

is acquired, then properly adapted and improved, and finally used in a way that allows achieving the assumed effects (Glabiszewski, 2016, p. 166; Glabiszewski, Grego-Planer, Liczmańska-Kopcewicz, & Zastempowski, 2018, p. 382). These abilities result from the specialized resources possessed by the company that are both individual (*e.g.* knowledge, skills, attitudes) and organizational (*e.g.* structures, systems, infrastructure) in nature (Barney, 2002, p. 41–56). Thus, the absorptive capacity should be understood as a strictly defined set of specialized resources enabling the company to effectively acquire, assimilate and use new technologies (Glabiszewski, 2016, p. 165).

However, the company's success is not only determined by its capabilities, but also by the conditions under which it operates. According to the positional school, which is part of the strategic management trend, these are the factors inherent in the environment, especially in the sector one, which mainly determine the company's results (Porter, 1985). Therefore, the starting point in building a company's strategy is its environment, determining the attractiveness of the sector in which it operates. According to the positional school, the company should first analyse the environment, so that based on it, it could select the strategy of competing, whose implementation is to ensure its desired position in the sector.

The issue of resources necessary to implement the strategy is secondary, *i.e.* it is a consequence of the situation in the environment and of the earlier strategic choices made. So this is an outside-in approach. On the other hand, however, according to the resource school, the company should first determine and develop its potential, including strategically significant resources, to later apply it in the preferred sector most beneficially. This is an inside-out approach.

In recent years, one can encounter an approach trying to reconcile the clashing views of the resource and positional schools, resulting in a coherent concept in which both the competitive potential of the enterprise and external conditions are determined as the company's success factor, which, in turn, they can be properly used thanks to the appropriately shaped potential, able to flexibly react to opportunities (Day, 1997, p. 51).

As a consequence, a very important area of empirical research should be identifying factors of success in the company's environment, also in the context of increased effectiveness of technology transfer activities, which is often overlooked (Walter & Heinrichs, 2011, p. 94). In this respect, all those elements that do not belong to the technology recipient should be included in the external environment and have an impact on the absorption. They are thus the constituents of the organization's environment, through which—generally speaking—one should understand everything that is outside the organization and at the same time affects it. Identifying all potentially important external factors of the decision-making process requires proper structuring of the company's environment. This approach allows a conscious search for specific factors in unambiguously defined and less

aggregated areas of the environment. Thanks to this, the process of analysing the environment takes on a comprehensive character, increasing the chances of noticing opportunities or threats that are still invisible to competitors. One of the widely-known proposals subdivides the environment into three specific segments, namely the task environment, the competitive environment, and the macro-environment, where the task one as the most related to the enterprise includes, in particular, its clients, suppliers and other directly related organizations; the competitive (industry) environment consists of competitors operating in a given sector who may interact with each other to a different degree; the macro-environment consists of four basic segments, *i.e.* social, economic, political, and technological, and constitutes the most-interacting group of factors (Narayanan, 2001, p. 24).

However, one should be aware that the division of the environment is only contractual, as it is difficult to clearly define the boundaries between its separate segments. Regardless of how the boundaries are set, an enterprise as an open system permanently enters into interaction with various elements of the environment, which results in its influences, but also influences itself, or at least tries to influence the conditions of the environment. The company that is able to see the concrete and significant manifestations of a complex and dynamic environment that is the source of uncertainty is more likely to have the chance to respond adequately and gain benefits from it.

When reviewing the literature in the field of enterprise innovation, one may come across different approaches to defining and operationalizing external conditions (Zastempowski, Glabiszewski, & Liczmańska-Kopcewicz, 2018, p. 121–123; Zastempowski, 2019, p. 71–74). They are subjected to diagnosis in various dimensions and configurations, as well as in subjective, objective and functional terms. For example, Adler and Shenhar (1990, p. 26) analysed the relationships that the company develops with current and potential allies, rivals, suppliers, clients, political actors, and local communities. Kogut and Zander (1992, p. 392–394) perceived in their research such elements of the environment as consumers, patent protection, monopolistic restrictions, the nature and pressure of competition, the speed of technology transfer, the level of cooperation, external knowledge possible to be gained. Özsomer, Calantone and Di Benedetto (1997, p. 408) determined the hostility of the environment (the degree of risk, the degree of stress) and its uncertainty (the pace of changes in marketing practices, the rate of product aging, unpredictability of competition, unpredictability of demand and tastes). Furman, Porter and Stern (2002, p. 905–909) diagnosed national innovation capacities through the prism of the strength of the common national innovation infrastructure, the innovation environment in domestic industrial clusters and the strength of links between them.

Quintana-Garcia and Benavides-Velasco (2004, p. 935), while carrying out research on innovation, analysed the types of relations existing in the environment, such as cooperation with direct competitors, upward relations: co-operation or

competition, and downward relations: co-operation or competition. Assink (2006, p. 219) estimated DEPEST, i.e. demographic, ecological, political, economic, social and technological factors as well as competition and consumers. Martinez-Roman, Gamero and Tamayo (2011, p. 465) studied rivalry and dynamics of competition as well as institutional support. Yam, Lo, Tang and Lau (2011, p. 395) determined the regional innovation system, including external sources of innovation and business services requiring high knowledge. Romero and Martinez-Roman (2012, p. 179) in their quantitative research took into account the spread of knowledge (knowledge spillovers), the university system and research and development institutions, regulations and public support measures. Martinez-Roman and Romero (2017, p. 543–569) diagnosed external sources of knowledge.

The effectiveness of the absorption of innovative technologies—as already mentioned—also results from a specific configuration of external conditions that may be supportive or restrictive (Walter & Heinrichs, 2011, p. 94). Enterprises should therefore consciously search, analyse and evaluate their impact, and if possible, even create these conditions and relational solutions that will induce them to acquire the desired technologies from the environment, and allow them to quickly apply them at home. These conditions are shaped, among others, by specific laws, regulations, political continuity of governments, the economic situation, social atmosphere conducive to innovation, the dynamics of technology, the intensity of competition, etc. (Walter, 2003, p. 20).

Currently, the institutional segment is considered to be a very important part of the environment. Undoubtedly, processes of technology absorption require more and more support from other entities. The growing needs of consumers, the pressure of competitors as well as the requirements of the law make technological progress so fast that a single enterprise seems almost helpless in the face of the need to search for innovative solutions in the field of specialized technologies. As it turns out, the interests of business partners in the framework of potential cooperation are mostly focused on the growth of market potential and technological development (Bleicher, 2011, p. 302). Undertaking joint ventures, due to accumulated financial and other resources, allows cooperating partners to significantly accelerate their technological development (Ford, Gadde, Hakansson, & Snehota, 2003, p. 42–45).

As a result of literature studies conducted, the authors selected 28 external conditions characteristic of the process of absorption of innovative technologies that are potentially favorable and 20 are potentially inhibiting or limiting, and then subjected them to empirical verification, the results of which are presented in the further part of the study.

## Research approach and methods

The empirical part of the article was written on the basis of research findings obtained in 2015–2016 by means of 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. Analysis is based on the results from 37 TFIs, 28 banks, 20 property insurance companies, 17 life insurance companies and 9 PTEs.

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

1) identification of potential external factors of the effectiveness of the innovation absorption process based on literature studies;

2) assessment of the stimulating and inhibiting impact of external conditions on the process of absorption of innovative technologies performed by financial companies in Poland;

3) assessment of the strength and direction of the impact of the perceived intensity of phenomena occurring in the environment on obtaining the expected level of absorption effects of innovative technologies by the financial companies in Poland.

While attempting to accomplish the specific objectives, and at the same time the article's main objective, the authors formulated and empirically verified the following four research hypotheses:

H1. Managers of financial companies in Poland perceive conditions occurring in the environment that stimulate the absorption processes of innovative technologies;

H2. Managers of financial companies in Poland perceive conditions occurring in the environment that destimulate processes of absorption of innovative technologies;

H3. The intensity of stimulating phenomena occurring in the environment and experienced by managers of financial companies in Poland positively affects the achievement of the expected level of absorption effects of innovative technologies;

H4. The intensity of destimulating distracting phenomena occurring in the environment and experienced by managers of financial companies in Poland has a negative effect on obtaining the expected level of absorption effects of innovative technologies.

The hypotheses formulated above are the effect of the cognitive gap identified in the literature and scientific considerations based on the assumptions of the strategic management theory and the concept of innovative and learning organization, according to which the company utilizing the conditions occurring in the environment and its existing capabilities, should acquire and exploit within its activities the already existing technological solutions to obtain measurable benefits. Therefore, it is assumed that in addition to the absorptive capacities possessed, also external operating conditions determine the scale of the effects achieved as a result of the innovation transfer performed. In fact, these effects should not be limited only to the implementation of the acquired novelty, but should lead to the obtainment of the desired benefits of a market and financial nature.

The willingness to verify the view on the impact of certain external conditions on the effectiveness of enterprises' transfer of innovative technologies in the reality of the Polish financial sector prompted the authors to undertake a research problem expressed in the hypotheses assumed above. In order to verify them, statistical and descriptive analyses of the obtained research results were carried out, reaching the observations and conclusions presented in the next points.

## Discussion and results

As part of the conducted survey, the impact of 28 external conditions of the process of absorption of innovative technologies, potentially having a favorable character, was firstly assessed. Table 1 presents the results obtained, which are the values estimated by averaging the the ratings made by the top management with the use of a percentage scale, the extreme categories of which are: 0%—the factor does not stimulate the absorption of innovative technologies at all, and 100%—the factor stimulates it very strongly, *i.e.* in a conclusive way.

It turns out that the growing competition in the sector (86.9%), including in particular the technological advancement of competitors (86.2%) and their high level of innovation (80.6%), is the main driver for the top managers of the surveyed financial companies to initiate absorption of innovative technologies. Strong sector rivals, facing serious market challenges, enforce technological development. A similar effect is observed in the presently very dynamic development of information and telecommunication technologies (83.1%) and universal access to Internet resources (82.2%). The universality of the Internet justifies the use of these technologies in the area of customer service, and its richness indicates the extensiveness of knowledge, which is a valuable source of inspiration and support for protechnological activities. Customers, and more specifically their growing requirements on financial markets (76.6%) and high dynamics of changes in their needs also exert considerable pressure on decisions to undertake this kind of

Table 1. Operationalization of close and open innovation process

| Phases of innovation process | Innovation process activities                          |  |
|------------------------------|--|--|
|                              | Close innovation process                               | Open innovation process                            |
| Gathering resources          | development of own resources                           | acquiring resources from outside                   |
|                              |  | harmonizing resources                              |
| Innovation creation          | independent creation of innovations                    | co-creation of innovations                         |
| Discounting of innovation    | implementation of innovations in the organization      | commercialization of innovations in the new market |
|                              | commercialization of innovations on the current market |  |

Source: Own preparation.

the new market. And close innovation process consists of: development of own resources, independent creation of innovations, implementation of innovations in the organization and commercialization of innovations on the current market (see Table 1).

Both open and close innovation process consist of eight above mentioned activities. However to determine open or close model of innovation there is need to validate separately each of the four activities (for open and close innovation process). Company needs to achieve a total value of 5 or more in the following scale: 0 is a lack of implementation, 1 means partial implementation and 2 is comprehensive implementation) and at the same time, this result must be higher than the value achieved for the other four activities characterizing closed or open innovation process.

Last variable that needs to be operationalized is ambidexterity of the organization, that is determined by four areas: company's goal, products, market and competitive advantage for both exploration and exploitation activities (see Table 2). There are two questions regarding each individual ambidexterity measurements (Zakrzewska-Bielawska, 2018, p. 116–117). Then, each of the measure was valued on the basis of the 1–7 scale. Next, the means for the measurements of exploration and exploitation were calculated. Finally level of ambidexterity is a sum of exploration and exploitation averages, which means that it can achieve values from 2 to 14.

Table 2. Operationalization of ambidexterity of organization

| Operational construct   | Measurement of the construct |  |
|-------------------------|------------------------------|--|
| Exploration activities  | company's goal               | The company's development was made from the perspective of long-term profits |
|                         |                              | New market opportunities were used   |
|                         | product                      | New products were created  |
|                         |                              | The range of products has been expanded                                      |
|                         | market                       | Entry into new markets has been made   |
|                         |                              | New, unique utility values were offered to clients competitive advantage     |
|                         | competitive advantage        | The company's competences have been developed                                |
|                         |                              | A new competitive advantage was created                                      |
| Exploitation activities | company's goal               | Short-term profits have been hedged and generated                            |
|                         |                              | Continuous improvement was carried out and efficiency gains were achieved    |
|                         | product                      | The existing products have been improved                                     |
|                         |                              | Production costs have been reduced   |
|                         | market                       | Increased economies of scale in existing markets                             |
|                         |                              | Satisfaction of existing customers in a systematic manner was investigated   |
|                         | competitive advantage        | The existing competences have been improved                                  |
|                         |                              | The current competitive advantage was protected and maintained               |

Source: Own preparation based on Zakrzewska-Bielawska, 2018, p. 116–117.

## Research results

The average intensity of innovation process in medium and large size enterprises in 2015–2017 is 0.80 in scale from 0 to 2, which means its below partial implementation (see Table 3). In general intensity of innovation process drops with each subsequent activity. What is particular interesting, that activities concerned with commercialization, both on current and new market, recorded very low level of implementation (respectively 0.49 and 0.37). That configuration of innovation process can be perceived as one of obstacles in achieving return of investments from innovations activity.

Table 3. Intensity of innovation process for open and close innovation and high level of ambidexterity for medium and large size Polish companies in 2015–2017, n = 400

| Activities of the innovation process                   | Medium and large Polish enterprises<br>n = 400 | Open innovation process<br>n = 21 | Close innovation process<br>n = 59 | High level of ambidexterity<br>(11–14),<br>n = 76 |
|--|--|-----------------------------------|------------------------------------|---|
| Resource development                                   | 0.62   | 1.19                              | <b>1.53</b>                        | 1.24  |
| Acquiring resources from outside                       | 0.70   | <b>1.62</b>                       | 0.98                               | 0.96  |
| Harmonizing resources                                  | 0.61   | <b>1.71</b>                       | 1.02                               | 1.07  |
| Independent creation of innovations                    | 0.67   | 1.14                              | <b>1.73</b>                        | 1.25  |
| Co-creation of innovation                              | 0.57   | <b>1.52</b>                       | 0.95                               | 1.01  |
| Implementation of innovations in the organization      | 0.59   | 0.76                              | <b>1.54</b>                        | 1.05  |
| Commercialization of innovations on the current market | 0.49   | 0.86                              | <b>1.44</b>                        | 1.00  |
| Commercialization of innovations in the new market     | 0.37   | <b>1.24</b>                       | 0.76                               | 0.82  |
| <b>Average</b>   | <b>0.80</b>                                    | <b>1.26</b>                       | <b>1.24</b>                        | <b>1.20</b>                                       |

Source: Own preparation.

Next two columns in below table presents intensity of open and close innovation process. Only 21 entities meet the criteria of selection for open innovation and 59 for close innovation, presented in chapter three—research method. Activities taken into account in selection process of open and close innovation process are marked with bold type. The average intensity for open innovation process is 1.26 and for close innovation process is 1.24, which means its above level of partial implementation (see Figure 1 and 2). Both results are significantly higher than intensity of innovation process for medium and large size Polish enterprises.

Despite similar results of average intensity of open and close innovation process, each of the processes have its own unique configuration of actions. The most intense activity implemented in open innovation process is *harmonizing resources*—acquiring orchestration of external and internal resources with value of 1.71 out of 2 and the less intense is *implementation of innovations in the organization* with

value 0.76. In case of close innovation process the most intense activity implemented is *independent creation of innovations* with value of 1.73 and less intense is *commercialization of innovations in the new market* with value 0.76.

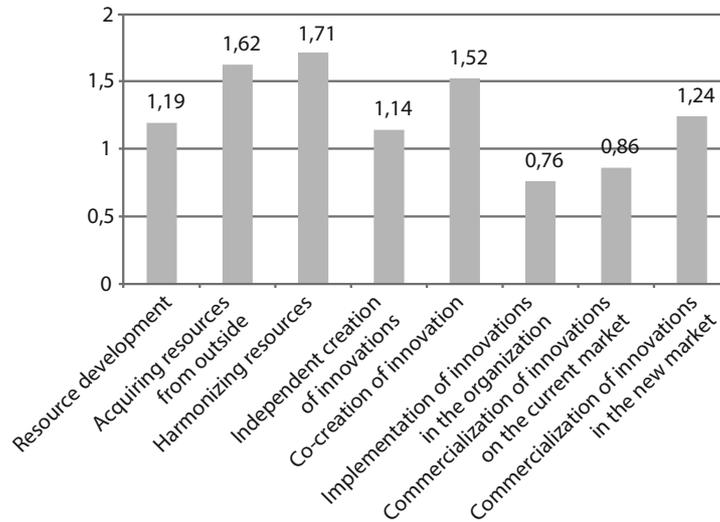


Figure 1. Open innovation process, medium and large Polish companies in 2015–2017, n = 21

Source: Own preparation.

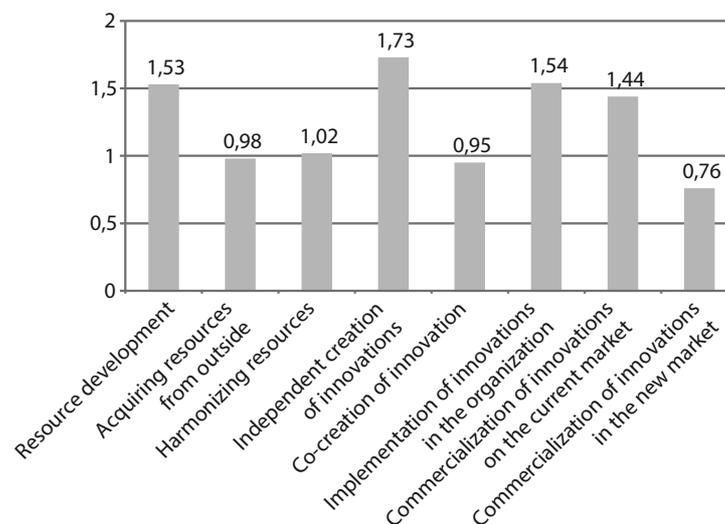


Figure 2. Close innovation process, medium and large Polish companies in 2015–2017, n = 59

Source: Own preparation.

Last column in the above table presents intensity of innovation process for companies that achieved highest level of ambidexterity (with values 11–14 in scale from 2 to 14).

In general for medium and large size Polish companies in 2015–2017 average result of organizational ambidexterity is 8.76, in scale for 2 to 14, which is rather moderate level. However base on this outcome there is an interesting question that can be formulated. What is an adequate configuration of innovation process to achieve highest level of ambidexterity?

Average intensity of innovation process for entities achieving highest level of organizational ambidexterity is 1.20 (in scale from 0 to 2) and is significant higher than result for medium and large size Polish companies and slightly lower than results for open and close innovation processes. This can be treated as a benchmark for model configuration of innovation process activity in order to obtain best effects in organizational ambidexterity. When compared those two group of results an innovation gap can be distinguished (see Table 4).

Table 4. Innovation process gap. Importance of process's activity, medium and large size Polish companies in 2015–2017, n = 400

| Activities of innovation process                       | Medium and large Polish enterprises | Key activity for innovation process | Innovation process gap (according to high level of ambidexterity) |
|--|-------------------------------------|-------------------------------------|---|
| Resource development                                   | 0.62                                | <b>57%</b>                          | <b>0.62</b>   |
| Acquiring resources from outside                       | 0.70                                | 50%                                 | 0.26  |
| Harmonizing resources                                  | 0.61                                | 49%                                 | 0.46  |
| Independent creation of innovations                    | 0.67                                | 52%                                 | <b>0.58</b>   |
| Co-creation of innovation                              | 0.57                                | 47%                                 | 0.44  |
| Implementation of innovations in the organization      | 0.59                                | 46%                                 | 0.46  |
| Commercialization of innovations on the current market | 0.49                                | 42%                                 | <b>0.51</b>   |
| Commercialization of innovations in the new market     | 0.37                                | 36%                                 | 0.45  |
| <b>Average</b>   | <b>0.80</b>                         | <b>47%</b>                          | <b>0.40</b>   |

Source: Own preparation.

their expectations and find a consensus of different visions, goals, motives and values. In practice such initiatives include stakeholder meetings, project evaluation meetings, interviews, focus groups, etc. Furthermore, an important manifestation of following responsible innovation approach is applying different methods of engaging stakeholders, tailored to the target group as well as sharing information and knowledge among multiple stakeholders. It refers to the idea that a firm aimed at the responsible innovation concept is daring in its approach to transparency and openness (Kupper et al., 2015, pp. 34–38; Blok et al., 2015, pp. 148–153).

Summing up, what is important while considering responsible innovations manifestations, is that they highly depend upon the industry in which the innovation process is conducted. Industry-specific examples of responsible approach to innovations refer to such issues as using sustainable materials, developing waste management and recycling or creating policies for managing hazardous waste (Scholten & Blok, 2015, pp. 103–104; Giannoni et al., 2018, p. 4).

## Conclusions

Responsible innovation is a very complex and multi-dimensional concept. In general, the main idea here refers the focus on solving a problem or fulfilling the need which delivers particular social and environmental benefits in addition to commercial goals. Nowadays, responsible innovation takes on a challenge confronting increasing number of business entities while responding to the emerging opportunities and threats collectively called ‘sustainability’. As such in our opinion, **responsible innovation can be considered as an example of dynamic capabilities**, i.e. “the firm’s processes that use resources—specifically the processes to integrate, reconfigure, gain and release resources—to match and even create market change” (Eisenhardt & Martin, 2000, p. 1107). Dynamic capabilities are a specific subset of capabilities which enable a firm to be responsive to new and sometimes unexpected development. As highlighted by Teece, dynamic capabilities are particularly important for companies in environments that not only pose risks, but also involve uncertainty at higher levels or of other types (Teece, Peteraf, & Leih, 2016, pp. 13–35). Thus, the extent to which a company has developed dynamic capabilities, has a great influence on how well it is equipped to act on responsiveness and anticipation while innovating (Van de Poel et al., 2017, p. 11).

Creating their strategies all enterprises ask the question: what should we do to remain competitive? It seems that in times of imminent climate changes, customers shifting their preferences toward more sustainable foods and services, growing people awareness of the social problems related to health and quality of life, the enterprises need to build their competitiveness through responsible innovation.