

OPEN INNOVATION AND STRATEGIC DECISIONS OF ENTERPRISES

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Purpose: The aim of the article is to verify the dependencies between the implementation of open innovations as strategic companies' decisions and the achieved financial results.

Design/methodology/approach: The paper contains three parts. In the first part the strategic decisions in enterprise management were presented. In the second part the open innovations as an instrument for implementing enterprise strategic decisions were shown. And in the last part of the paper the methods were described. In this part of the paper the verification of dependencies between the implementation of open innovations and achieved financial results were presented. The whole of the paper is closed by the discussion and summary.

Findings: The article shows the topic concerned with open innovations with regard to the strategic decisions of enterprises. It has been shown that the implementation of open innovation in an enterprise affects its financial result.

Originality/value: The issues of implementing open innovations in logistics enterprises are important and current due to their impact on the financial results of the surveyed enterprises.

Keywords: open innovations, strategic decisions, management.

Category of the paper: Research paper, Viewpoint.

1. Introduction

Nowadays, managers make decisions to make an enterprise more competitive on the market. In terms of activities affecting the competitiveness of enterprises, open innovation can be distinguished, which, when implemented in the enterprise, may affect the financial result. Decisions concerning the introduction of open innovations, due to the long horizon of action, are strategic decisions and are made by the top management. The aim of the article is to verify the dependencies between the implementation of open innovations as strategic companies' decisions and the achieved financial results. The research methods used to achieve the assumed

goal are literature studies, analysis of the trend of operating income, operating costs and financial result on sales of surveyed enterprises as well as the strength and direction of the linear relationship between the main decision-making factors based on the Pearson correlation coefficient and case study. The contribution of the paper is to indicate the positive effects of the implementation of open innovations, which is reflected in the level of generated profit.

2. Strategic decisions in enterprise management

Permanent changes in the business environment must be constantly recognized by managers. The speed of response to changes in the environment in which business entities operate is determined by the pace of decision-making by managers. The effectiveness of the decisions made affects the adaptation possibilities of enterprises. A decision in the subject literature is defined as "choosing one of the possible variant of action in a given situation" (Bolesta-Kukułka, 2006, p. 88), made in a deliberate and non-random manner (Bolesta-Kukułka, 2007, p. 43). The above definition shows that the decision is the result of the decision-maker's mental activity, that is "the person or group of persons making decisions about the implementation of this and not another undertaking and bearing responsibility for the results of its implementation" (Łucki et al., 2008, p. 7), which confirms the non-random nature of the decision (see: *Procesy informacyjne w zarządzaniu*, 2010, p. 22). According to E. Urbanowska - Sojkin, a decision is "a conscious and deliberate choice, made with a specific objective function, in limiting conditions and criteria, of one among the recognized variants of solving the problem" (*Podstawy wyborów strategicznych w przedsiębiorstwie*, 2011, p. 20). In addition to the awareness of choice, the authors pay attention to defining the problem that is the subject of the decision and the purposefulness of making decisions. According to P.F. Drucker, "the decision should bring the desired result with the minimum of effort and interference" (Drucker, 1994, p. 376-377). The authors emphasize that the decision must take into account the actions that implement it, which will trigger the occurrence of feedback, allowing to check the accuracy and effectiveness of decisions in the light of current events (Drucker, 1994, p. 382).

In the management sciences a criterion for the division of decisions is the scope of planning, where operational, tactical and strategic decisions are distinguished (Bolesta-Kukułka, 2007, p. 51). Operating decisions are current decisions made throughout the entire business life cycle. Tactical decisions relate to partial plans and objectives related to shorter periods, their effects are visible only in one economic cycle. Strategic decisions relate to the implementation of long-term goals, the scope of the problem being solved and resource involvement in the case of strategic decisions is visible in the long-term perspective (Stoner et al., 2001, p. 244-245; Nitkiewicz, 2013, p. 21; Łucki et al., 2008, p. 8; Griffin, 2000, p. 269).

Making decisions is the choice of one possible solution among many alternative options. The decision must be preceded by recognition of opportunities and threats that may arise when a particular solution is adopted. Therefore, looking for ways to solve a decision-requiring problem, a continuum of decision-making conditions is assessed on a scale ranging from certainty, corresponding to the full possibility of predicting decision-making variants, by deciding in risk conditions, to decisions made under conditions of uncertainty (Nowakowska-Grunt, 2010, p. 154-162).

The state of certainty enables making decisions characterized by low probability of making a wrong decision. The rational scope of certainty is for decision-makers who have a large amount of quantifiable and accurate information about alternative options for choosing a decision. They must also have appropriate instruments for selecting the information they have. Making decisions in conditions of certainty is rare in contemporary enterprises. The state of certainty is possible to achieve when making current decisions at an operational level with a short implementation period, for which the purpose, means and methods of implementation are clearly specified (Stoner et al., 2001, p. 247; Griffin, 2000, p. 270).

The functioning of enterprises in a turbulent environment forces managers to make decisions in conditions of risk, which is understood as "a threat that a certain event, action or inaction will negatively affect the company's ability to achieve its goals in situations where there are threats of negative consequences or unused opportunities" (Zachorowska, 2006, p. 58).

Decision making in risk conditions is related to the emergence of economic phenomena that produce both negative and positive effects (see: Dziawgo, Zawadzki, 2011, p. 22; Hu, Blettner, Bettis, 2011; Hu, D., Blettner, R.A. Bettis). The positive risk is called "dynamic risk", the negative risk is referred to as "pure risk" (see: Zachorowska, 2006, p. 58). This means that the risk cannot be completely eliminated from the decision-making processes, however, an acceptable level of risk in the positive and negative aspect can be assumed and risk and responsibility can be coupled for the achieved effects of the company's operations.

The issue of business management depends on the decision-making processes (Hatch, 2002, p. 270, 277; Otolá, 2013, p. 5; Renckly, 2004, p. 20; Zarządzanie strategiczne. Systemowa koncepcja biznesu, 2005, p. 170). As a result of changes in the environment of enterprises whose basic resources are people (Barber, Strack, 2007, p. 66; Bohlander, Snell, Sherman, 2006, p. 4-5) there is permanent analysis of decision-making variants from the perspective of the imperative of decision. Making decisions regarding future directions of enterprise development requires not only estimating the current situation, but also taking into account the conditions of rational and efficient decision-making. The decision-making process in the enterprise streamlines the application of the decision-making models that allow for a quick change of the company's strategy (Bratnicka, Dyduch, 2014, p. 167; Žuber, 2008, p. 16). Perspective thinking becomes the necessary managerial competence, which translates into the innovation of enterprises (Grudzewski et al., 2010, p. 29; Grudzewski, and Hejduk, 2001,

p. 436). When looking for modern management instruments to increase the effectiveness of decisions, managers use a wide range of classification decision models. Decisions on the implementation of specific management instruments improve the efficiency of the company's operations and enable faster completion of the assumed goals.

In summary, it should be stated that the decision-making process should be characterized by the ability to adapt to changes. This means that the construction and selection of an appropriate decision model should be determined by many internal and external factors occurring in the company's environment. One of the most important factors determining the construction and selection of the decision model are innovations that enable not only increasing the readiness of clients to pay for the good, but also reducing the total cost of the alternative (Porter, 2006, p. 93-207). Therefore, the emergence of innovations forces competitors to make immediate decisions, the aim of which is to maintain or gain an advantage on the market.

3. Open innovations as an instrument for implementing enterprise strategic decisions

The literature on the subject provides many different definitions of innovation. One of the leading definitions of innovation is developed by the Organization for Economic Cooperation and Development (OECD) and Eurostat, according to which innovations are defined as: "implementation of a new or significantly improved product (product or service) or process, a new marketing method or a new organizational method in business practice, workplace organization or relations with the environment" (OECD, Eurostat, 2005, p. 48). On the other hand, the Act of 30 May 2008 on certain forms of supporting innovative activity defines innovative activity as "an activity consisting in developing new technology and launching on the basis of it the production of new or significantly improved goods, processes or services" (Act of 30 May 2008, art. 2.1, point 3). The legislator for the new technology recognizes "technology in the form of industrial property rights or results of development works, or results of application tests, or unpatented technical knowledge, which enables the production of new or significantly improved goods, processes or services compared to the ones manufactured so far on the territory of the Republic of Poland"(Act of 30 May 2008, art. 2.1, point 9).

In the condition of hyper-competition (Kotler, Caslione, 2009, p. 44-45), the implementation of innovation by a competitive company means that the remaining companies on the market must immediately make decisions in order to maintain or gain an advantage in this market, as it was mentioned above. C.K. Prahalad and M.S. Krishnan draw attention to the role of innovation in value creation processes. According to the authors, the most important component of the innovative and competitive potential of the enterprise is the business model that should serve its transformation (Prahalad, Krishnan, 2010, p. 38-47). It follows from the

above that innovation is the basis for making effective decisions whose aim is to stay on the market. This means, as it was underlined above, that building an innovation strategy requires, on the one hand, immediate decisions to maintain market advantage, while on the other hand, it is a long-term process that covers both technical, technological, product, service and market areas, implemented on a micro and macro scale (De Wit, Meyer, 2007, p. 147). Thus, the research and development activity becomes a realization of the innovation strategy, which includes product development, innovative cooperation of companies as well as patent and license policy (Griffin, 2000, p. 259). The implementation of innovations within the framework of research and development activities of enterprises may become a stimulus that inhibits or accelerates the development of enterprises (Itami, Nishino, 2010, p. 364-369) which will be reflected in their economic results.

Various approaches to open innovations are presented in the literature on the subject. Some researchers treat open innovations as an external source of innovative activity of the company, informing about its openness (Laursen, Salter, 2004, p. 1201-1215). For other researchers, open innovation means systematic encouragement and research of internal and external sources of innovation that integrate research with the capabilities and resources of the enterprise (West, Gallagher, 2006, p. 319-331). Open innovations are also treated as a set of activities for gaining the benefits of running innovation and modelling of creating, explaining and researching these activities (Chesbrough, 2006), which have an impact on the innovative activity of the enterprise (Chesbrough, 2002, p. 803-837). Applying the concept of open innovation can also mean transferring knowledge created within the organization beyond its borders or simultaneous use of the environment as a source of knowledge and a place where it is disseminated. The concept of open innovations assumes the possibility of existing three basic processes of opening the innovative process: centripetal, centrifugal and mixed (Gassmann, Enkel, 2005, p. 289-308; Newman, 2010).

According to H. W. Chesbrough and M. Bogers (2014, p. 17), open innovations are "a diffused innovation process based on deliberately managed knowledge flows in the organization, including cash and non-monetary flows, organized in accordance with its business model". H.W. Chesbrough emphasizes that the concept of open innovation consists on the one hand in the use of internal and external ideas in the enterprise's innovation processes, on the other hand, it is based on the use of internal and external channels that enable innovation to enter the market (Chesbrough, 2003; Chesbrough, Garman, 2010, p. 46-59).

Summing up, it can be stated that the application of open innovations to the implementation of the company's strategy should consist in searching for various sources of innovation, identifying opportunities for innovation (West, Gallagher, 2006, p. 319-331) and integrating them with the company's potential and resources. Therefore, it can be assumed that open innovations constitute an important instrument for the implementation of the company's strategy, which proves a holistic approach to the strategy of innovation management.

4. Methods – Verification of dependencies between the implementation of open innovations and achieved financial results

Empirical research was carried out on a sample of two companies, A and B, from the logistics industry. Enterprises were selected using a non-random sampling method, however, due to the lack of consent for the publication of data in the article their names were not disclosed. The research period was the years 2010-2017. Enterprises were selected in a targeted manner due to the fact that both implemented open innovations in the area of warehouse management in 2013, concerning the attempt to implement modern tools in the field of augmented reality (AR), in order to improve the management of warehouse space. The research process consisted in verifying the relationships between the implementation of open innovations and the financial results achieved in the surveyed logistics enterprises. In the research process, attention was focused on selected parameters of value flow (see: Łęgowik-Świącik, Stępień, 2014, p. 95-106), i.e. operating revenues, operating costs and the financial result from sales. The selection of the indicated parameters of the value flow as the object of the study was dictated by the horizontal approach to the economic categories.

Company A is a global logistics company, it provides multimodal freight transport services, storage services, supply chain management and the production and rental of trailers. The researched enterprise uses IT solutions in the scope of logistics, transport, storage and distribution referred to as Lean culture tools in the supply chain.

Company B is also an enterprise in the logistics industry that provides transport services for a diverse group of clients, in its logistic and transport activities it widely uses an integrated and multimodal customer service system, provides road and rail transport services, using the own rolling stock and network of carriers.

Analysing the level of operating revenues in enterprise A, it is noted that in the base year the company generated a 25% higher operating income than the company B. The year 2011 brought the surveyed enterprises an increase in the level of operating income, while in company A, revenue growth was stronger (14% while in company B it was 7%). In 2012, both company A and company B were affected by the crisis in the form of lower operating revenues (by 15% and 14%, respectively). That year, the surveyed companies also made strategic decisions regarding the implementation of innovations in the area of warehouse management using modern AR-type tools. Since 2013, both companies have implemented innovative solutions in warehouse management, which affected the results of the surveyed enterprises and gradually rebuilt their market positions. Company B systematically and evenly increased the market share of logistic services, while in company A, the increase in the level of operating revenues was slower, and in 2016 a decline in the level of operating revenues was noted. In the last research year company A increased the level of operating income, however, it was lower than the company's B operating income by 6%. The level of operating income in enterprises A and B was presented in Table 1.

Table 1.*The level of operating revenues in enterprises A and B in the years 2010-2017*

Research period	Operating income (in mln \$)	
	Enterprise A	Enterprise B
2010	4,387	3,489
2011	5,036	3,731
2012	4,269	3,203
2013	4,952	3,793
2014	5,289	4,527
2015	5,580	5,055
2016	5,473	5,585
2017	5,806	6,165

Source: own calculations based on data from the surveyed enterprises.

When analysing the level of operating costs in the surveyed enterprises, it is noted that in enterprise A the operating cost trend is comparable to the operating income trend. But in 2012, the level of operating costs exceeded the level of operating revenues, generating a loss on sales. Hence, the year 2012 was a breakthrough year in both companies due to the decisions regarding the implementation of open innovations in the field of warehouse management. In the following years of the research period, company A tried to rebuild its position on the market of logistic services, however, despite the implementation of modern solutions, the level of operating costs remained high (around 4% below the level of revenues). Company B used current control over operating costs in the audited period and, thanks to introduced innovations, managed to reduce operating costs in 2013-2017, obtaining in 2017 a 11% surplus of revenues over operating costs. The level of operating costs in enterprises A and B is presented in Table 2.

Table 2.*The level of operating costs in enterprises A and B in the years 2010-2017*

Research period	Operating costs (in mln \$)	
	Enterprise A	Enterprise B
2010	4,122	3,121
2011	4,844	3,373
2012	4,295	2,955
2013	4,874	3,445
2014	5,082	4,082
2015	5,351	4,524
2016	5,264	5,007
2017	5,538	5,533

Source: own calculations based on data from the surveyed enterprises.

When examining the level of financial result from sales in enterprises A and B, an interesting tendency is visible. During the analysis of operating revenues and costs, it was noted that company A in the base period showed a higher level of both revenues and operating costs. In the case of shaping the profit on sales, the opposite tendency is observed. This company B has a higher level of sales profit throughout the research period. Interestingly, in the most difficult period (2012), company A incurred a loss when company B achieved a positive financial result (although reduced by 5%). In 2013-2017, after the implementation of modern solutions for warehouse management, both companies recorded profits on sales, but company

B is characterized by an even increase in the financial result on sales, while company A, in the years 2015-2016, slowed down in the area of generating profits from sales (revised only in 2017). The level of the financial result on sales in the surveyed enterprises is shown in Table 3.

Table 3.

The level of the financial result on sales in enterprises A and B in the years 2010-2017

Research period	Profit from sales (in mln \$)	
	Enterprise A	Enterprise B
2010	265	368
2011	192	358
2012	-26	248
2013	78	348
2014	207	445
2015	229	531
2016	209	578
2017	268	632

Source: own calculations based on data from the surveyed enterprises.

In order to identify the relationships between the implementation of open innovations and the achieved financial results, a force and direction analysis of the linear relationship between the main decision factors based on studies of the Pearson correlation coefficient was performed. Based on the value of Pearson's linear correlation coefficient calculated for company A (table 4), a moderate relationship between the level of operating revenues and the financial result from sales (0.58) is observed. A positive correlation sign informs that as the level of operating income increases, the financial result from sales increases. Correlation is statistically significant for all comparisons studied (at the level of $\alpha = 0.05$).

Table 4.

Relationship between factors shaping the financial result in enterprises A and B in 2010-2017

Specification	Enterprise A	Enterprise B
Correlation between the level of operating income and the financial result from sales	0.58	0.98
Correlation between the level of operating costs and the financial result from sales	0.44	0.98

Source: own calculations – statistically significant correlation at the level of significance 0.05 (at the significance level 0.01 – Student's t-distribution).

The correlation study in enterprise B between the level of operating revenues and the financial result from sales indicates the existence of very strong positive relationships (0.98). This means that the increase in operating income is accompanied by a simultaneous increase in the financial result from sales. For company A, the relationships studied show moderate positive dependence. The tested compounds were additionally confirmed by the significance test (at the level of $\alpha = 0.05$).

Summarizing the results of the conducted research, it should be noted that in the case of the surveyed logistics companies, the optimization of operating costs, obtained by shortening the inventory flow cycle and generating revenues reflected in the acquisition and maintenance of

the market position is the result of the ability to make quick decisions in the implementation of innovative solutions. The decision to introduce tools of augmented reality in the activities of the surveyed entities was the result of not only a correct assessment of the current situation on the market of logistic services, but also decision-making in the implementation of the adopted strategy in the surveyed enterprises.

5. Discussion

In an attempt to verify the relationships between the implementation of open innovations and the financial results achieved in the surveyed logistics enterprises based on the results of Pearson's linear correlation, one can notice the main components of the strategic decision making process, which in the analysed cases concern taking risks related to the implementation of a specific innovation in warehouse management. The empirical studies concerning the trend line of operating income and costs, as well as the financial result from the sale of the surveyed enterprises, provided information about the retrospective decision-making processes, at the same time providing a basis for forecasting the size of costs and revenues as well as future development directions.

The conducted research shows that the dependencies occurring between the implementation of open innovations and the achieved financial results represented by enterprise A are the result of the adopted priorities in terms of the quality of offered products, but this company does not conduct ongoing control of operating costs. However, the surveyed company made the right strategic decisions to implement adaptation measures to the phenomena occurring in the external environment, i.e. it implemented open innovations in the area of warehouse management, which positively influenced the growth of the company's competitiveness in a given market segment and its financial results.

When analysing the relationships between the implementation of open innovations and the achieved financial result represented by enterprise B, it is noted that the priority is to increase the competitive advantage on the market. The conducted research shows a very strong positive correlation between the level of operating income and costs and the financial result from sales. What follows is that the implementation of open innovations related to warehouse management was a very important strategic decision, which allowed to significantly reduce operating costs, and thus increase the financial result in order to maintain and expand the competitive position on the market.

6. Summary

The issues of implementing open innovations in logistics enterprises is important and current due to their impact on the financial results of the surveyed enterprises. The implementation of innovations, and thus knowledge in the company, allows to reduce operating costs, and thus to increase the financial result. Making strategic decisions regarding the implementation of a given innovation involves a certain risk, but at the same time it gives one the opportunity to reduce costs.

The aim of the paper was to verify the dependencies between the implementation of open innovations as strategic companies' decisions and the achieved financial results. The empirical study was supplemented by research on the strength and direction of the linear relationship between selected decision parameters in the analysed range. The aim of the work was carried out, the relationship between the implementation of open innovations and the achieved financial results was verified. It has been shown that the implementation of open innovation in an enterprise affects its financial result. The multifaceted nature of the subject matter caused that some of the considerations were presented in general terms, which on the one hand allowed to highlight the problem, on the other hand, it inspires further research. The implementation of open innovations has positive effects reflected in the financial results of enterprises.

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