially successful innovations, as well as identify shortcomings of each of the definitions. The set of applications and tools of enterprises' innovation groups has been improved by partial specification and supplement. The contribution of other authors to the theory of innovation and transforming the paradigm of entrepreneurial activity innovative development was determined and systematized. Materials of the article may be relevant for use by managers of enterprises, government officials, researchers, graduate students, and doctoral students.

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INTRODUCTION

At present processes in the world economy, there is a need to form a theoretical and methodological basis for innovative changes of business processes in economic systems, especially at the enterprise level. In such an intensive development path, implementation of innovations and the achievement of real changes in a short period of time is becoming a dominant trend in the vast majority of sciences. Due to globalization developments, features of the management level, specialization of enterprises, conditions of their operation in the target markets, strategic development priorities, and resource opportunities must be taken into account. In general, in economic theory, the implementation of innovations under dynamic changes of the environment contributes to the better development of enterprises in the shortest possible time. In this regard, scientific research was started with the study of innovative theories and their impact on general economic processes. In the early twentieth century, the concept of "innovation" was introduced into

scientific circulation by the famous Austrian-American scientist J.A. Schumpeter, although some aspects of innovation processes have been studied even before. The most significant contribution to the initial (pre-Schumpeter) era was made by prominent scientists A. Smith, D. Ricardo, W. Sombart and others. The theory of cycles, the most significant contribution to the development of which was made by Tugan-Baranovsky and Kondratiev, revealed the existence of cyclical economic development of countries. Moreover, cyclical patterns are observed throughout the world economic system. This theory is especially relevant for service markets, since activity in these markets does not involve the creation of stocks, and therefore participants are more vulnerable to cyclical economic downturns. Basic neoclassical theory of innovations was characterized by a significant increase in the number of scientific researches, focusing the efforts of specific enterprises on them, as well as the emergence of a range of derived theories and concepts.

According to the basic neoclassical theory, technological changes become the main factor of economic growth. Innovation diffusion models are characterized by determining the rate of spread of innovative solutions in different economic systems. Although the theory of diffusion of innovations has been studied by many leading scientists, the most significant contribution to the development of this theory was made by E. Rogers, who proposed the theory of innovation implementation and identified main sources of innovation diffusion influence on the development. Scenario modelling theory involves the active use of simulation in the application of the endogenous concept of scientific and technological progress. In general, development of the scenario system is an important and relevant tool in the strategic management theory.

Empirical patterns of economic growth, known as stylized factors, were proposed by N. Kaldor and played a key role in the development of economic theory in general. A number of models were developed by K. Arrow, in particular, in the impossibility theorem he proved that no procedure of social choice will be an optimal reflection of the particular individual choice. Theories of social transformation actively promote the importance of scientific and technological progress as a driver of economic development. One of the key adherents of this theory was the famous American scientist E. Toffler. He actively developed theories of post-industrial society and technological revolution. In his works, the famous American sociologist D. Bell determined that representatives of intellectual professions will be the main carriers of values in the digital age of society development. Psychological concepts providing for the implementation of the adaptive principle to the professional activity of the person are also focused on the key value of the individual. No direct dependence of the individual adaptability level on the perception of education is noted, while the factors of educational quality are of key importance for the formation of professional representation of the individual. Systematization of innovative and conceptual theories is presented in Table 1. Each of the mentioned theories or concepts was important for economic theory, and most of them are relevant in modern conditions.

Table 1. Evolution of innovative theories and concepts.

Theory (concept)	Main features	Developers and supporters	Period
Initial	Fragmentary research of innovations	A. Smith, D. Ricardo and others	1776-1820
Cycle theory	Identifying the cyclical nature of economic development	M. Tugan-Baranovsky, M. Kondratiev	1894-1920
Classical theory of innovation	Introduction and substantiation of the term “innovation”	J. Schumpeter, W. Sombart and others	1911-1939
Basic neoclassical theory of innovation	Key importance of technological changes as a factor of economic growth	C. Freeman, R. Solow, T. Swan, P. Cobb, J. Tinbergen, G. Mensch, B. Twiss, F. Nixon, E. Mansfield, J. Rapoport, B. Santo	1962-1995
Models of diffusion of	Segmentation of innovations’	T. Hagerstrand, F. Bass, P. Haggett, E.	1963-2010

innovations	consumers	Rogers, R. Foster and others.	
Scenario modelling	Application of simulation modelling	N. Kaldor, K. Jones, K. Arrow, R. Lucas, T. Schultz; J. Forrester	1970-present
Theories of society transformation	Economic development is a reflection of STP	D. Bell, E. Toffler, Y. Masuda, A. Touraine and others	1970-2010
Psychological concepts	Key importance of an individual	H. Barnett, E. Witte, E. Denison and others	1980-2000
The concept of the entrepreneurial nature of innovation	New type of innovative economics	P. Drucker	1985
General theory of innovation	Creation of strategic innovations	G. Yezersky	1987-2010
Educational concepts	Key importance of education	A. Jaffe, J. Lerner, S. Stern, W. Baumol, R. Freeman, D. Darmier, W. Hopp, S. Aravani, A. Arora, A. Fosfuri, A. Gambardella and others	1990-2010

Drucker's scientific achievements are reflected in the definition of a new type of innovative economy. Also, he saw the main purpose of business in the realization of a new unique value. It was he who expanded the concept of innovations, by which was meant everything providing an increase in available resources. In addition, he emphasizes the possibility of using simple innovative solutions to solve specific problems, abandoning the trivial approach and the need to apply creative thinking in these processes.

Who has previously considered this issue

Modern methodological principles of a particular problem are formed on the basis of educational concepts and general theory of innovations. Educational concepts imply the significant importance of education. In the scientific work of Baumol (2005), which is presented in a fundamental study edited by A. Jaffe, J. Lerner and S. Stern a number of hypotheses about educational entrepreneurship encouraging innovations was considered. The author emphasizes that breakthrough inventions are mostly offered by independent inventors, and education is extremely valuable for innovation and growth in the process of mastering scientific knowledge and methods. There is a rather sharp differentiation between the contribution of independent entrepreneurs to economic technological innovations and the contribution offered by large internal specialized units of established enterprises. The type of innovations in which large enterprises usually specialize is conservative and primarily concerns the improvement of the productive line, as well as increasing the reliability and ease of using the products and expanding the scope of their distribution. At the same time, smaller businesses are more flexible and able to deliver more breakthrough innovations. In addition, the author emphasizes that each small improvement may be relatively unimpressive, but all of them together can become significant due to the synergy effect.

Freeman (2006) studies issues of knowledge innovation. The author emphasizes that changes in the world labour market of scientists and technicians have actually destroyed the dominance of the United States. The reduced comparative advantage in the field of high technologies has led to the relocation of jobs to the Asia-Pacific region and the organization of high-tech production there as part of spreading the influence of multinational corporations and R&D institutions in developing countries.

Scientific developments proposed by Diermeier *et al.* (2007) provide for the formation of a theoretical basis for improving crisis management strategies. The authors pointed out that at the time of the study, most of the existing models of complex social networks are vaguely modeled due to limited human capabilities or system congestion. The approach proposed by them involves the integration of the social network to model communication resulting in provision an opportunity to significantly increase the speed of the system response, and to mitigate the negative effects

of changes in the environment.

Forman *et al.* (2014) patented that the interrelationship between the spread of advanced IT technologies and the geographical concentration of the invention is measured by patents. Patenting became more concentrated from the early 1990s to the early 2000s, with a slight difference in the growth rate of patenting between leaders and those lagging behind in the use of the Internet on average, and the growth rate of patents faster among countries that were not leaders in patenting. The authors' analysis helps to understand the significant impact of globalization shifts and their impacts for innovations and inventions as a source of regional competitiveness, as well as the impact of the Internet and the associated reduction in communication and coordination costs. On the whole, the authors noted the positive net impact of these changes on the concentration of innovations.

At the beginning of the 21st century, there was a transformational change in thinking in the markets, associated with the spread of innovation worldwide. In addition, there was intensification of intellectual property management and external monitoring of technologies and licensing. The attractiveness of a focused business model for startups in technology markets is growing, and there is increased competition at the industry level, which is ensured through the removal of barriers and restrictions (Arora *et al.,* 2014).

In accordance with the general theory of innovation by Yezersky (2007), competition between enterprises can be represented by the ratio of their price proposals, with each price offering goes through the process of changing life cycles by stages. Sustainable success can be achieved only if the company constantly puts forward price proposals that are perceived by the market and consumers. It was noted that the most successful companies use reliable time methods to reduce the variability of results. Creating value is possible in two ways – through innovation and through optimization. However, it is innovation that creates new functions and provides a significant competitive advantage.

The ecosystem approach to innovation activity proposed by R. Ayres suggests that despite the attractive analogy between nature and industry, which is characterized by the similarity of natural functions and certain types of industrial activity, this identification is incorrect. The author notes that in the economic system there is no primary producer, and the provision of economy are mainly natural resources, capital services and labour force; in the economic system output is a heterogeneous set of products and services, while labour is an output but not the result. The economic system using a much larger set of elements processes much less. In economics, differentiation is based on inventions and innovations, and choice is based on competition. The author concludes that the application of environmental concepts in economic systems in an unadjusted form is incorrect (Ayres *et al.,* 2004).

A series of works by Fukuda and Watanabe (2012) should be considered the most systematic and comprehensive study examining the ecosystem approach theories. In particular, they defined innovation as complex and multidimensional, and proposed to consider its dynamics as an ecosystem where different stakeholders interact with each other. At the same time, reduction of the resource use and environmental impact is mandatory requirement for innovations. Socio-ecological component of development using elements of cognitive modeling implemented by Boichenko *et al.* (2021).

The innovative activity organization at the enterprise with provision, in particular, of scientific and technical changes and production concentration is investigated by Britchenko and Saienko (2017). The additive econometric model presented by Dykan *et al*. (2021) allowed to calculate the integrated indicator of the synergy effect of Ukrainian machine-building enterprises' economic activity. The research of Hrosul *et al.* (2021) is devoted to the definition of strategic and operational management bases of enterprises, in which the most interesting are proposed operational management criteria of the service enterprise and their estimation with use of concentrated growth strategy.

The current state of innovation

The current process of implementing innovations is characterized by a significant time gap between the period of creation of price proposals and their implementation in the market in the form of a product or service. Therefore, there is a need for appropriate forecasting since it is necessary to predict the need for a particular innovation in the future. In accordance with the general theory of innovation, in which G. Yezersky systematized previous researches, there are two definitions of "innovation" as a process of value

creation and as a result of this process.

The processes of evolutionary development of real systems (products, processes, services, companies, markets) can be considered as the theoretical basis of the general theory of innovation. Also Yezersky selected systems of different nature and studied both the systems themselves and the relationship between them. The author, in particular, tried to identify the factors that cause the need for innovation, as well as the emerging circumstances for determining the success of their implementation. In this case, a single service or product is a common component of the business processes of the enterprise and it cannot provide the same value individually as a separate element of the system.

In Figure 1, in addition to the definitions of the term "innovation", the advantages and disadvantages are given. It should be noted that the definition of innovation as a process of value creation has more advantages than disadvantages.

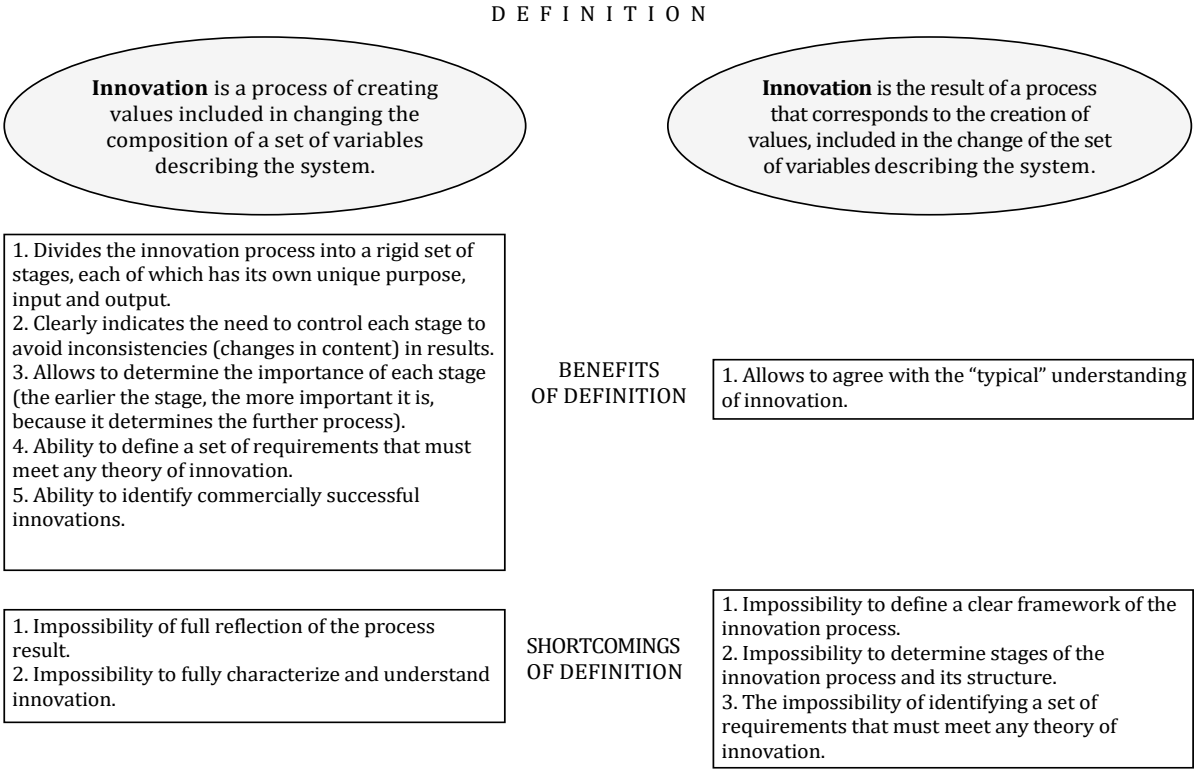

Figure 1. Characteristics of the definitions of "innovation".

According to G. Yezersky, four groups of advantages of defining innovations as a process have been formed, which are characterized by the importance of phasing, control, and establishing a set of requirements that any theory of innovation should meet. We have determined a fifth advantage, which is the ability to identify commercially successful innovations. The disadvantages of defining innovation as a process include the impossibility of full representation of the process result and the impossibility of full characterization and understanding of innovation. These shortcomings, on the one hand, are not critical, and on the other hand, they are significantly overlapped by the benefits provided by that definition. The disadvantages of the definition of innovation as a process result will significantly outweigh the one advantage identified by G. Yezersky – a typical understanding of innovation. These shortcomings are characterized by us as the impossibility of defining a clear framework for the innovation process, determining the stages of the innovation process and its structure, as well as identifying a set of requirements that must be met by any theory of innovation.

In Figure 2 the improved set of innovation groups by G. Yezersky is given, which are formed by applications and tools of the general theory of innovation. According to the author, the first group of needs is the changes

demanded by the market to which the market entity must respond, and therefore there are reactive innovations. The second group assumes that the company itself is proactively seeking change, and therefore they are determined by the perspective business goals based on strategic opportunities and threats of the company. The third group is characterized by the company's ability to implement innovations on demand, and these applications can be tested only partially and remain mostly theoretical.

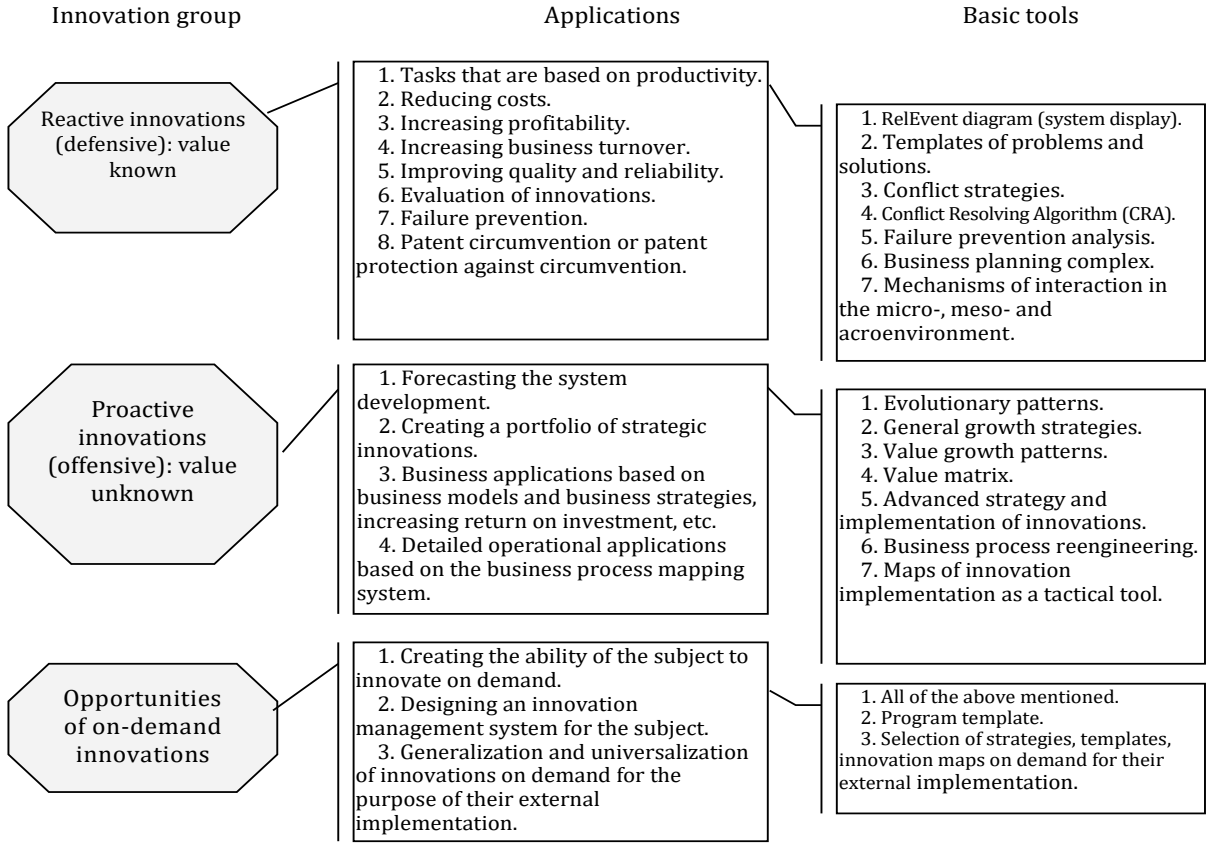

Figure. 2. Improved set of applications and tools of the enterprise's innovation groups.

In addition to reactive innovations, increased yield, profitability, and increased turnover were added. Mechanisms of interaction in the micro-, meso- and macroenvironment were added as tools by this group. As additions to proactive innovations, detailed post-operational applications based on the business process mapping system have been added. Proactive innovations are complemented by tools for the formation of new strategies and implementation of innovations, business processes reengineering, as well as innovation implementation maps as a tactical tool.

Opportunities for on-demand innovations are supplemented by the application of generalization and universalization of on-demand innovations for the purpose of their external implementation and a tool for selection of strategies, templates, maps of on-demand innovations.

Innovation in strategic management

In accordance with the general theory of innovation, it was revealed that innovation in the field of strategic management is immeasurably more important than innovation in any area of corporate activity, such as product or process innovation. This is due to the fact that companies with ordinary product, but with excellent strategies, for the most part, beat their more technically equipped competitors. Only some innovations can disturb markets and significantly increase the share for their implementers. On the whole, knowledge of the evolutionary cycle laws combined with the opportunities of the general theory of innovation allows any enterprise to develop its capability to

continuously produce commercially successful innovations. The strategic capabilities of the general theory of innovation allow to accurately identify those companies that have a strategic advantage over competitors, which makes it possible to determine the objective criteria for the implementation of investment decisions.

The authors' contribution to the theory of innovations and transforming the paradigm of innovative development of entrepreneurial activity are presented in Figure 3. Assessment of theoretical points of view on innovations and their impact on economic processes, despite their complexity and diversity, allows to assert the existence of certain gaps in the system understanding and instrumental support. It should be noted that innovative changes should be the basis of strategic management of enterprises, and they should serve as an effective basis for solving strategic tasks of the enterprise. Complexity and continuity of the strategic management process requires the use of innovative approaches in medium-term planning during the innovation program realization in the framework of strategies implemented by the enterprise. The system model of innovations is well known and it involves the transformation of ideas into results, which materialize into innovative products, innovative technologies and innovative methods, while actively using management mechanisms. The complexity and inconsistency of the innovation process under different conditions of the markets operation fundamentally changes the approaches to strategic management of enterprises. This is especially evident in the markets of services with unstable and dynamic demand, a variable product that is constantly in need of improvement. The concept of "diffusion of innovations" was proposed by J. Schumpeter and was defined as a process of dynamic dissemination of innovations by companies-imitators after the initial implementation by pioneer innovative companies. The vast majority of domestic companies should be attributed to the companies-imitators, but the peculiarities of the services markets mentioned earlier require the participating companies to have a significant level of innovativeness.

The so-called innovative recipient companies should also be noted, which are the upper echelons of companies-followers and ultimately, they are also able to implement innovations quite effectively with sufficient savings in financial resources. It makes them extremely competitive in turbulent environmental disturbances. Despite the significant contribution to innovation theories, constant changes require the search for new approaches to integrating innovation into the strategy of enterprises.

Innovative development during a pandemic

The paradigm of innovative development of business activity in a pandemic has changed significantly. Anomalous transformational changes in most world markets were the impetus for this, which required system consideration from their participants. Significant shifts in global supply chains have taken place before, but they have been evolutionary, while changes due to the spread of COVID-19 worldwide have led to almost revolutionary changes. It should be noted that these changes had the most significant impact on enterprises operating in the service sector. These markets have become more vulnerable to the unexpected force majeure circumstances related to the COVID-19 pandemic. Some markets of transport and logistics services changes in which have led to the greatest changes should be considered (Innovation, development and COVID-19…, 2020).

The air cargo transportation market has suffered significantly. In the conditions of innovative changes of the world economy, the role of its individual participants is transformed, and air cargo carriers are not an exception.

It is worth noting that at present the vast majority of traditional air cargo carriers perform only the functions of transporting goods from airport to airport, without performing any additional functions, which is quite justified. Usually, when structuring the air transportation market, traditional and low-cost airlines are distinguished as two poles of development, which is not entirely true. In addition, such gradation is carried out on the principle of forming a route network, which is also not entirely correct. As rightly noted by Cook and Goodwin (2008), although the route structure is an important strategic choice, it is only one element of the airline's business model, and therefore there is a need for a comprehensive analysis of air carriers' business models as part of strategic management of their activities. Quantitative assessment of the global air network is an extremely complex and non-trivial task. Qualitative analysis, clustering and scenario modeling of the global air transport system allows: to identify its

vulnerable elements under different operating conditions (Verma *et al.,* 2014), to identify the peripherality of up to 95% of air transport network nodes (Guimerà *et al.,* 2005), to form a simulation model to study the air network redevelopment using the multilayer structure paradigm (Cardillo *et al.,* 2013), to understand the effectiveness of the perspective air networks (Sridhar *et al.,* 2008).

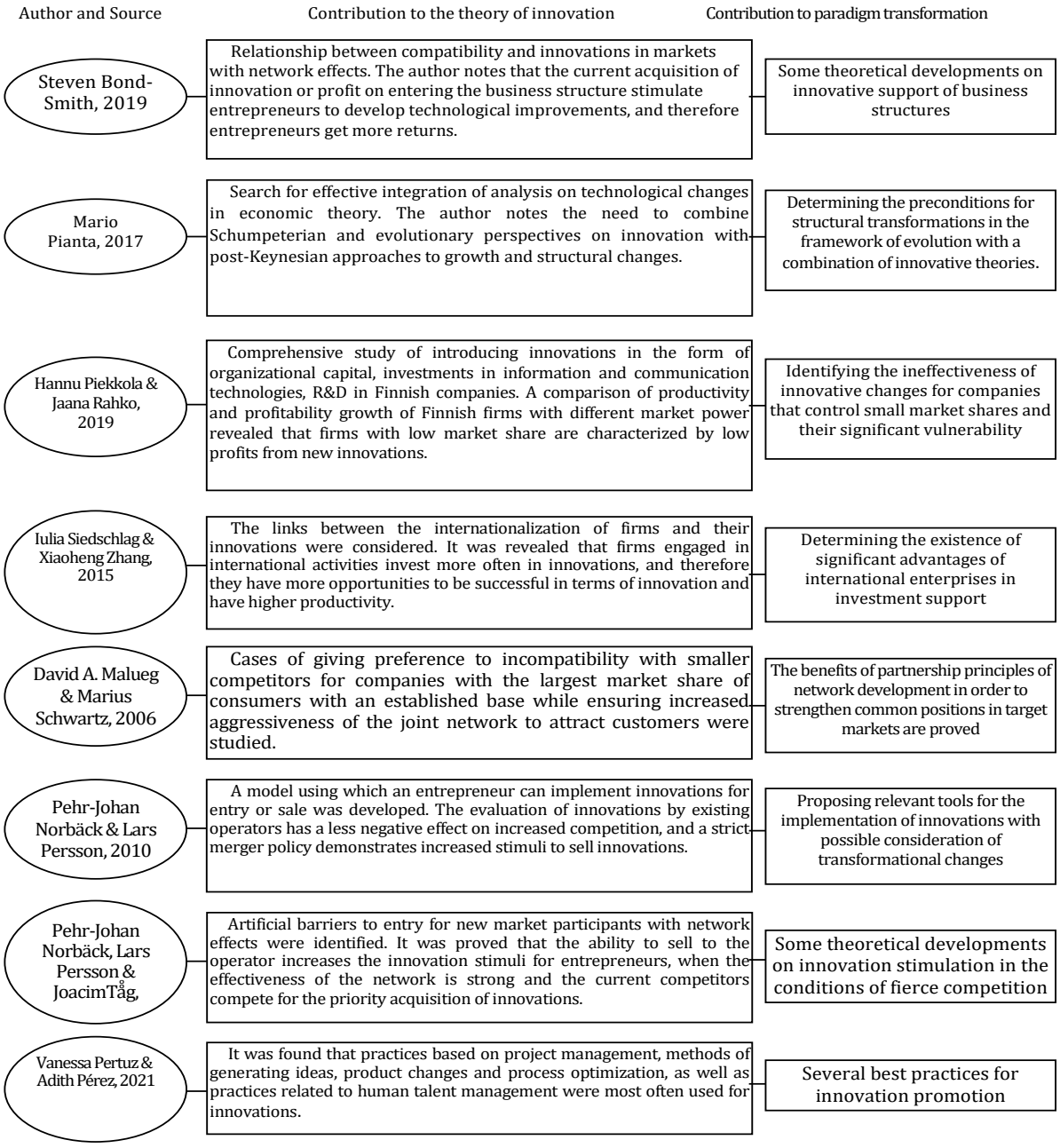

Figure. 3. The authors' contribution to the theory of innovations and transforming the paradigm of innovative development of entrepreneurial activity.

A significant share of joint service of cargo flows with the involvement of passenger aircraft was typical for the air transport market. In the last one and a half years, there has been a sharp separation of these flows, which was a forced step. Air carriers which were focused on meeting the needs of the cargo clientele precisely through the reloading capacities of passenger aircrafts have suffered the most. On the other hand, the shortage

of transport capacities has led to a significant increase in tariffs, which is beneficial for air carriers and has made it possible to open new purely freight flights. Transformational processes in these markets continue, despite the fact that the world has been able to partially adapt to the challenges caused by the spread of COVID-19. The innovative development of enterprises in the aviation markets has slowed down considerably, as air carriers, especially in the first wave of the COVID-19 pandemic, have been forced to intensify their critical support of main activities. However, it should be noted that those airlines that initially had a high level of financial stability and provided maintenance of their own cargo flows on purely cargo aircraft even benefited from this situation, given the shortage of capacities and a sufficient increase in total market tariffs. This is one of the paradoxes of aviation markets' development.

Other transport and logistics markets have suffered much less from the spread of COVID-19, due to the separation of freight and passenger flows in most modes of transport. However, in these markets, the innovative development of enterprises has also slowed down, which should be recognized as a temporary trend, and this does not apply to leading companies which are still trying to win the competition by using innovative advantages.

CONCLUSIONS

In the study the need for the formation of theoretical and methodological foundations of innovative changes in business processes in economic systems, especially at the enterprise level, was identified. Systematization of innovation theories and concepts allowed to assert that modern methodological principles of pointed out that the statements about breakthrough inventions which are mostly offered by independent inventors are relevant, and their implementation is better in the environment of small and medium enterprises. It was interesting to note that most of the existing models of complex social networks are vaguely modeled due to system constraints and congestion. Globalization changes have a significant impact on innovations and inventions, which form the basis for differentiation, while the choice is determined by the competitive environment of particular markets.

Within the conducted study, the fifth advantage of determining innovation as a process was proposed, namely the ability to identify commercially successful innovations. The disadvantages of this definition include the inability to fully reflect the process outcome and the inability to fully characterize and understand the innovation. As additions to reactive innovations during the development of an improved set of applications and tools of enterprises' innovation groups, increased profitability and increased turnover were added, and as tools for this group the mechanisms of interaction in micro-, meso- and macroenvironment were added. In proactive innovations, detailed operational applications based on a system of business process maps, which are supplemented by appropriate tools were added. Opportunities for on-demand innovations are supplemented by the application of generalization and universalization of on-demand innovations for the purpose of their external implementation with a set of tools. It was determined that the transformation of the paradigm of business activity innovative development in a pandemic condition is based on recent researches on innovation theory and the general principles of transforming approaches to entrepreneurial innovative development, and the changes for enterprises in different sectors of the economy were considered.

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