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Strategic Dimension of Innovation

Abstract

The article presents the conceptualisation of one of the aspects of the strategic dimension of innovation: the choice of the method (strategy) of innovation activities carried out by enterprises. Two types of strategic decisions are discussed: the strategy of developing innovation and the decision of an already innovative enterprise choosing the way of further development of innovation activities. Original proposals of strategy models are presented against the background of innovation strategy models described in literature, and the method of their identification is illustrated using case studies of five Polish innovation enterprises.

Keywords: innovation strategies, innovation models, innovation management
JEL Codes: M10, M11, O3

1. Introduction

A strategic dimension of innovation can be understood in two ways: as an innovation strategy of an enterprise or as an innovation management strategy. The first meaning of a strategic dimension of innovation is in line with the the Oslo Manual, which classifies it as an organisational type of innovation (Oslo Manual, 2005), implicating that the novelty element refers to an enterprise strategy. Strategic management literature provides many examples of innovation strategies, from Ansoff's diversification strategy, the concept of strategic divergence, to the most famous blue ocean strategy. This aspect of the strategic dimension of innovation is not the subject of this article.

The second meaning of the strategic dimension of innovation presents it as a process of strategic innovation management in an enterprise, and this is the way of perception pursuant to which this aspect of innovation strategy will be developed in the article. Strategic decisions relating to innovation activities can be made in two different situations, or an enterprise's life moments: when an enterprise which has not carried out any previous innovation considers undertaking such activities and chooses to take up a strategy of creating enterprise innovation, and when an enterprise already carrying out innovation activities chooses a way of further innovation development. Conditions and nature of choices in these two situations are totally different, as well as their reasons and choice opportunities. Similarly to the enterprise internationalisation theory, which distinguishes the concepts of entering foreign markets and the concepts of running international business, we can also consider innovation development strategies and innovation management strategies. The third element of innovation strategic dimension highlighted in the article is the relation between innovation management strategy and general strategy of an enterprise.

The aim of the article is to present the original concept of strategic innovation management taking into account a critical review of literature attainments and to present the author's innovation strategy model verified for selected Polish enterprises.

The article uses the results of the statutory research carried out by the author in 2016 in cooperation with K. Melnarowicz (Romanowska 2016[1]) on Polish innovation leaders. Five enterprises were selected for the detailed research from among several tens of Polish enterprises from the rating lists of the most innovative Polish

[1] M. Romanowska, *Raport z badań statutowych pt. „Innowacyjność polskich przedsiębiorstw. Pomiar, modele, determinanty"*, SGH, Warszawa 2016.

enterprises, and the major selection criterion was the availability of information on their strategies and innovation activities (see Table 1 in the Appendix).

Information on Qumak, Elektrobudowa, Rafako, Protektor and Asseco Poland companies will be used to illustrate model innovation strategies of enterprises.

2. Strategies of Developing Enterprise Innovation

The literature presents innovation models reflecting researchers' views on determinants and conditions of innovation processes in enterprises and the course of these processes. British sociologist R. Rothwell has synthesized early research clarifying the innovation process, describing five models of innovation processes corresponding to changes of the global economic situation in the second half of the 19th century. (after Knosala et. al, 2014[2]; Karbowski, 2015[3]).

The first-generation model, the so-called supply model, was applicable up to the mid 1960s and resulted from a very receptive market of the post-war period. Expenses for research transformed into new products were immediately met by demand on the market. As the market was saturating, more and more innovations were not finding customers, which caused financial losses.

The second-generation model, the so-called demand model, functioning from mid 1960 until mid 1970, was better adapted to less dynamic markets. According to this model, the factor triggering innovation is the demand for new products and services, for which enterprises respond by investing in new technologies and products. The concentration of enterprises' attention on quick adaptation to market needs made them avoid radical innovation, which in the long term resulted in losing their permanent competitive advantage.

The third-generation model, the so-called supply-demand chain model, was functioning from the mid 1970s to the mid 1980s and was not, unlike the two previous ones, a linear model where subsequent innovation phases always occur in the same order. This model took into account macroeconomic conditions – stagflation and a more turbulent economic environment, and it emphasised mutual adaptation of market needs and enterprise development pace, as well as decreasing development costs and integrating marketing activities with R&D.

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[2] R. Knosala, A. Boratyńska-Sala, M. Jurczyk-Bunkowska, A. Moczała, *Zarządzanie innowacjami*, PWE, Warszawa 2014, Chapter 2.

[3] A. Karbowski, *Innowacyjność– miary oraz modele*, "Kwartalnik Nauk o Przedsiębiorstwie" 2015, No. 3.

The fourth-generation model, the so-called cooperation model, functioning from the mid 1980s to the mid 1990s, was a response to the accelerated social and economic changes and higher demand for capital. This model took into account the broad context of a macroeconomic environment and business environment, as well as the significance of networks and alliances of enterprises in their innovation activities.

The fifth-generation model, the so-called network model, is a developed version of the cooperation model and it accentuates integration with external partners resulting in a high level of organisational and technological integration of partners performing innovation activities. Close cooperation of network participants in the innovation process is the implementation of the open innovation concept.

Modern innovation models are usually a creative development of the fifth-generation model, as they develop the social dimension of the innovation creation process. These include the social corporate innovation model described by R.M. Kanter (Kanter, 2006[4]), applied in the public sector as a form of a public-private partnership and the open innovation model. The open innovation model developed by H. Chesbrough (Chesbrough, 2003[5]) implies that enterprises exchange new ideas and solutions, share knowledge and thus stimulate innovation development. The development of innovation clusters confirms that all the participants of an innovation process can benefit. Developed network models are often called the sixth or seventh generation models.

The presented models show the evolution of macro-conditions of enterprise development, highlighting development challenges and incentives to undertake innovation activities occurring in subsequent decades, but they do not explain the reasons for the decisions concerning innovation activities made by particular enterprises and differences in the ways of starting and developing innovation activities. However, if we look for an answer to the question why enterprises of the same country and of the same industry respond differently to challenges and incentives of the macroeconomic system, these models will not give us the answer.

It is interesting that even in highly developed countries creating incentives to introduce innovation, only some enterprises choose to undertake innovation activities and only some of them make innovation their strategic goal and permanent development leverage. The latest Polish Central Statistical Office survey proves that in 2013–2015 only 19% of industrial enterprises and 10.6% of service providing enterprises carry

[4] R.M. Kanter, *Korporacyjna innowacyjność społeczna – nowy model innowacji*, [in:] *Zarządzanie innowacją*, "Harvard Business Review", Wydawnictwo HELION, Katowice 2006.

[5] H. Chesbrough, *The era of open innovation*, "MIT Sloan Management Review" 2003, No. 44.

out innovation activities (*Działalność*, 2016[6]). Why do only few enterprises choose development by innovation?

To find the answer to this important question, research should go down to the level of an enterprise and it should analyse ways of forming enterprises' decisions concerning undertaking innovation activities, their reasons and determinants. In certain moments of life of an enterprise managers of most companies make a decision to undertake innovation activities or carry on previous development strategies. Such a decision is preceded by an effectiveness analysis of the strategy applied so far, the usefulness of resources under the new strategy and costs of acquiring necessary resources and expected advantages of innovation introduction. As a result of such an analysis, some enterprises choose to start innovation activities if they consider that they have sufficient resources and can expect satisfactory benefits from innovation. These enterprises are the subject of the studies presented herein. The analysis of the reasons and determinants of decisions on starting innovation activities allows identifying three various models of innovation development strategies.[7]

Model I. The **strategy of regular innovation development**: it is chosen by enterprises which, after years of accumulation of resources and out-dating the development pattern applied so far, encouraged by economic advantages or forced by competition requirements, choose to undertake innovation activities. As a result of investing in innovation and adapting to the new agenda, this strategy may lead an enterprise to a high level of innovation maturity, i.e. high activity in all the innovation fields. Enterprises applying the strategy of gradual undertaking innovation activities can be called "innovation builders".

Model II. **The strategy of quick innovation development**: it is typical for enterprises which start innovation activities immediately or shortly after establishing their business and consolidate them as time goes by. These enterprises can be called "born innovators", similarly to those "born global", or enterprises which, operating in globalized industries, choose to enter global competition from the very start of their business. This strategy is often applied by enterprises undertaking activities in high-tech industries, which enter the market with their original product or modern technology, but also by companies from low-tech sectors, which start a business with an innovative idea of operating on the market, e.g. an original business model.

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[6] *Działalność innowacyjna przedsiębiorstw w Police w latach 2013–2015*, "Informacje i Opracowania Statystyczne", CSO, 2016.

[7] The author used a parallel with the enterprise internationalisation strategy, where models of stage internationalisation and models of quick internationalisation, so called "born global" are distinguished. (see M. Jarosiński, *Procesy i modele internacjonalizacji polskich przedsiębiorstw*, OW SGH, Warszawa 2013.).

Model III. **The strategy of temporary innovation initiatives** is typical for enterprises which take advantage of an opportunity to establish or buy a start-up or to implement innovation using money from grants or EU projects, but do not continue innovation activities on their own after the project is over. Such enterprises can be called "occasional innovators". They perceive innovation projects as a source of temporary benefits, they do not introduce permanent changes necessary to develop permanent innovation and do not include these actions in their company strategy.

Depending on the advancement rate of innovation, enterprises can be placed on the beginning of this way as "innovation beginners" or have considerable achievements as "advanced innovators". "Innovation beginners" can be found among enterprises implementing each of these strategies, but "advanced innovators" are only those enterprises which successfully implement strategies of regular innovation development and quick innovation development.

Elektrobudowa S.A., Qumak S.A. Rafako S.A. and Protektor S.A. are examples of the strategy of regular innovation development, while Asseco Poland S.A. is an example of the strategy of quick innovation development.

Elektrobudowa S.A. is the parent company of a holding comprising 2 national companies and 3 foreign ones. This enterprise was established in 1953 and since the beginning, it has specialised in electrical power production and services dedicated mainly to the building industry, as well as power, oil and mining industries. Since 1996 it has been listed on the Warsaw Stock Exchange. The company development strategy assumes development by introducing its products and services on new markets and introducing new products on the markets on which it has been present so far. Innovative products from the electro-technical production segment, especially those from the automation technology field, which is new for the company, are the carrier of the company development. Modern products raise the quality of construction and erection works. The second direction of innovation activities is acquiring international quality certificates enabling the provision of services to demanding clients. Greater activity in developing new products and services, as well as the certification was related to the decision to start international expansion. The company's internationalisation commenced in 2007 and 2 high-tech companies were simultaneously purchased; modern automation production had previously been initiated, which was a trigger to intensify innovation activities. The holding's strategy of starting innovation activities can be described as the "innovation builder" model: the company has gone a long way from low-tech construction and erection works to innovation solutions for production and services.

Qumak S.A. is a Polish IT company designing and implementing ICT solutions for the private and public sector. It is an integrator operating on the Polish ICT market:

in the industry reports it occupies leading positions in the area of integration, it is a partner of world technology leaders, whose solutions it integrates, and on their basis it develops their own ones, adapted to the needs of the Polish market. Qumak originates from the Secom company selling computers and maintenance services. As a result of an agreement with the Polish-American Enterprise Fund at the turn of 1990 and 1991, Qumak International Sp. z o.o. *joint venture* was established. In 1998 Sekom S.A. in agreement with Qumak International Sp. z o.o. set up Sekom Group and both of these entities were merged in 2002. The newly founded company was named Qumak-Sekom S.A. and started running its business. In 2006 it made its début on the Warsaw Stock Exchange. Since 2013 the company has been running its business as Qumak S.A. and managing a holding comprising 3 companies. After entering the WSE, it broadened its activities in the area of developing its own innovation solutions. In 2012 an R&D Department was created and the importance of innovation activities raised. Only in 2015, several years after being established, did it occur on the list of most innovative Polish companies. Now the innovation level and the range of its own innovative products is large enough for the company operating so far on the Polish market to plan competition on highly developed markets.

The **Rafako S.A.** company was founded in 1949, since the very beginning it has been connected to the power industry, for which it has been designing and producing boilers and environment protection equipment. Since 1994 it has been listed on the WSE. It is the parent company of a holding comprising 7 subsidiaries, 2 of which are located abroad. The company is an unquestioned leader of the power equipment market in Poland. Rafako S.A. was for the first time included in the list of most innovative Polish companies in 2007. The process of innovation development started in 1990, which was several tens of years after the company was established. The innovation process has been regularly developed, a high innovation level of products has become the core competitive advantage of the enterprise and made it possible to enter foreign markets and maintain a large volume of sales. Rafako's long-term investment strategy emphasises especially innovative ideas and creating new solutions, which is also reflected in the company's mission. Among the 4 strategic goals of the new 2016–2018 strategy "enhancing R&D" is in the first position. The instruments for reaching this goal are as follows: creating a dedicated structure for R&D, commencing and continuing strategic R&D programmes.

Protektor S.A. is currently one of the biggest European producers and distributors of high safety class protective, military and special footwear. The company was founded in 1944, since 1998 it has been listed on the WSE. Currently the three-tier holding includes Polish and foreign companies. Protektor is a strongly internationalised

enterprise, mainly due to the acquired German companies which produce and sell their products on the German market. Only 13.8% of the holding's sales income comes from the sales in Poland. The reason for developing innovation for Protektor was entering the very demanding sector of special footwear and the will to carry out international activities. Aspirations related to the company's innovation activities were enhanced by the acquisition in 2007 of the majority, and in 2009 of all the shares of the German companies, which were more technologically advanced and had footwear brands distinguished in Europe.

Asseco Poland S.A. is the only example of the strategy of quick innovation development in our group of innovation leaders under research. Asseco Poland is a leader of the IT market in Poland with the market capitalisation over PLN 4.7 billion. Today's Asseco Poland is a result of joining Asseco Poland (earlier COMP Rzeszów), Softbank, Prokom Software and ABG. Asseco Poland has been carrying out its business under this name since 2005, and since the very beginning it has been preparing its own programmes dedicated at first to Polish companies, and then to foreign enterprises and institutions. Purchasing foreign companies with their innovation base and products made it possible for Asseco Group to internationalise quickly and consolidate its position of a leading software and IT systems producer in Poland. For Asseco, the reason for choosing the "born innovator" strategy was the fact that since the beginning the company has been operating in the IT sector, considered to be a high-tech industry, where without own innovative solutions any entity could only be a software reseller. The company president, Mr Góral, said in an interview for the "Forbes" magazine: "Considering the way Asseco operates currently, I dare to say that we are the largest technology start-up in Poland."

Rating lists of innovation leaders can include enterprises implementing the strategy of temporary innovation initiatives, but they are difficult to identify without a detailed study. These can be enterprises included in the innovation leaders list because of periodically high technology and product investments, carried out independently or by purchasing licences from foreign companies, often financed by funds from EU programmes. However, after completing these projects, "occasional innovators" have not built their own R&D base and have not undertaken other innovation projects.

The "occasional innovators" group definitely also covers a considerable part of start-ups created as part of programmes for innovation support, as well as enterprises which join the network of entities implementing the EU innovation project supported by government funds. After completing projects and consuming their part of funds they do not undertake their own innovation initiatives and do not become mature innovators. This fact is confirmed by the study on network organisations and start-ups

in Poland (see *Innowacyjność*, 2015[8]). The issue of frequency of implementing various innovation strategy models depending on industry, company size and its strategy requires broader research. Here the author would only like to highlight the reason for such research and propose a model useful for the identification of a strategy.

3. Innovation Management Strategies

Strategic innovation management is practised in enterprises which made a decision to use innovation in the company development and have already worked out some innovation potential. Continuing this development path requires drawing up a strategy covering innovation investment volume, a way of acquiring and managing resources necessary to create innovations, choosing activity areas (industries, products, markets) in which innovations are to be implemented, choosing basic and auxiliary links of the value chain at which innovation activity will be targeted, specifying the scope and forms of collaboration with the environment in the process of innovation activities, as well as the methods of using innovation for creating their competitive advantage and enterprise development. The observation of the competitors' actions and effects of their innovation strategy, as well as the evaluation of one's own achievements and restrictions from the time of initiating innovation activities is the basis for undertaking such decisions. The enterprise's mission and strategic targets should be a reference point for drawing up innovation management strategies.

J. Kalinowski, an expert at KPMG in Poland, defines an innovation strategy in the following way: "An innovation strategy answers to the question on what business goals an enterprise wants to reach by innovation. The strategy also specifies financial resources dedicated to acquisition, development and implementation of innovation. Identification of the kind of innovation that is sought for is also an important element of the strategy" (Kalinowski, 2016[9]). J. Kalinowski defines various kinds of models which are part of an innovation strategy. These are models specifying the way of innovation acquisition, ways of collaboration with external partners, innovation financing models and innovation development instruments (project selection mechanisms, the system of innovators acquisition and development, business processes and innovation project supervision procedures, the innovation processes control system,

[8] *Innowacyjność organizacji sieciowych w gospodarce opartej na wiedzy*, B. Bojewska (Ed.), OW SGH, Warszawa 2015.

[9] J. Kalinowski, *Innowacje dla sukcesu*, https://kpmg/com/pl/pl/homr/insights/2016.07/ (retrieved on 27 September 2016).

structural solutions, the system of indicators and reports for monitoring innovation effectiveness, innovation culture).

J-P. Deschamps defines innovation strategy by four questions which indicate most important features of a strategy (Deschamps, 2014, p. 159 and further[10]):

1) What is the aim of the planned innovation, what does an enterprise want to achieve by innovation?
2) What should be the scope and subject of innovation, or what kind of innovation should it refer to (technological, product-related, marketing-related, organisational) and what part of enterprise should it cover?
3) What should be the innovation intensity in terms of depth and costs of changes?
4) What should be innovation limits: will an enterprise choose the path of innovation development based on the company's internal resources or will it rather collaborate with the environment and acquire external resources?

By combining various answers to these basic questions Deschamps drew up four different models of innovation strategy, which he called "blades" or "scenarios" of innovation (Deschamps, 2014, p. 160[11]):

Model 1. The introduction of a new, improved product, process or service, aimed at enhancing present activities with internal work of an organisation;

Model 2. The introduction of a totally new category of products or services to create a brand new business undertaking by radical innovation activities inside the organisation;

Model 3. Collaboration with external partners in creating a totally new business model or system by radical innovation;

Model 4. Collaboration with external partners in creating a new or improved system solution aimed at enhancing present activities on an increment basis.

Another example of a multidimensional model are model strategies of R.E. Miles and C.C. Snow (after: *Zarządzanie,* 2016, pp. 16–17[12]), where strategy differentiation factors are as follows: the investment level, rate of changes novelty, rate of activity and speed of response to environmental challenges. They distinguish the following innovation strategy models:

1) **Prospector strategy**, by which an enterprise aspires to take the position of a leading innovator and benefit from a pioneer position. Companies applying this strategy are very active, they shape new trends, aggressively force out competitors from the market, but incur large costs of investments connected with a high risk.

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[10] J.-P. Deschamps, *Liderzy innowacyjności*, Oficyna Wolters Kluwer business, Warszawa 2014.
[11] Ibidem, p. 160.
[12] *Zarządzanie*..., op.cit., pp. 16–17.

2) **Defender strategy** – typical for companies aspiring to maintain their position on the present market based on their key competences. It corresponds to Ansoff's penetration strategy.
3) **Analyser strategy** combines the Defender and the Prospector strategies: an enterprise applies simultaneously, depending on the sector of business, the strategy of aggressive investment in its own solutions and imitation in other sectors, consolidating at the same time its position in all the sectors and taking a smaller risk.
4) **Reactor strategy** of passive reaction to environment changes and delaying the introduction of innovation.

Both classifications of innovation strategy models presented above prove considerable pointlessness of drawing multidimensional models, since taking several strategy parameters simultaneously makes the models opaque and consequently they do not include all the possible combinations of strategy features and thus are not very useful for diagnosing the real innovation strategy in empirical research.

Most innovation strategy models known in the literature combine two parameters describing innovation activities of an enterprise or combine a selected parameter describing innovation activities with a chosen environment feature, e.g. the rate of industry or region innovation, phase of life cycle of a sector or its rate of internationalisation.[13]

An example of a model showing diversity of two internal innovation parameters of an enterprise is the model developed by J.-P. Deschamps[14], who considers it to be most important to distinguish two different patterns of generating and developing innovation: top-down innovation initiated by the management with process changes, and bottom-up innovation, initiated by creativity and entrepreneurship of employees and stimulated by pro-innovative culture. Deschamps distinguishes four innovation strategy models depending on the quality of innovation culture and quality of innovation processes, understood as the power of support for innovation activities (Deschamps, 2014, p. 159 and further[15]):

1) **World class** – companies combining the high quality of culture with the high quality of innovation processes;
2) **The ambitious ones chasing the peloton** – companies with innovation processes of high quality, not accompanied by the high quality of innovation culture;
3) **Natural innovators** – the high quality of innovation culture but the low quality of innovation processes;

[13] An innovation profile is a list of features describing the innovation level and way of innovation management in a given enterprise, e.g. volume of expenses for R&D, existence of the R&D department, the level of innovation protection, its financing sources, etc.

[14] J-P. Deschamps, *Liderzy innowacyjności*... op.cit.

[15] Ibidem., p. 159 and further.

4) The fourth category covers companies with both parameters on a low level, which excludes them from competition.

Contemporary publications on innovation are characterised by irrelevance to the operational level of innovation creation and tendency to combine many projects and innovation processes into one strategic concept of enterprise innovation management. An example of such a way of thinking is a widely known process model of innovation management by K. Pavitt, J. Tidd and J. Bessant, forming a chain of actions subordinate to innovation strategy (Tidd et al., 2013[16]). Subsequent stages of the process-based attitude to innovation management are as follows: searching an identification of innovation on the basis of enterprise environment analysis, selection and decision on the choice of innovation, implementing chosen innovations and benefiting from the implemented innovations.

An innovation management model developed by consulting company A.T. Kearney, called also the innovation pyramid is of similar nature (After: *Zarządzanie*, 2015, p.26[17]). Innovation in this model is a result of an enterprise's effort directed at new products, processes, business models, and the value of innovation is verified on the market. Strategy is at the top of the pyramid, organisation and innovation culture, innovation life cycle management and factors conducive to innovation are at lower levels. Although the process-based innovation concept assumes the separation of the innovation management process from innovation strategy and subordinating the operational level of strategy innovation, the author believes that a researcher focusing on the strategic dimension of innovation should rather avoid the process-based approach and use in his or her studies strategy models showing various possibilities of choice of nature and method of innovation development.

The usefulness of these simple two-dimension models for diagnosing innovation strategies is demonstrated by a model including two dimensions defining the method of developing innovation by an enterprise: the main source of acquired resources (internal or external) and the rate of enterprise partners' involvement in innovation creation (insignificant or significant). Descriptions of the five enterprises from *the Rzeczpospolita*'s most innovative companies list are used to illustrate these models.

There are our model innovation strategies in Figure 1 (see the Appendix): "autistic innovator", "cooperating innovator", "network innovator" and "innovation buyer".

"**Autistic innovator**" is an enterprise which builds its innovation mainly by using its own resources, e.g. creative makers, its own inventions and ideas and financial

[16] J. Tidd, J. Bessant, *Zarządzanie innowacjami. Integracja zmian technologicznych, rynkowych i organizacyjnyc*h, Oficyna Wolters Kluwer Business, Warszawa 2013.

[17] *Zarządzanie*…., op.cit., p. 26.

resources, and does not involve other enterprises such as providers or buyers, it avoids entering networks, clusters and other forms of cooperation which would make them share knowledge and use of innovation. A considerable part of Polish start-ups belongs to this category. The reason for applying this strategy can be the difficult access to financial resources or knowledge, but also the will to sell the company or its patented solutions subject to an exclusive right of ownership.

"**Cooperating innovator**" is a strategy typical for larger enterprises which pay considerable attention to their ownership right to an innovation and its protection, but do not want to carry out activities on a broad scale and have to cooperate with their environment: scientific and research entities, providers, banks and funds financing innovation activities. By placing their key elements in their structures, however, and developing their own R&D divisions, employing their own staff and financing innovation to a large extent from their own funds and loans, they keep control over the innovation process and innovation commercialisation. The reason for the choice of such a strategy can also be an insufficient volume of resources and the will to learn from partners' achievements or copy their solutions.

"**Network innovator**" is an enterprise which prefers the synergy effect of cooperation related to innovation solutions over short-term benefits of their innovation protection. These benefits include the great scope of investments and the opportunities of breakthrough inventions, access to the partners' knowledge, raising international competitiveness of the enterprise's sector and market. Enterprises often implement this strategy operating in clusters and consortia.

"**Innovation buyer**" is an enterprise which purchases innovations either in the form of complete patents and solutions for R&D entities and other enterprises, or acquires, makes alliances or merges with enterprises that have valuable resources and ready innovations. An enterprise implementing this strategy must have considerable financial resources available, but it also has considerable control over innovations and it can benefit from them in a way similar to the "autistic innovator". The reason for using this strategy is the will to develop innovation activities quickly, impossible to achieve by internal development because of a lack of key competences necessary to reach success in demanding sectors.

When studying a specific enterprise, it can be classified in one of four model strategies, but more probably enterprises would be found in between various models. It is also possible that an enterprise would change its strategy in various periods of its business, e.g. it would move from the "cooperating innovator" to "innovation buyer" category as its business size grows. An enterprise can also differentiate innovation strategies in various domains of its business, e.g. in its core domain it would apply the "autistic innovator" strategy, while in other fields it would apply the "innovation

buyer" strategy. It often happens in pharmacy companies or conglomerates, which focus their research on their key groups of drugs, while buying others along with companies that have licenses. The classification of five selected innovation leaders to specific strategy models is presented below.

Elektrobudowa SA implements the "autistic innovator" strategy. It has a large own R&D division, considerable proportion of R&D employees and large expenses, which were, however, different in the subsequent years for R&D. The company has innovation products developed by their own R&D base and implemented into production, e.g. the high voltage gas insulated switchgear. Most innovation activities concern new and improved products and services, but in recent years the management has also introduced innovations concerning strategy, marketing and organisational processes. In general, the company development is based on two types of its own key resources: financial capital and human capital, which enables both the development of internal innovation and purchasing of innovation entities or licenses. The company's method of innovation activities is considerably autonomous: it does not cooperate with any entity in creating innovation, and the expenses are covered fully by the company's own funds. It is not part of any cluster or network. High-tech companies have been bought only incidentally. The growing foreign expansion and experience on the acquisitions market may forecast combining the "autistic innovator" with the "innovation buyer" strategy.

Qumak S.A. implements the "cooperating innovator" strategy. The company develops its technology innovations independently in its own R&D division, the rate of employees working in R&D is 3%, it also allocates considerable funds for research, but it tries to broaden its competences by collaboration with scientific entities. Collaboration with scientific entities is a consequence of several orders Qumak has performed for universities and scientific centres: it is the leader of services for education and science and research sectors and is considered a solid business partner. Because of the continuous contact with these entities, Qumak can consult its ideas with scientists, it collaborates with many universities, such as Military Technical Academy (WAT, Wojskowa Akademia Techniczna). Generally, Qumak finances its innovation projects on its own, but occasionally it takes advantage of the possibility of financing projects from the state funds or EU programmes in collaboration with Polish universities, e.g. currently it receives financing from the Ministry of Finance and Higher Education as part of the "Horizon 2020" programme. As part of the work in the National Centre for Research and Development, in collaboration with the Railway Institute and WAT, the company carries out a project under the brand Qumak – locomotive simulator for training engine drivers. The R&D division carries out broad market research, and also specialises in drawing up innovation projects and acquiring

money from external entities. Qumak also collaborates with ICT companies, it acts as an innovation incubator for the companies with a high development potential it selects, the companies which produce modern instruments and would cooperate with Qumak. By using its contacts and experience, it helps young companies to enter the market, ensures access to the newest technologies and provides financial support for the projects for which it has the priority of access to the new growing technologies. Because of the nature of the products and services intended for specific clients, the company also uses its clients' knowledge and inspirations to implement new ideas. Qumak's way of development is currently organic development: designing its own innovation products and offering them to present and new clients; acquisitions of other entities were practised several times during the holding creation in order to broaden its offer. The President announces that the company's entering foreign markets will be made by internal development, acquisitions will be considered later. It cannot be excluded that as the company becomes more international, it will use more external resources than now, so the "innovation buyer" will join the "cooperating innovator" strategy in reference to selected market segments.

Rafako S.A. combines the "cooperating innovator" strategy with the "autistic innovator" strategy. It spends a lot of funds on its own research and development, it also has several own design bureaus located in Poland and abroad. Rafako's products are protected by patents both in Poland and abroad. R&D expenses are covered by the company's own resources, budget grants and EU programmes. The funding is acquired by active participation both in national programmes managed by the National Centre for Research and Development and EU projects. As part of its R&D activities, Rafako closely collaborates with numerous scientific entities, such as the Wroclaw University of Science and Technology, Silesian University of Technology, Stanislaw Staszic AGH University of Science and Technology in Krakow, Institute of Fluid-Flow Machinery of the Polish Academy of Sciences in Gdansk. Projects carried out by Rafako are focused on several themes, such as the development of boiler technologies and environment protection installations, including the desulfurization and denitration of flue gases, modernisation of dust suction plants. Currently, the company carries out a project named "Innovative System of Flue Gases Treatment from the Ship Diesel Engines Based on Innovative Emission Control Methods" in collaboration with the National Centre for Research and Development as part of the 7th Framework Programme. Rafako's innovation strategy is based on its own strategic resources, mainly its own technological solutions and licences, its own staff and production equipment, but also on good collaboration with scientific centres and other entities. Rafako has a complete engineering base enabling innovation projects such as a design and construction bureau or production plant, where new solutions

can be tested. Irrespective of process- and product-related innovation, Rafako has introduced innovation in internal processes and business strategies and models. In Rafako's new strategy the significance of business partners in winning new markets and new competence is highlighted, as well as building stable strategic alliances. Further development of an internal R&D structure, however, is also foretast. Currently, the scope of cooperation is smaller than for Qumak and covers only "safe" partners, such as universities and R&D entities.

Protektor S.A. implements the "autistic innovator" strategy. Protektor was for the first time included in the list of innovative companies in 2015, due to its high expenses for R&D, having its own R&D division and considerable employment in R&D. Expenses for R&D were covered from the company's own resources, some innovation projects were carried out in collaboration with research institutes. The basis for developing innovative solutions in the area of technology and products in Protektor is the many years' experience on the footware market, numerous certificates for specific models and groups of footware and certificates confirming quality management systems, as well as good relations with regular clients. The company's priority is high protection of its own resources and innovation. It finances innovation from its own resources so new product templates and technologies are created within the holding. In spite of some acquisitions and collaboration with scientific entities, the company's priority is strong protection of innovation, which makes it possible for the company to compete on the very competitive market in Poland and abroad due to the unique quality of footwear.

Asseco Poland S.A. is a company whose main product is innovation. It implements two strategies simultaneously, depending on the project and the market: the "cooperating innovator" strategy and the "innovation buyer" strategy. Each year the company spends enormous money (13.45% of its income) on R&D work carried out by the managing company. The majority of the employees of the company work on developing innovation initiatives (79.82% of its employees). A large volume of spending and large R&D divisions in foreign companies of the holding should also be taken into account, as well as expenses for purchases of innovation companies, a large innovation centre, software licences, numerous products without national equivalents. Asseco Poland S.A. founds its business on knowledge and innovation technologies, as well as extensive experience in the IT industry. The offered solutions are also developed using structural funds and state budget funds allocated for education. Asseco Poland S.A. also participates in R&D projects carried out in collaboration with university R&D units and other organisations supporting the development of Polish science. As a result of the common implementation of projects, Asseco Poland S.A. pro-actively participates in the share of knowledge and experience between the

IT industry and science and higher education sectors. The company builds many years' relations based on trust with the clients, and becomes their strategic partner. Asseco uses the best experience of the international holding companies to prepare a comprehensive offer, meeting the requirements of thousands of its clients. Asseco's innovation strategy is based on two pillars. The first one is organic development based on the company's own software and services, while the second one is development by acquisitions. Asseco takes over companies which enable it to improve competitive advantages in a given sector, but also those which enable entering new geographical markets. Recently Asseco has started to acquire innovations from outside by taking over start-ups, small technology companies in order to acquire their products or skilled IT staff, which is also an innovative management move. The many years' successful acquisition policy places Asseco Poland in the group of the most experienced companies in this area in Poland. Asseco is a good example to observe the evolution and combination of various strategy models applied depending on the project and market. Starting from the "cooperating innovator", the company moves, as it gathers experience and financial resources, to the "innovation buyer".

4. Conclusion

Research and studies on innovation in enterprises have been carried out for many years in Poland and all over the world, but so far they have not made it possible either to understand fully the phenomenon of innovation, or to construct an empirically confirmed list of determinants, mechanisms and effects of enterprises' innovation activities. One of the reasons is the lack of common theoretical and methodological basis of research projects, and often also skipping the strategic dimension of innovation in research, especially the relation between an enterprise's innovation activities and its competitiveness, as well the enterprise's history and development. The lack of good theoretical models hampers the formulation of hypotheses concerning innovation strategies of enterprises, factors differentiating these strategies, organisational and economic effects of the implementation of various innovation strategy models. The examples of innovation strategies placed in the context of their business history and conditions presented in this article show the complexity of these issues on the one hand and the usefulness of simple innovation strategy models for diagnosing enterprises' innovation behaviours on the other hand.

It seems that the research focused on the strategic dimension of innovation would make it possible to answer many key theoretical and practical questions concerning the reasons and conditions of enterprises' decisions to start innovation activities,

reasons for diversified intensity and methods of these activities, as well as relations between innovation activities and the success of enterprises, industries and regions.

Bibliography

1. Chesbrough H., *The era of open innovation*, "MIT Sloan Management Review", 2003, No. 44.
2. Deschamps J-P., *Liderzy innowacyjności*, Oficyna Wolters Kluwer business, Warszawa 2014.
3. *Działalność innowacyjna przedsiębiorstw w Police w latach 2013–2015*, "Informacje i Opracowania Statystyczne", CSO, 2016.
4. *Innowacyjność organizacji sieciowych w gospodarce opartej na wiedzy*, B. Bojewska (Ed.), OW SGH, Warszawa 2015.
5. Jarosiński M., *Procesy i modele internacjonalizacji polskich przedsiębiorstw*, OW SGH, Warszawa 2013.
6. Kalinowski J., *Innowacje dla sukcesu*, https://kpmg/com/pl/pl/homr/insights/2016.07/ (retrieved on 27 September 2016).
7. Kanter R.M., *Korporacyjna innowacyjność społeczna – nowy model innowacji*, [in:] *Zarządzanie innowacją*, "Harvard Business Review", Wydawnictwo HELION, Katowice 2006.
8. Karbowski A., *Innowacyjność– miary oraz modele*, "Kwartalnik Nauk o Przedsiębiorstwie" 2015, No. 3.
9. Knosala R., Boratyńska-Sala A., Jurczyk-Bunkowska M., Moczała A., *Zarządzanie innowacjami*, PWE, Warszawa 2014, Chapter 2.
10. *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data*, European Commission and OECD, 3 rd edition, 2005.
11. Romanowska M., *Raport z badań statutowych pt. "Innowacyjność polskich przedsiębiorstw. Pomiar, modele, determinanty"*, SGH, Warszawa 2016.
12. Tidd J., Bessant J., *Zarządzanie innowacjami. Integracja zmian technologicznych, rynkowych i organizacyjnyc*h, Oficyna Wolters Kluwer Business, Warszawa 2013.
13. *Zarządzanie innowacjami w przedsiębiorstwie. Wybrane aspekty*, R. Zuber (Ed.), Warszawa, Difin, 2016.
14. *Zarządzanie współczesnymi organizacjami gospodarczymi w procesie wzrostu innowacyjności i globalizacji gospodarki*, U. Wąsikiewicz-Rusnak (Ed.), WNWSzB w Dąbrowie Górniczej, 2015.

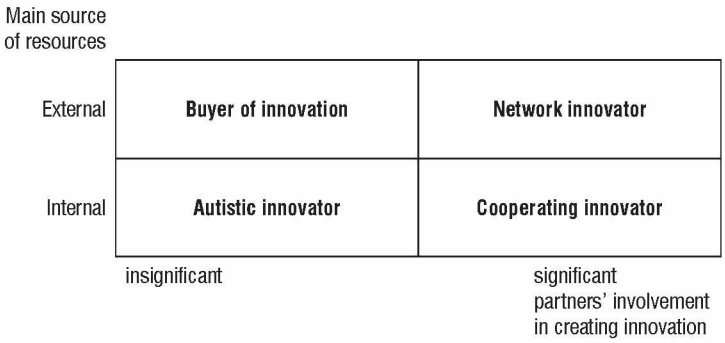
Appendix

Table 1. Position of companies covered by research for innovation ratings of *the Rzeczpospolita* newspaper published between 2007 and 2015

Companies/years	2015	2014	2013	2012	2011	2010	2009	2008	2007
Qumak SA	32	-	-	-	-	-	-	-	-
Elektrobudowa SA	28	13	-	44	56	-	52	-	44
Rafako SA	-	-	15	-	-	47	43	-	20
Protektor SA	35	-	-	-	-	-	-	-	-
Asseco SA	2	6	5	4	59	46	27	-	-

Source: the author's own study of *the Rzeczpospolita* newspaper ratings[18].

Figure 1. Models of innovation strategy



Source: the author's own study.

[18] Results of a questionnaire sent annually to enterprises by *the Rzeczpospolita* are the basis of the ratings. In their answers to the questionnaires, enterprises give information concerning the volume and nature of R&D expenses, number of employees of this field of activities, having a separate R&D unit and other issues.