

A. V. Dyubina, K. O. Dyubina, G. R. Kopets
Lviv Polytechnic National University
Department of Management of Organization

FORMATION OF SCIENTIFIC APPROACH TO THE INTERPRETATION OF BASIC CONCEPTS OF INNOVATION THEORY

© Dyubina A. V., Dyubina K. O., Kopets G. R., 2014

The article considers the urgent problems of forming the unified approach to interpretation of the basic concepts of innovation theory in the contemporary economy. Two main approaches to the interpretation of the term “innovation” are considered: dynamic and static. The appropriate generalization is made on this basis. The author’s own definition of the term “innovation” is given. The survey of major contemporary scientific views on the classification of innovations is made. Innovations are classified based on their types and areas of origin.

Key words: innovation, classification of innovations, innovative theory, type of innovation, sphere of origin of innovation, static approach, dynamic approach.

A. В. Дзюбіна, К. О. Дзюбіна, Г. Р. Копець
Національний університет “Львівська політехніка”,
кафедра менеджменту організацій

ФОРМУВАННЯ НАУКОВОГО ПІДХОДУ ЩОДО ТЛУМАЧЕННЯ ОСНОВНИХ ПОНЯТЬ ІННОВАЦІЙНОЇ ТЕОРІЇ

© Дзюбіна А. В., Дзюбіна К. О., Копець Г. Р., 2014

Розглянуто актуальні проблеми формування єдиного наукового підходу до тлумачення основних понять інноваційної теорії в сучасних умовах господарювання. Розглянуто два основні підходи щодо тлумачення поняття “інновація”: динамічний і статичний, на основі чого здійснено відповідне узагальнення. Запропоновано авторське визначення поняття “інновація”. Здійснено огляд основних поглядів сучасних науковців щодо класифікації інновацій. Прокласифіковано інновації на основі їх типів та сфер виникнення.

Ключові слова: інновація, класифікація інновацій, інноваційна теорія, тип інновації, сфера виникнення інновації, статичний підхід, динамічний підхід.

Statement of the problem

New market economy set for modern enterprises a number of important tasks, the key pro of which is to achieve a competitive advantage in the long term, to implement sustainable development and function, to obtain social and economic benefits from economic activity. Solving such problems today is impossible without innovation in all sectors: industrial, organizational, scientific, financial, political. Innovations in modern conditions are the driving force of scientific progress, an engine of innovation activity of enterprises. However, there is no single approach to the interpretation of the basic concepts of the theory of innovation. This gives rise to some controversy in the understanding of its essence.

Analysis of recent research and publications

The term “innovation” was introduced in the early twentieth century by Austrian scientists Schumpeter, by which he meant “any possible change that is due to the use of new or improved solutions of technical, technological, organizational processes in production, supply, sales, after-sales service, etc.” [18].

He was identified five types of new combinations of changes or innovations:

- production of a new product or a known product in new capacity;
- introduction of a new method of production;
- development of a new market;
- involving to the production process new sources of raw materials;
- reorganization (introduction of new organizational forms).

It should be noted that the theory of J. Schumpeter was based on studies about relationships of industry fluctuations with capital upgrading process (developed by Ukrainian scientist and economist M. Tugan-Baranovsky [14]) and about “theory of large cycles in dynamics of the global economy” (developed by Russian researcher N. D. Kondratieff) [7].

Contemporary researchers understand the nature of innovation from the standpoint of two approaches: dynamic (L. Vodachek, V. Medyns'kyy, B. Santo, B. Twiss, N. Khomyak, K. Khol't, V. Sharshunova, Yu. Yakovets') and static (V. Veryutina, T. Dudar, V. Zyan'ko, V. Ivanova, A. Levinson, N. Molchanov, V. Frydys'kyy), which leads to controversy in identifying this category.

The formulation of objectives

The urgency of forming a unified approach to the interpretation of the basic concepts of innovation theory necessitates setting the following objectives of this study:

- to consider the main approaches to understanding the nature of “innovation” concept;
- to put forward the most appropriate approach to the interpretation of “innovation”;
- to explore the views of contemporary scientists on the classification of innovation;
- to offer a generalized classification of innovations based on their differentiation by type and areas of origin.

Presentation of main materials

Most widespread in the world economic practice are two scientific approaches to the interpretation of the main aspects of innovation theory.

Supporters of the first approach (the followers of J. Schumpeter) isolate in innovation dynamic processes or changes [1, 9, 12, 13, 17, 19, 21]. The dynamic approach interprets innovation as the transition of a system from one condition to another. Particularly, these researchers recognize that innovations are multistage.

The supporter of this approach (American economist B. Twiss) consider the innovation to be a process, in which an invention or idea acquires an economic content [13].

According to Canadian researchers K. Khol't, innovation – is the process of knowledge or relevant information which aims to create something new and useful [21, p. 24].

Hungarian scientist B. Santo considers innovation to be a feasibility process, that is realized due to the practical usage of inventions and generated ideas and leads to the emergence of improved products, superior technologies [12, c. 35].

Slovak scientist L. Vodachek understands innovation as a target change in the company functioning (quantitative, qualitative, in any area of the company) [1].

According N. V. Hamsters, innovation – is “the process of creating new or improving existing products (goods, works, services) in order to ensure social progress and to improve efficiency in various areas of human life” [17, p. 203].

Russian scientist V. Medynsky and V. Sharshunova treat innovation as “the social, technical, economic process that leads to the creation of the best (in characteristics) goods (services) and technology through practical application of innovation” [9].

According to Yu Yakovets, innovation – a qualitative change in the production, concerning both equipment, technology and forms of production organization and management [19].

Scientists adhering to a static approach meant by innovation the results of the innovation process, which has a concrete embodiment in the form of new products and technologies, organizational changes, etc. [2, 3, 5, 6, 8, 10, 16].

According to the “Frascati Manual”, innovation is defined as the final result of innovation, embodied in the form of new or improved product that is introduced on the market, or technical process used in the practice or a new approach to solving social problems [20].

According Zyanko V. V., “innovation – the result of incarnation or materialization of innovative ideas in a particular subject substance: product, technology, means of human activity or service, for which new consumer characteristics are inherent and the realization implies a change in the established, conventional ways of life, creating new demand or a change of the old order to obtain economic, social, environmental or other effect” [3, c. 49].

The supporter of the static approach is also V. V. Ivanov, who believes that “innovation is a result, that is realized in the market and gained from investing in a new product or transaction (technology, process)” [6, p.85].

Russian scientist P. Zavlin thinks that innovation is the result of a creative process that is reflected in the embedded or created new consumer values, the usage of which requires changing of traditional stereotypes. The novelty of the consumer properties of the newly created innovation, according to the position of the researcher, is its most important characteristic with secondary importance of the role of technological innovation [5].

Frydyskyy V. A. and Veryutina V. Yu. understand innovation as “the end result of the implementation of innovation for the purpose of control object application and economic, social, environmental, scientific and technical types of effect obtaining” [16, p. 172].

According to T. Dudar, innovation – is the end result of creative activity, embodied in launched into the market new or improved product, processes used in practice, or a new approach to consumer services [2, p. 14].

N. Molchanov interprets innovation as a result of scientific work aimed at improving the social practice and immediate implementation of social production [10].

According to A. Levinson, innovation – the result, the outcome of previously conducted researches, practical and organizational work [8].

Summarizing the above, we can conclude that both dynamic and static aspects are inherent for innovation. The very essence of innovation leads to a twofold understanding related to its dual nature. The process of creating something new (a product, service, technology etc.) ends with materialization, it has a specific result. Despite the many variations of the innovation definition, uniting principle of all approaches is new knowledge that underlie each innovation. So, given the above required position, static and dynamic approaches to the interpretation of the essence of innovation must be combined, because they are logically complementary. From this methodological assumptions we consider the concept of innovation as a result of the process of development and implementation of new or improved products, services, processes, approaches to organizational problems solving.

Versatility of innovations, different degrees of its novelty and scale, a variety of formation and implementation areas require appropriate classification of this concept.

The first attempts to classify innovations were implemented by founder of the innovative theory J. Schumpeter, who divided innovations in basic and secondary [18].

Subsequently, the German scientist G. Mensh identifies basic (improving) innovations (those that contribute to the emergence of new industries and markets) and pseudoinnovations that amend under the influence of short-term fluctuations in consumer preferences [22].

Russian scholar Yu. Yakovets' in terms of technological development cycle identifies four types of innovations [4]:

– the innovations, based on the most important inventions realization and cause a revolution in the technology development, create its new directions, lead to the emergence of new industries;

– major innovations, which are based on comparable rank inventions and the results of which is the emergence of new generations of technology within the data lines; feature implementation of major innovation is the introduction of shorter periods, relatively lower expenses compared to most of basic innovations and the lower level of progress in technical terms and economic efficiency at the same time;

– middle innovations that shape new models and modifications within individual generations of technology;

– small innovations, which are based on the improvement of certain consumer characteristics of separate technical models.

This classification is enough detailed and gives an idea of innovation importance in product-technology area. At the same time, it doesn't outline administrative, service, social, economic and other spheres.

Quite interesting classification of innovation on the basis of prevalence, place in the production cycle, relation to the predecessor, scope of usage, innovation capacity and the degree of novelty was offered by Russian economist A. Pryhozyn (table 1).

Table 1

Classification of innovation by A. Pryhozyn [11]

Classification features	Types of innovation
Prevalence	<ul style="list-style-type: none"> – individual – diffusional
Place in the production cycle	<ul style="list-style-type: none"> – raw – providing – food
Relation to the predecessor	<ul style="list-style-type: none"> – substitution – canceling – turning – retro – input
Scope of usage	<ul style="list-style-type: none"> – local – systematic – strategic
Innovation capacity and the degree of novelty	<ul style="list-style-type: none"> – radical – combinatorial – improving

It should be noted that this classification, despite sufficient details, gives no clear delineation of the emergence sphere of innovations.

Russian researcher R. A. Fathutdinov offers a classification of innovation, which is given in table 2.

Table 2

Classification of innovation by R. Fatkhutdinov [15, p. 27–29]

Classification features	Types of innovation
1	2
1. Level of innovation	<ul style="list-style-type: none"> – radical (introduction of discoveries, inventions, patents); – ordinary (know-how, innovations)
2. Phase of life cycle	<ul style="list-style-type: none"> – innovations that are being implemented at the stage of strategic marketing – innovations that are being implemented at the stage of research and development – organizational and technological preparation of production – production (including tactical marketing) – service that is carried out by the manufacturer

Table 2 continued

1	2
3. The scale of novelty	<ul style="list-style-type: none"> – new worldwide discoveries, inventions, patents – new for a country – new for an industry – new for a firm
4. Economic sector where innovation is introduced	<ul style="list-style-type: none"> – in science – in education – in the social sphere – in the material production
5. The scope	<ul style="list-style-type: none"> – internal use – savings – sale
6. Frequency of use	<ul style="list-style-type: none"> – single – duplicate (diffusion)
7. Form of novelty	<ul style="list-style-type: none"> – discoveries, inventions, patents – innovations – know-how – trademarks, brands, logos – new documents that describe technological, industrial, administrative processes, designs, patterns, techniques and so on.
8. Effect type (obtained as a result of innovation)	<ul style="list-style-type: none"> – science and technological – social – environmental – economic (commercial) – integrated
9. Subsystem of innovation management, in which innovation is implemented	<ul style="list-style-type: none"> – scientific support subsystem – target subsystem – providing subsystem – controllable subsystem – management subsystem

This classification is certainly noteworthy, however, it complicates the process of classifying innovation in a particular classification features despite a large number of proposed types.

Given classification is certainly a valuable tool for detecting an affiliation of innovation to a certain classification groups. Considering these classifications we offer a generalized classification that will help to give a three-dimensional characterization of aggregate innovation with a clear demarcation of areas by type and origin. Table 3 presents the corresponding classification matrix of innovations.

Table 3

Innovations classification matrix *

Type of innovation \ Sphere of innovation	Modification innovation	Replacement innovation	Radical innovation	Basic innovation
1	2	3	4	5
Product	Modification innovation in the product area	Replacement innovation in the product area	Radical innovation in the product area	Basic innovation in the product area
Service	Modification innovation in the service area	Replacement innovation in the service area	Radical innovation in the service area	Basic innovation in the service area

Table 3 continued

1	2	3	4	5
Technological	Modification innovation in the technological area	Replacement innovation in the technological area	Radical innovation in the technological area	Basic innovation in the technological area
Managerial	Modification innovation in the managerial area	Replacement innovation in the managerial area	Radical innovation in the managerial area	Basic innovation in the managerial area
Socio-economic	Modification innovation in the socio-economic area	Replacement innovation in the socio-economic area	Radical innovation in the socio-economic area	Basic innovation in the socio-economic area

* developed by the authors

This matrix consists of 20 elements (types of innovation). Each of the 4 types of innovation (modification, replacement, radical, basic) corresponds to the appropriate area of its origin (product, service, technological, managerial, socio-economic).

The described classifications can be used as an important tool of innovative management possess of industrial enterprises in terms of acceleration of STP and fierce competition in the domestic and foreign markets.

Conclusions

While exploring the views of economists the generalizations about the interpretation of the category “innovation” is made. In particular two main approaches are singled out: static and dynamic. The static approach involves understanding of innovation as a result of innovation processes, which is a concrete embodiment in the form of new products and technologies, organizational changes etc. Interpretation of innovation as a process of creating new or improving existing products (goods, works, services) is reflected in the dynamic approach. Separation of modern approaches to the innovation interpretation of the category “innovation” gives the reason to believe that the both dynamic and static aspects are inherent for innovation. Based on this the definition of “innovation” was clarified.

Introduction to modern scientific classifications of innovations allowed to make the developed generalizing classification. This gives an opportunity to make a three-dimensional characterization of aggregate innovation with a clear demarcation of areas by type and origin. As a result, the corresponding generalization in the classification matrix was proposed, which consists of 20 items (types of innovation). In this matrix each of the 4 – types of innovation (small, medium, large, most basic) corresponds to the scope of its origin (product, service, technological, managerial, socio-economic).

Prospects for future research

Prospects for future research are in-depth study of the basic concepts of innovation theory and the formation of a unified approach to their interpretation in the modern economy.

1. Водачек Л. Стратегия управления инновациями на предприятии / Л. Водачек. – М.: Экономика, 1989. – 168 с. 2. Дудар Т. Г. Інноваційний менеджмент: навч. посіб. / Т. Г. Дудар, В. В. Мельниченко. – Тернопіль: Економічна думка, 2008. – 250 с. 3. Зянько В. В. Щодо визначення сутності інновації як категорії економічної теорії / В. В. Зянько // Науковий вісник Волинського національного університету імені Лесі Українки. – 2008. – № 7. – С. 48–51. 4. Инновации: теория, механизм, государственное регулирование: учеб. пособие / под ред. Ю. В. Яковца. – М.: Изд-во РАГС, 2000. – 237 с. 5. Инновационный менеджмент: справ. пособие / под ред. П. Н. Завлина, А. К. Казанцева, Л. Э. Миндели. – М.: ЦИСН, 1998. – 559 с. 6. Іванова В. В.. Дослідження теорії поняття інновації / В. В. Іванова // Економіка промисловості. – 2009. – № 4. – С. 80–87.

7. Кондратьев Н. Д. *Избранные сочинения*. – М.: Экономика, 1993. – 543 с. 8. Левинсон А. *Экономические проблемы управления научно-техническим прогрессом: Опыт системного анализа* / А. Левинсон. – М.: Экономика, 1973. – 256 с. 9. Медынский В. Г., *Инновационное предпринимательство: учеб. пособие* / В. Г. Медынский, В. Г. Шариунова. – М.: ИНФРА-М, 1997. – 240 с. 10. Молчанов Н. Н. *Инновационный процесс: Организация и маркетинг* / Н. Н. Молчанов. – СПб: СПбГУ, 1994. – 103 с. 11. Пригожин А. И. *Нововведения: стимулы и препятствия (социальные проблемы инноватики)* / А. И. Пригожин. – М.: Политиздат, 1989. – 346 с. 12. Санто Б. *Инновация как средство экономического развития* / Б. Санто. – М.: Прогресс, 1990. – 296 с. 13. Твисс Б. *Управление научно-техническими нововведениями* / Б. Твисс. – М.: Экономика, 1989. – 271 с. 14. Туган-Барановский М. И. *Основы политической экономии* / М. И. Туган-Барановский. – Петроград: Право, 1917. – 540 с. 15. Фатхутдинов Р. А. *Инновационный менеджмент: учебник для вузов* / Р. А. Фатхутдинов. – 6-е изд. – СПб.: Питер, 2008. – 448 с. 16. Фрыдынський В. А. *Инновация и инновационные технологии в экономической деятельности* / В. А. Фрыдынський, В. Ю. Верютина // *Вісник Національного технічного університету “Харківський політехнічний ін-т”*. – 2010. – № 6:– Харків: НТУ “ХП”.– С. 172–176. 17. Хомяк Н. В. *Концептуальні підходи дослідження сутності інноваційних технологій* / Н. В. Хомяк // *Економічний простір: зб. наук. пр.* – № 25. – Дніпропетровськ: ПДАБА, 2009. – С. 201–206. 18. Шумпетер Й. *Теория экономического развития (Исследование предпринимательской прибыли, кредита, процента и цикла конъюнктуры)* / Й. Шумпетер: пер. с нем. – М.: Прогресс, 1982. – 453 с. 19. Яковец Ю. В. *Ускорение научно-технического прогресса: Теория и экономический механизм* / Ю. В. Яковец. – М.: Экономика, 1988. – 335 с. 20. *Frascati manual, Proposed Standard Practice for Surveys on Research and Experimental Development*, OESD, 2002. – 256 p. 21. Holt K. *The management of Product Innovations* / K. Holt. – Batterford, 1983. – 273 p. 22. Mensch G. *Stalemate in Technology: Innovation Overcome the Depression* / G. Mensch. – Cambridge, Mass., 1979. – 241 p.