KEY ELEMENTS OF THE PROTECHNOLOGICAL ABSORPTIVE CAPACITY OF FINANCIAL COMPANIES IN POLAND

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A number of socio-economic phenomena that are intensifying nowadays, in particular an increase in competition and customer expectations, forces enterprises to seek new sources of innovation, including process (technological) ones to ensure their ability to compete effectively. It turns out that they are increasingly transferring them from their environment, and the success of this undertaking is dependent on their absorptive capacities. Therefore, the main goal of this article was to identify the key absorptive capacities that are endogenous determinants of the effectiveness of the process of the absorption of process innovations in the activity of Poland's financial companies. The empirical part of the article was written on the basis of an online survey carried out in 2015-2016. It was sent to the heads of 155 commercial financial sector companies registered in Poland, namely all banks, property and life insurance companies, investment funds and universal fund management companies. In total, 111 entities filled in the online survey questionnaire. In the conducted study an attempt was made to assess the direction and strength of dependence between the level of development of specific absorptive capacities of financial companies and the scale of the effects achieved as a result of the absorption of process innovations. Personal and organizational absorptive capacities of financial companies in Poland remain in a positive and strong linear relationship with their effectiveness achieved in the scope of the absorption of process innovations. The results identified the key absorptive capacities that determine the effects obtained in the process of absorbing technological innovations, taking into account the specific conditions prevailing in the service sector.

Keywords: absorptive capacity; absorption; process innovations; financial companies; Poland
JEL Classification: G20, M10, O32

1 Introduction

Due to the dynamics and nature of socio-economic changes taking place today, the current management literature abounds with the results of research attempting to identify the most valuable sources of innovation and competitive advantages, as they condition the success of enterprises.

Similarly, fierce competition in the financial markets increasingly enforces the development of innovativeness in companies operating there. By exerting pressure on the use of advanced technologies and providing innovative services, competitive markets compel even well-established companies to reach for already available technological solutions, and, therefore, to absorb them. Absorption of innovations stemming from the environment has become today an integral part of any company's activity (Liczmańska-Kopcewicz, 2017). However, making such a transfer effectively, in particular, a technological (process) innovation one, is quite a challenging task.

The transfer of technological innovation, especially of an entire technological innovation, is a very complex and challenging undertaking that is burdened with high risk and, therefore, it is not always completed successfully (Knowledge, 2000). Reaching a success is conditioned by numerous factors (Walter & Heinrichs, 2011) and, according to the resource-based view of the firm (which in the 1990s became the dominant school of strategic thinking in business management) (Barney, 2002), the leading role is played by the company's intraorganizational absorptive capacity.

Absorption of technological innovations requires the involvement of many different and specialized capabilities that make up the company's absorptive capacity but are not a fundamental component of the competencies used by them in their core business. Developing and providing them requires making additional time-consuming and capital-intensive investments, and thus maintaining special care and consideration while acquiring them. Therefore, the desirable directions of improving absorptive capacities should be defined precisely, including a precise definition of their target range as well as of the quantity and quality of their elements. It is worth remembering that there are clear, characteristic and lasting differences occurring in the scope of sources, implementation methods as well as in conditions of technological changes made within the sphere of services and other branches of the economy (Tidd & Bessant, 2013).

Given the above, the main research objective of this article is to identify the key absorptive capacities that constitute endogenous determinants of the effectiveness of the absorption of process innovations in the activity of financial companies operating in Poland. Its accomplishment, based on the results of surveys carried out in the Polish financial companies sector, will lead to providing an answer to the question about intra-organizational resource-related factors that determine the success of an undertaking narrowed to the absorption from the process innovations environment. Thus, the question remains about which elements of absorptive capacity should particularly be assured to achieve the assumed effects as a result of acquiring and implementing the desired process innovation?

It should be mentioned here that this article is an extension of considerations and discussions undertaken within the paper that was presented by the authors at 6th International Conference on Innovation Management, Entrepreneurship and Sustainability (IMES 2018) at the University of Economics in Prague (Glabiszewski et al., 2018).

2 Theoretical Background

There are many different concepts of absorptive capacity in the world literature. However, in its mature form, it appeared on the basis of the theory of knowledge management and the learning organization. Without going into thorough scientific discussions, knowledge management can be understood as a model of activities undertaken by the company with all aspects of knowledge in the context (especially knowledge creation, sharing, codification, and application) and using these activities to promote internally the phenomenon of learning and creating innovation (Gupta et al., 2004). Therefore, knowledge management is a process-oriented towards the appropriate shaping and utilization of knowledge resources, consisting of an integrated set of well-defined activities, such as locating knowledge, it's evaluation, acquisition, creation and processing, codification, gathering and saving, acquisition, dissemination, application, and its protection. (Dalkir, 2005; Davenport & Prusak, 2000; Probst et al., 1999). In turn, according to D.A. Garvin (2000), the learning organization can be such an organization that is capable of creating, assimilating, interpreting, transferring and saving knowledge, and deliberately changes its behaviour due to the newly acquired knowledge and its understanding. An organization learning through knowledge seeks constant development through flexibility, changeability and a quick response to changes (Pedler & Aspinwall, 1996). Summing up, one can attempt to state that the learning organization is the effect of implementing and conducting systematically the knowledge management process.

According to the assumptions of the theories taken into account, an organization's absorptive capacity is understood as its ability to continually enrich itself with useful knowledge that increases its innovation through the ability to identify changes taking place around and initiate creative reactions adequately (Glabiszewski, 2016). Therefore, the concept of absorptive capacities exposes the importance of external knowledge, treating it as a critical element in building a company's innovativeness. The role of absorptive capacity is to determine directly the quality of activities undertaken within the innovation process, starting from acquiring knowledge from the outside, through its integration with the knowledge already possessed, and finally applying it creatively (Nonaka & Takeuchi, 1995).

Absorption of technological innovations assumes three basic, though internally differentiated and structured stages. Namely, these are the acquisition of new technology, its assimilation and application (Cohen & Levinthal, 1995).

Therefore, the absorption process does not end with the selection and acquisition of new technology, but it also entails its assimilation within which this technology is learnt, adapted, improved, to be finally used in the current operations of the company. (Todorova & Durisin, 2007; Fernez-Walch & Romon, 2006). The last stage consists in launching and exploiting the acquired technology, and it is an equally important and complex stage, as it crowns and ultimately determines the success of the entire undertaking. It is at this stage that the mechanisms of efficient, effective and pro-market use of the newly acquired technology are launched and the final verification of its usefulness is made (Glabiszewski, 2016). In the subject literature, there are also concepts of absorptive capacities that are described as a

construct consisting of four components, i.e. recognition of external knowledge, its assimilation, transformation, and use for business purposes (Volberda et al., 2010; Marabelli & Newell, 2014; Jo et al., 2016). However, these components are presented rather as phases interacting with each other than the successive stages of a linear process.

It is not only the complexity of the absorption process indicates the degree of the difficulty of its implementation, but also the fact that it requires cooperation with external entities and, in principle, at all its stages. It is an open innovation process, going beyond the boundaries of one entity. However, these boundaries should be perceived at the same time as a space for integration of various organizations to bring about the implementation of innovation by its recipient.

As a consequence, implementation of all activities within the process of absorbing technological innovations requires the involvement of many different and specialized capabilities that make up the company's absorption potential. The absorption potential should, therefore, include all of the organization's capacities to evaluate the new knowledge and then to acquire it, integrate with the knowledge already possessed and use it in cooperation with the environment (Bosch et al., 1999; Glabiszewski & Grego-Planer, 2016). In the sphere of the absorption of technological innovations, the absorption potential should be expressed by the ability to carry out an effective transfer, i.e. one in which the chosen desired technology is acquired, then properly adapted and implemented, and ultimately used in a way that enables the company to earn achievements of the intended goals (Glabiszewski, 2016).

In order to determine the detailed structure of the absorption potential, it is necessary to identify within the general categories more homogeneous areas of abilities (due to the scope of their use), namely (Glabiszewski, 2016):

1. Abilities to acquire the new technology:
   - ability to identify and assess one's own technological needs and capabilities,
   - ability to identify in the environment and evaluate potential technologies and their providers,
   - ability to apply particular forms of technology transfer,
   - ability to cooperate with other entities to bring about the transfer of technology.
2. Abilities to assimilate the newly acquired technology:
   - ability to learn gained technologies,
   - ability to adapt gained technologies,
   - ability to develop gained technologies,
3. Abilities to exploit the introduced technology:
   - ability to efficiently exploit implemented technologies for the intended purpose,
   - ability to efficiently exploit new technologies,
   - ability to generate the outcomes desired by the market by means of new technologies.

These abilities result from a specific combination of their basic elements, that is of specific resources being at the company's disposal and belonging to different distinct categories. These include tangible and intangible assets of an individual and general organizational nature, being functional systems, intellectual property rights and contact networks (links), belonging to physical, financial, human and organizational capital, constituting relational and competence resources, having the form of knowledge, skills and attitudes (Dollinger, 2003; De Wit & Meyer, 1999; Barney, 1997; Hall, 1993).

Subject literature indicates various proposals of resources creating capacities used in the process of absorbing knowledge and innovation. They include specific combinations of knowledge (e.g. technical, in the R&D area, marketing, and management), skills (e.g. teamwork, communication, assessment of technology and its providers, determination of technological needs), experience (e.g. in the field of TT, implementation and exploitation of technologies, negotiations, cooperation with other entities) and attitudes of employees (for instance, attitudes that are entrepreneurial, motivated and prone to undertake a specific action, willing to learn and take risks, open to new knowledge and changes, leader like), as well as oriented towards innovative changes in management systems, human resource systems, culture and organizational structure, intra-organizational communication, relations with entities from the sectoral and cross-sectoral environment, technological know-how, and infrastructure used (Walter & Heinrichs, 2011; Trott, 2008; Zastempowski, 2010; Child et al., 2005; Minbaeva et al., 2003; Bosch et al., 1999).

It is worth noting that a number of these resources can be applied simultaneously at various stages of the absorption process of technological innovations, and therefore they are of universal nature, while others may have a special purpose. Therefore, not three but four aggregated categories of abilities should be provided for when creating the final structure of the absorption potential, namely:

- Universal absorptive capacities used in the process of absorbing new technologies.
- Specific abilities to acquire the new technology.
- Specific abilities to assimilate the newly acquired technology.
- Specific abilities to exploit the introduced technology.

The above suggested resource suggestions do not specifically address technological innovations and do not take into account the specificity of services providing companies. Also, they usually do not represent a holistic approach to absorptive capacities as a coherent system. Therefore, it is justified to continue to search for and verify the real determinants of success in the process of absorbing technological innovations leading to their comprehensive application.

3 Methodology and Data

The empirical part of the article was written on the basis of research findings obtained in 2015-2016 using an online survey using a CSAQ-a (Computerized Self-Administered

Questionnaire), in which the respondents filled in a digital version of the survey questionnaire available online. It was sent to the heads of 155 commercial financial sector companies registered in Poland, namely all banks, property and life insurance companies, investment funds (TFI) and universal fund management companies (PTE). In total, 111 entities filled in the online survey questionnaire, constituting 71,6% of the population under study. The analysis is based on the results of 37 TFIs, 28 banks, 20 property insurance companies, 17 life insurance companies and 9 PTEs.

The survey was the primary source of data essential for realizing the article's main empirical objective, which was identifying key endogenous factors of the effectiveness of the absorption of process innovations in the activity of financial companies operating in Poland. In order to accomplish the formulated main objective, the authors formulated two specific objectives:

1. Identification of resource-related factors made by innovation absorptive companies based on a literature review.
2. Assessment of the impact of the degree of development of specific absorptive capacities of Poland's financial companies on the level of direct and indirect effects obtained as a result of the performed absorption of process innovations.

In attempting to accomplish their specific objectives, and at the same time the article's main objective, the authors formulated and empirically verified three research hypotheses:

H1. The degree of the development of personal absorptive capacities of Poland's financial companies affects positively the achievement of the expected level of effects of the absorption of process innovations;
H2. The degree of the development of organizational absorptive capacities of Poland's financial companies positively affects the achievement of the expected level of effects of the absorption of process innovations.

The hypotheses formulated above are the result of scientific considerations based on the assumptions of the concept of the learning organization, according to which an enterprise using its existing capabilities should acquire and exploit as part of its activities the resources of new knowledge embedded in its environment as well as ready-made solutions to obtain measurable benefits. Therefore, it is assumed that the absorptive capacities possessed condition the scale of effects achieved as a result of the transfer of innovations, which should not be limited only to the implementation of the acquired novelty, but also to the obtainment of the resultant and desired market and financial benefits.

The desire to verify the view on the impact of certain absorptive capacities of companies on the effectiveness of their on-going process innovation transfers in the reality of the Polish financial sector prompted the authors to undertake a research problem contained in the hypotheses presented above. To verify them, statistical and descriptive analyses of the results were carried out. The observations and conclusions reached are discussed in the next part.

4 Results

To sum up, the absorption potential is the foundation of the company's innovation based on the achievements of other entities, i.e. on external knowledge and technology. The building blocks of this foundation are resources, or rather a specific configuration of strictly defined resources which are responsible for the transfer of innovation that is available in the environment.

A direct effect of the absorption of process innovations desired by the company is its adaptation for use in order to increase activity efficiency and effectiveness (Glabiszewski & Zastempowski, 2017). This is most often reflected in costs reduction or in improving quality, flexibility or efficiency achieved through processes supported by it, which should increase in the market value of the proposed offer. This, in turn, gives grounds for obtaining indirect effects, whose primary manifestation should be achieving the desired market results, in particular, achieving an increased market share and, in consequence, improving financial performance, i.e. generating higher profits. It is the willingness to meet these target effects that drives companies to take action to absorb process innovations. However, the degree of their achievement is shown by means of a measure of the effectiveness of these activities, which is conditioned by the level of excellence of absorptive capacities used for this purpose.

To assess the effectiveness of the absorption of process innovations in financial companies operating in Poland, we asked the management of those companies to determine the extent to which during the last three years they were able to achieve the individual effects underlying the decision to launch these pro-technological undertakings. For this purpose, a percentage scale was applied, where 0% meant that the effect was not achieved at all, and 100% that it was achieved completely, i.e. at a level consistent with expectations. The obtained results, being arithmetic averages of the assessments made, are presented in Table 1.

Table 1 | The degree of effects achievement in the absorption of process innovations

No.	Effects of the absorption of process innovations	Average grade
Total of direct effects		**66.7**
1	Increased level of quality of ongoing business processes	78.9
2	Increased level of operations flexibility within ongoing business processes	70.0
3	Increased efficiency of business processes	61.0
4	Reduced costs of ongoing business processes	56.8
Total of indirect effects		**65.1**
1	Increased market share	65.7
1	Improved financial performance	64.4
Total of all effects – total efficiency		**66.1**

Source: authors' elaboration based on survey results

The highest percentage (i.e. 78.9%) of answers given by the surveyed managers related to the achievement of goals with regard to the increase in the quality of business processes implemented in the sphere of operating activity. On the other hand, the lowest percentage of answers (i.e. 56.8%) was related to achieving cost-effectiveness. In-depth interviews with respondents indicate that the surveyed companies, due to the intense pressure evoked by tough market competition, focus their attention and resources on improving the particularly important area of activity that is the customer service process. As is known, a significant increase in quality caused by new technologies is not necessarily accompanied by a decrease in costs, since cost and qualitative competition strategies are usually an alternative to each other.

It is also worth noting that the direct effects of the absorption of process innovations were achieved to the degree that was very similar to that of the indirect effects, which should be deemed a desirable phenomenon. This means that the direct effects allowed the obtainment of the indirect effects, which should be treated as target ones. The direct effects of the transfer of technological innovations should not be considered the main goal of the entire technological venture, as they should be reflected in strategic objectives of companies, especially market and financial ones (Iyengar, 2015). The level of their achievement declared by the surveyed managers is almost identical (65.7% and 64.4%) and, what is quite interesting, it ranges between the level of achievement of cost and qualitative direct goals.

The presented results do not prove the full effectiveness of financial companies operating in Poland in the area of the absorption of process innovations (see more in Glabiszewski, 2016). Since they do not achieve all of the intended effects (total effectiveness achieved was at the level of 66.1%), there are rational premises to improve this sphere of pro-innovation activity, i.e. to increase their capacities to carry out effective innovation transfer. However, it should be performed in an intentional and effective manner, and thus justified due to the achievable results. Therefore, in the further part of the study, we made an assessment of the direction and strength of the impact of the elements (selected during the literature studies) of the absorptive capacity of the examined financial companies on the level of the effects of their pro-innovation absorptive activity. To this end, Pearson's correlation coefficients were estimated for the degree of development of specific absorptive capacities as well as for the degree to which all expected effects were achieved as a result of the absorption of process innovations (the so-called total effectiveness). The results obtained in this respect are shown in Table 2. The degree of development of absorption capacities used for calculations was estimated based on the evaluation of top management indications using a percentage scale, where 0% meant that given capacities were not developed at all, and 100% that they were developed to a maximum – in other words, the capacity was fully developed.

Table 2 | Correlations between the degree of development of absorptive capacities of financial companies and the effects of the absorption of process innovations.

No.	Elements of absorptive capacities	Total effectiveness
		r
Personal absorptive capacities		**0.68†**
1	employees' experience in the area of the absorption of process innovations	0.71†
2	motivation to introduce innovative changes, in particular technological ones	0.71†
3	entrepreneurial attitudes of employees	0.68†
4	employees' aptitude for learning	0.65†
5	interpersonal skills of employees	0.62†
6	employees' aptitude for communicating with other employees	0.59†
7	knowledge and technical skills of employees	0.58†
8	openness and readiness to absorb new knowledge	0.56†
Organizational absorptive capacities		**0.60†**
1	pro-innovation motivational system (providing incentives to undertake innovative activity)	0.67†
2	pro-innovative recruitment system (promoting employees' qualifications in the field of innovative activity)	0.65†
3	pro-innovative organizational culture (focused on inspiring and making innovative changes)	0.65†
4	pro-innovative training system (raising qualifications in the field of innovative activity)	0.64†
5	pro-innovative employee evaluation system (providing assessments of innovative activity)	0.62†
6	know-how and technological infrastructure	0.59†
7	multiple and positive relations with entities from the sector environment	0.46***
8	an efficient flow of intraorganizational communication	0.43***

Note: *** - significant at the 0.01 level; † - significant at the 0.001 level

Source: authors' elaboration based on survey results

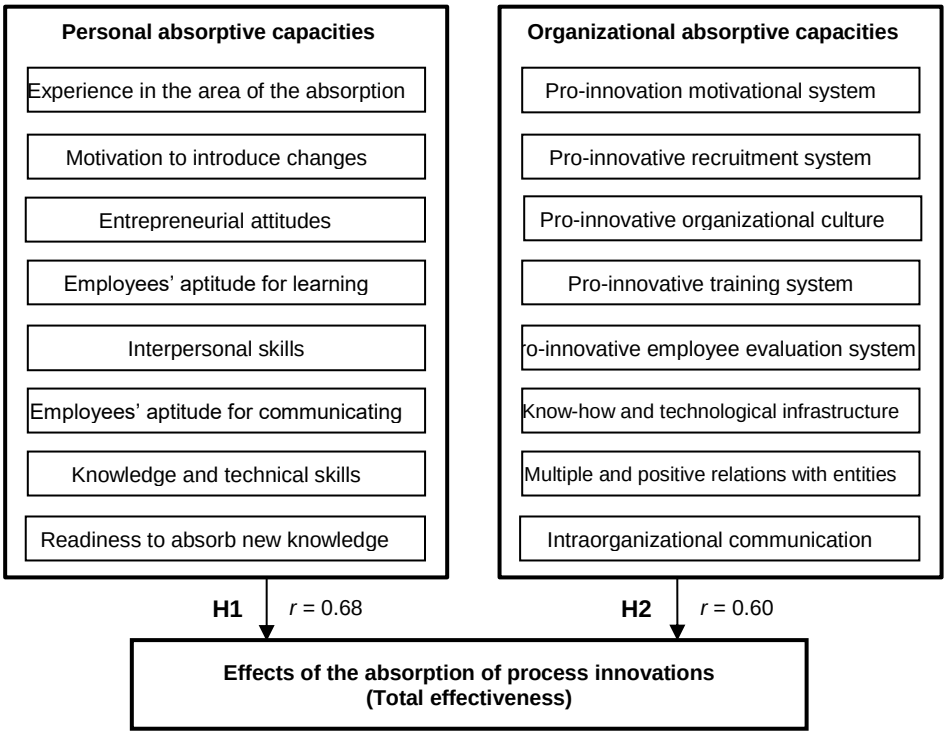
The obtained values of Pearson's correlation coefficients indicate the existence of a positive, strong, and relatively moderate dependence between the variables under study. In principle, all identified elements of absorptive capacity should be considered as significant endogenous determinants of the absorption of process innovations in financial companies operating in Poland. In other words, the examined absorptive capacities have a real impact on the level of effects obtained by financial companies in the process of absorbing technological innovations.

However, the effectiveness of the analysed area of pro-innovation activity is particularly affected by the development of these capacities, about which a strong linear relationship ($r \geq 0.6$) was identified. Both in the category of capacities attributed to individual employees as well as those having a general organizational effect, a strong impact was diagnosed in five out

of eight analysed components. The other three of each category have a moderate, though significant influence.

The obtained research results prove that also aggregated variables, i.e. personal absorptive capacities and organizational absorptive capacities, remain in a positive and strong linear relationship with the so-called total efficiency in the scope of the absorption of process innovations. Thus, it should be recognized that there are no grounds for rejecting H1 and H2 hypotheses accepted in the research proceedings, which means that the degree of development of both personal and organizational absorptive capacities of Poland's financial companies positively affects the level of the absorption of process innovations expected by them. These dependencies are presented in Figure 1.

Figure 1 | Relations between absorptive capacities and the effectiveness of financial companies operating in Poland.



Source: authors' elaboration based on survey results

The diagnosed dependencies indicate that the more developed absorptive capacities financial companies have, the more they are satisfied with the effects of their application, i.e. the results obtained from the absorption of process innovations. It is therefore justified to further develop their identified absorptive capacities, both personal and general organizational ones.

Nevertheless, one should be aware of the fact that the analysed efficiency is undoubtedly influenced by many other factors, not only endogenic but also exogenous.

5 Discussion

As mentioned before, in principle, all examined elements of absorptive capacity should be considered as significant endogenous determinants of the absorption of process innovations in financial companies operating in Poland.

However, the greatest impact on the level of effects obtained in the process of absorbing technological innovations - as it turns out - has the previous experience of employees gained during the absorption processes already undertaken and their internal motivation to introduce innovative changes, especially technological ones, their entrepreneurial attitude, willingness to learn as well as interpersonal skills. In turn, in the area of general organizational capabilities, pro-innovation targeted personnel management systems and pro-innovative organizational culture are of the greatest importance. Therefore, especially those resources should set priorities for financial companies in the sphere of supplementing and improving absorptive capacities.

Similar key elements of the absorption potential are indicated in the subject literature by other researchers exploring the subject issue. The importance of the existing knowledge, including technological knowledge, readiness of the organization, and thus its employees to learn and accept new knowledge, as well as openness to various types of impulses from the environment that stimulating the development of new knowledge were already pointed to by W.M. Cohen and D.A. Levinthal (1990) in their pioneering study. The importance of these elements is also emphasised by P. Trott (2008) and V.K. Narayanan (2001).

J. Child, D. Faulkner and S.B. Tallman (2005) argue that apart from the attitudes of openness to acquiring knowledge from the environment, readiness to undertake related activities and adequate competences, a very important component of the absorptive capacity are the previous experience of employees in the field of knowledge transfer and innovation, especially their experience in cooperation with other entities, and existing relationships with partners who are potential providers of knowledge in the process of inter-organizational learning. The importance of previous experience is also stressed by S.A. Zahra and G. George (2002). P.J. Lane and M. Lubatkin (1998) also point to the importance of relationships with partners, and H.M. Khamseh and D. Jolly (2014) pay special attention to building trust in these relationships. F.A.J. Van den Bosch along with the team (1999) prove that an increase in absorptive capacity is dictated by three types of combinative capabilities a firm has at its disposal: systems capabilities, coordination capabilities, and socialization capabilities. These are the capabilities that are responsible for absorbing knowledge through the application of laws and procedures (creating rules for the exchange of knowledge), developing relationships between group members (introducing coordination mechanisms and freeing interactions) and through

dissemination through an organizational culture of non-formalized principles of considering common ideals and the interest of the company in its business operations.

The clear role of employees' skills and motivation as well as intra-organizational communication in ensuring the effectiveness of absorption potential is emphasized by D. Minbaeva with the research team (2003). Even more attention is paid to the interactions occurring between skills relating to the absorption of knowledge and the motivation to take it as well as to the dependence determining the impact of the quality of internal communication on employee motivation. Moreover, Minbaeva exposes the importance of properly targeted results and development of the competence of personnel management systems (training, incentive and periodic appraisals).

In conclusion, it should be noted that the basic elements of the absorption potential indicated in the world subject literature also play a significant role in the processes of absorption of technological innovations realized by financial companies operating in Poland. It is, however, worth exploring whether the perspective of perceiving and defining these individual elements by different researchers is the same in different contexts, or whether there are specific characteristics that would indicate the specificity of these resources, which could significantly affect the choice of the method and scope of shaping the absorption potential in different companies, e.g. in service companies (Jimenez et al., 2010).

6 Conclusion

In today's economic reality the increase in technological innovativeness in a company appears to be a prerequisite of its market success, and ultimately also financial. This is all the more justified in the case of companies operating in a strongly competitive environment, which undoubtedly is a characteristic of the Polish financial sector. Obtaining this growth is increasingly difficult, especially when basing only on one’s capabilities. Obtaining and effectively implementing the sublime solutions available in the environment is also very demanding. It requires the use of properly configured and developed absorptive capacities to ensure satisfactory results.

Based on the results of own research, it should be recognized that the effectiveness of financial companies operating in Poland in the field of innovative activities narrowed to the absorption of existing process solutions in the environment is determined by specific absorptive capacities presented in the study. They are provided by individual employees or by the organization within a holistic approach, and therefore they should be perceived in the dimension of an individual employee or the entire organizational system co-created by numerous staff and tools supporting their activity (Barney, 2002). Ensuring their development leads to an increase in the degree of the achievement of the goals that financial companies set for themselves while taking action to absorb process innovations. Therefore, investments undertaken by them to improve these capacities become justified, since they are a source of their innovation and competitiveness growth.

To enhance the scientific and applicational value of the conclusions and recommendations formulated above, it seems necessary to continue empirical research aimed at further identifying of specific absorptive capacities that are key determinants of the effectiveness of financial companies in the scope of absorption that should not be limited only to process innovations.

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