How do companies envisage the future? Functional foresight approaches

Anna Kononiuk, Anna Sacio-Szymańska, Judit Gáspár

ABSTRACT

The main aim of the paper is to present the synthesis of the results of methodological analysis conducted on examples of foresight projects executed in chosen companies representing four companies type: small and medium-sized enterprise (SME), non-profit-organization, international corporations and consulting companies as well as to posit functional approach for the implementation of foresight research within organizations. The empirical part of the study is based on the qualitative approach. A multiple case study methodology is employed. The research objects are sixteen companies experienced in foresight research. The first part of the paper gives an overview of definitions of corporate foresight and the analysis of background that have influence on the conducting of foresight in large multinational companies on one side and SMEs on the other side. In the field of the theory of foresight research, the study demonstrates that there are different motivations for foresight introduction as well as different organizational structure of teams conducting the activities and the approaches that they use. In the practical perspective, the study and a detailed functional foresight approach proposed by authors could be valuable for SMEs who consider implementing foresight research into their strategic planning processes.

KEY WORDS

corporate foresight, strategic foresight, foresight in/for business, small and medium-sized enterprises (SMEs), functional approach

DOI: 10.1515/emj-2017-0028

Corresponding author:

Anna Kononiuk

Bialystok University of Technology,
Faculty of Engineering
Management, Poland
e-mail: a.kononiuk@pb.edu.pl

Anna Sacio-Szymańska

Institute for Sustainable
Technologies - NRI, Poland
e-mail: anna.sacio@itee.radom.pl

Judit Gáspár

Corvinus University of Budapest,
Faculty of Business Administration,
Institute of Business Economics,
Department of Decision Sciences,
Hungary
e-mail: judit.gaspar@uni-corvinus.hu

INTRODUCTION

By and large, strategic foresight seems to be an umbrella term for all the organizational activities embracing environmental scanning, the final choice of strategic options and integrating capabilities enabling the firm to detect discontinuous change early enough to interpret the consequences for the company and formulate responses, while at the same time maintaining a high-quality, coherent and functional forward view (Rohrbeck, 2010; Slaughter, 1995; Peter & Jarrat, 2015). Terms like "(industrial) futures research", "business futures", "strategic foresight", "strategic business intelligence", "strategic marketing intelligence" are also used to describe this field of practice (Ruff, 2015). As noted by Iden et al. (2017), "the field looks immature,

dominated by explorative research using case studies to construct arbitrary categories in order to organize and summarize empirical observations". Nevertheless, on the basis of the critical analysis of the existing published works carried out by the authors of the article, one may identify emerging research streams. Recently foresight is perceived more and more as a managerial competence in the constructing of the future of the organization, and not just a compile of methodologies through which organization may gain a broader vision of the future (Saprong et al., 2013; Rorbeck & Gemunden, 2011; Rohrbeck, 2010). According to the authors of the article, the openess to foresight managerial competence is indispensable for foresight capacity building within organization. As noted by Fidler (2011, pp. 540-541), from managerial perception, foresight could be classified as "search behavior" encompassing such activities as information gathering and the due-diligence processes undertaken in anticipation of a major move. Therefore, the reframing of an organization's essential understanding of a situation seems to be an explicit mandate for managers.

In order to support companies in the process of building and consistent reconfiguration of their strategic resources (especially in the face of continuous changes), which determine the competitive advantage, a methodological analysis has been conducted of examples of foresight projects executed in chosen companies. The authors of the article have posed the research problem in the form of three research questions, namely:

- What is the motivation for foresight introduction in the companies?
- What is the manner of organizing foresight research in the companies?
- What approach of foresight research is taken in the investigated companies?

Such organization of research allowed for identification of different motivations for foresight research characterization of specific models and concepts of foresight at the level of institutions; it also confirmed the presence of a need to propose a functional corporate foresight approach that should be able to provide outcomes that fit the needs of innovatively oriented SMEs. The selection of the companies for the case studies as well as the scope of the research was limited by the data accessibility.

1. LITERATURE REVIEW

Foresight executed by enterprises varies in name as much as it does in motives, organisation and approach. Ruff (2004) breaks corporate foresight into: long term technology foresight, technology assessment, product impact assessment, innovation and technology analysis, technology monitoring, strategic technology monitoring, strategic competition analysis, prospective economic analysis, strategic market research, advanced marketing and trend research, future oriented organisational research and global developments and trend monitoring. In the recently published works on foresight in the enterprises, there function notions such as corporate foresight (Rohrbeck, 2010), strategic foresight (Saprong et al., 2013; Alsan, 2008) and business foresight (Jarvis, 2012). While these many different names for foresight no doubt indicate slight differences in approach, organisation and methodology, the varying terms are not used with enough consistency to discern any pattern. Therefore, the authors of the paper will use the notions of corporate and business foresight interchangeably.

Corporate foresight relates to projects run by individual companies, groups of companies, industry-wide associations, etc. within the private sector (JRC-IPTS, 2008). Daheim and Uerz (2006, p. 12) claim that the key to foresight is making sense of often contradictory information, drawing conclusions on their impact, dealing with diverging opinions, subjectivity and uncertainty, depicting future options, and, most importantly: deciding on actions to take. Will (2006, p. 4) claims that corporate foresight is a process of communication to build a midterm to long-term vision of future markets, customer needs and societal challenges supporting the potential, competitiveness and innovation capability of a company. Palmer and Kaplan (2007, pp. 13-15) specify corporate foresight as a thorough understanding of the emerging trends, drivers, inhibitors, potential dislocations, and emerging opportunities within a market, industry or set of converging markets and industries. They add that organizations that possess foresight are better positioned to establish a strategy that leverages future trends – and even helps define them – to create a leadership position in the marketplace. They claim that gaining and applying foresight is a continuous activity that requires an organization to engage in processes that define an explicit linkage between the evolving external

environment, potential growth opportunities, and business strategies/tactics as well as create an ongoing capability for tracking and quickly responding to positive or potentially detrimental changes in the competitive business environment. According to Rohrbeck (2010, p. 11) organizational foresight is an ability that includes any structural or cultural element that enables the company to detect continuous change early, interpret the consequences for the company and formulate effective responses to ensure the long term survival and success of the company. Whereas Vecchiato, Roveda (2010) use strategic foresight deliberately to emphasize the tight relationship between foresight and strategy formulation. This interrelation had already been underlined by Slaughter (1995). The general definition that he provided was, in his own terms, an analogical one: "Foresight is a human attribute that allows us to weigh up pros and cons, to evaluate different courses of action and to invest possible futures on every level with enough reality and meaning to use them as decision making aids. The simplest possible definition of foresight is: opening to the future with every means at our disposal, developing views of future options, and then choosing between them".

The existing published works on foresight research in companies provide insight into the corporate foresight of large corporations and SMEs which both have common features and many dissimilarities (Major & Cordey-Hayes, 2000; Bidaurratzaga & Dell, 2012; Jun et al., 2013). As noted by Vishnevskiy et al. (2015), the similarities and differences are motivated by variations between the forms of ownership, the scope of activities, and the disposable resources of large companies and SMEs. According to the authors of the article, the important role may play also the openness of the organisational culture as well as the foresight awareness of the managerial staff. The main rationales of foresight research in companies have been studied (Daheim & Uerz, 2008; Gracht et al., 2010; Phillips, 2013; Battistella, 2014; Fikirkoca & Saritas, 2012; Vishnevskiy & Egorova, 2015). According to the authors of those articles they seem to be quite similar: SMEs and large companies try to anticipate volatility in the environment, prepare new strategies and identify business field to enter.

The manner of organising foresight research in the companies has been touched upon mainly by Cuhls and Johnston (2006), Becker (2003) and Daheim and Uerz (2006). Cuhls and Johnston (2006) categorize foresight projects along a continuum of two extremes, foresight for the purposes of creating change within the organisation, often using a broad focus and using a variety of external sources for information, and foresight focused internally used mainly for information gathering. Cuhls and Johnston plot different approaches along a continuum between these two extremes, including the three main approaches identified by Becker the Collecting Post, the Observatory and the Think Tank. The Collecting Post is mainly concerned with providing background information for the decision-making processes of the company and it is present in companies with low levels of foresight activity The Observatory is an autonomous foresight unit with a fulltime staff and a budget of its own. Its particular trait is that is fulfils a highly specialised and rather singular purpose for the company. The Think Tank is a special forward-looking unit, performing elaborate and broad foresight work in a company. This type of organisation can also provide foresight services to external clients (Pirttimäki, 2006, p. 61). Becker defines the Collecting Post approach as foresight that is strongly imbedded in other R&D activities. The people responsible for foresight in this approach are often "part-time futurists" who perform foresight activities in addition to other tasks. This type of approach is common where there are temporary foresight teams for "one off" projects. The collecting post usually collects information from existing data sources, rather than conducting exercises to generate their own data. Cuhls and Johnston place it at the internal information gathering end of the spectrum. Becker's Observatory is a more autonomous unit, with its own budget and full time staff. The observatory often has a single purpose or focuses on a specific issue or industry. The Observatory is usually organised by professional futurists with some experience, but they will often reuse pre-existing data from external sources, as well as generating their own new future oriented knowledge. The Observatory sits roughly in the middle of Cuhls and Johnston's scale, performing both internally focused information gathering and change oriented activities that use external information sources. According to Becker, the Think Tank is the broadest and most elaborate foresight approach. Like the Observatory, the Think Tank is usually an autonomous unit with full time specialist staff and budget, however its focus is broader; its purpose is to connect expert knowledge from multiple areas into a bigger picture of the future. Generally, the Think Tank uses more sophisticated foresight tools and is more change oriented than the Observatory. Cuhls and Johnston place the Think

Tank at the end of their scale, having a broad focus on a range of external factors and information sources and with the goal of initiating change within the organisation.

Daheim and Uerz add a fourth approach to Becker's three approaches to foresight, the outsourcer. Outsourcers are often independent foresight units like the think tank, but they focus only on defining the scope and goals of the foresight study, leaving the foresight process itself and large parts of the research to be conducted by external consultancies or agencies (often following a think tank approach), before re-integrating the results back into strategic planning and other aspects of the organisation. This approach to foresight is often used by enterprises, who frequently outsource the foresight research and process to external consultants.

Fig. 1 shows how Daheim and Uerz plot their four foresight approaches along the axes of scope and level of connectedness of the foresight tasks and the size of the teams. This graph is a mirror image of the Cuhls and Johnston graph implying that as foresight teams are more change oriented, the scope of their tasks and their networking with other resources and teams becomes greater. It also indicates that information gathering teams are generally smaller than change-focused foresight teams.

The vast majority of the cases investigated in the existing published works, utilized a "top-down" approach to foresight. Munnecke and van der Lugt (2006) compare these top-down down strategies with a "bottom-up" approach that uses the insights of front line workers and consumer needs as the main drivers of the foresight process. Very few organisations appear to be using these strategies, instead preferring the strategic planning focus of the top-down approach. However, the bottom up approach may be very beneficial, particularly in foresight exercises that are focused on a particular industry or aim to promote innovation. A few studies appeared to recognize the importance of bottom-up strategies, such as van der Duin (2006) and Havas (2006). Despite this, bottom-up approaches appear to have not been employed, either for practical reasons or because decision makers did not feel that it was important to involve consumers or front line workers in a meaningful way.

Relating to problems of corporate foresight and factors regarded as critical for its success, the authors of the paper will propose four functional corporate foresight approaches and will detail the one that should be able to support SMEs' decision making processes and reinforce their innovation orientation.
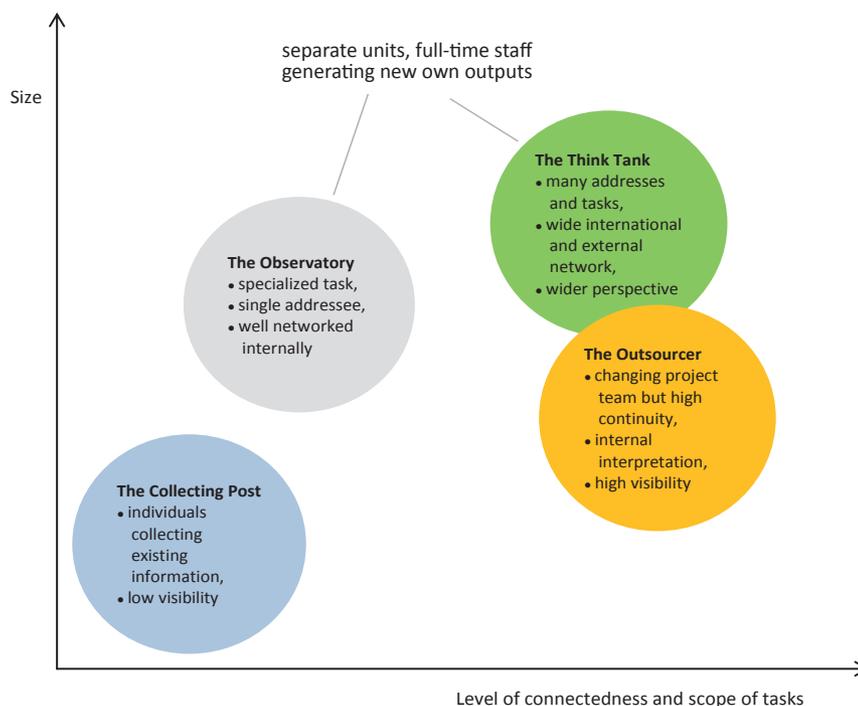

Fig. 1. The manner of organising foresight research

Source: (Daheim & Uerz, 2006).

2. RESEARCH METHODS

Taking into account the general objective of the study, the authors of the research base their work on the qualitative approach. In the first phase of the research, the authors of the article carried out a literature review on foresight in enterprises on the basis of EBSCO, Elsevier, Science Direct, Springer and Emerald databases. In the second phase, they employed the multiple case study methodology promoted by Denzin and Lincoln (2009) as as an appropriate approach in management sciences when the researcher seeks to provide in-depth understanding of the cases or a juxtaposition of a several cases. The information about investigated cases was retrieved on the basis of secondary sources such as the articles in the existing published works, company's reports as well as documented interviews with the presidents of the companies. The scope of the research was limited by the data availability.

Foreign foresight projects have been analyzed which were conducted by companies themselves (foresight in business) as well as projects run by external institutions for companies (foresight for business). In the "foresight in business" category the analysis covered companies representing the SME sector, a national non-profit organization and international corporations. As for the " foresight for business" category, the analysis dealt with projects run by a consulting company.

General characteristics of the companies are presented in Tab. 1.

The analyzed companies were diverse in terms of their size, geographic coverage (local, regional, national and international) and business activity (e.g. manufacturing, education). In the process of company selection (despite data availability), diversity of foresight project methodologies among the companies was a deciding factor.

The case studies have been analyzed with the consideration of the following aspects: motives, organization and approach to the conducted foresight projects. The results of case studies analyses of the chosen companies suggest the occurrence of certain trends in all of three aspects being a subject of analysis.

Tab. 1. General characteristics of the companies

COMPANY TYPE	COMPANY NAME	SECTOR	COUNTRY HEADQUARTERS
Foresight in business			
SME	Lunar Design	industrial product design	USA
	Białostocka Fabryka Okien	doors and windows industry	Poland
	BEWA	FMCG (beverages)	Poland
	Asterix (invented name)	children-book publishing	Hungary
	Institut Straumann AG	dental implants, instruments, prosthetics, and tissue regeneration products	Switzerland
Non-profit organization	Technology Promotion Association (Thailand-Japan)	technology transfer, education and training	Thailand
International corporations	Deutsche Telecom	telecommunications industry	Germany
	Shell	energy industry	Great Britain, the Netherlands
	Philips	diversified technology company (healthcare, consumer lifestyle and lighting)	The Netherlands
	Rovio Entertainment	entertainment media company	Finland
	Daimler Chrysler	automotive industry	Germany
	Finnair	transport	Finland
	Siemens	conglomerate company	Germany
	Volvo	automotive industry	Sweden
Foresight for business			
Consulting company	KPN Research	telecommunications industry	the Netherlands
	4CF	all	Poland

3. Research results

The growth of interest in foresight methodology application in companies is caused by the influence of external and internal factors. The most frequently indicated motives for foresight application in the group of the analyzed companies were the external factors, especially: growing competition (KPN Research, Deutsche Telekom, Lunar Design, 4CF); technological development (Deutsche Telekom, Lunar Design); identification of the relevant future fields (Volvo, Asterix), increasing budget limitations; volatility of financial markets and political and social determinants (Shell, TPA) leading to increase in risk and uncertainty of running a business; and also aspects of protection of the environment and environmental friendliness (Shell, Finnair).

The most significant internal factor was a planned company re-organization and thus a necessity to redefine the company mission and corporate strategy with the use of, among other, foresight methods (Shell, TPA, Białostocka Fabryka Okien, BEWA, Rovio Entertainment, Asterix). The most important goals of undertaking foresight initiatives in the analyzed companies were: striving towards raising the innovation level and strengthening the position on the market, determining technological development directions, and identifying potential market opportunities and threats.

A major motive (for firms like Siemens, Philips, operating in fast-changing sectors such as consumer goods and ICT) was to "never be surprised by future developments in the business environment", but to be aware of and possibly influence them. Thus, these companies use foresight as part of an early warning system in order to identify future trends and opportunities for their businesses (Becker, 2002). Additionally, Siemens and Philips, (representing technology-intensive sectors) use foresight more broadly in order to better understand the social/cultural context of the use of technology, firms and build up knowledge both about emerging technologies and their future users (Becker, 2002).

The size of the company was the factor which determined the differences in companies' motivation. In the case of the companies representing the SME sector (Lunar Design, Białostocka Fabryka Okien, Asterix), the most significant motives were the internal ones, especially striving towards raising the innovation level in the company. However, in the international corporations it was both external and internal factors which constituted the most significant impulses to undertake foresight initiatives. The most common external factor was growing competition, and the prevalent internal factor was striving towards strengthening the company's position on the market. The most common objectives of executing foresight projects are the following (Becker, 2002):

- priority setting – research and investment priorities identification and arrangement in terms of importance,
- direction setting – establishing company's general development directions,
- innovation catalyzing – innovation transfer stimulation and support,
- anticipatory intelligence – identification of market opportunities and threats,
- strategy formulation – formulating the corporate strategy.

Apart from the multitude of factors and objectives of undertaking and executing foresight projects in companies, another significant characteristic of this process is the manner of organizing research in companies. As a result of case studies analysis, four basic models were identified of corporate foresight implementation in companies: Collecting Post, Observatory, Think-tank, and Outsourcer. The Collecting Post model is implemented in small and medium-sized businesses (e.g. Lunar Design, KPN Research) in which analyses are conducted independently by employees in many departments with the use of relatively straightforward and inexpensive methods and tools. The Observatory model is applied in large national organizations (e.g. TPA) in which a temporary team appointed for the time of a particular foresight project conducts analyses of the company's micro-environment. In the case of international corporations which have in their structure research and analysis centers (e.g. Deutsche Telekom, Shell, Daimler Chrysler), research is conducted according to the Think-tank model in which a foresight specialized team does extensive research into micro- and macro-environment. Also, in chosen international corporations (e.g. Deutsche Telekom) and in large companies (e.g. TPA) the Outsourcer model is utilized. In this last case, due to limitations in human resources capacity and in financial outlays on corporate foresight, external consulting companies are employed (BEWA, BFO).

In the examined companies corporate foresight is an element of the strategic planning process and its results assist in making internal operational decisions.

When bottom-up approaches are used, it appears that this is mostly in SMEs. SMEs such as Lunar Design in the United States, the Swiss technology company Institute Straumann incorporate some limited foresight tools in their day to day activities (Andriopoulos & Gotsi, 2006), so does the Hungarian Asterix company in its everyday strategizing practice (Gáspár, 2015). Foresight in these SMEs is used primarily for innovation, with only a small emphasis on strategy, so the bottom-up approach is understandable and appropriate to their goals. In all four of these companies, foresight is closely integrated into the day to day R&D and operational activities and is conducted by employees who are not future specialists, and who perform foresight in addition to their existing tasks. This is very similar to Becker's Collecting Post organisational model, which is common in small businesses, due to the limited resources of most SMEs; few small companies can afford independent foresight teams or large scale foresight programs. However the use of bottom-up approaches by Collecting Post teams contradicts Becker's theory that such approaches are more likely to be used by Think Tanks that have greater autonomy in the organisation of foresight activities (Becker, 2003). Becker theorises that Collecting Posts tend to have their goals and methods dictated from above in a very top-down style, but this does not appear to be the case in these SMEs.

4. DISSCUSSION OF RESULTS

In the outcome of the conducted analysis, it has become apparent that foresight activities are conducted mostly in large companies (often multinational) rather than in SMEs. The reasons for that are the following:

- foresight activities are time-consuming, capital- and labour-intensive. Entrepreneurs of small and medium sized companies possess neither the time nor financial or human resources to allocate to extensive research in order to develop their long-term innovation strategies;
- foresight activities are conducted in order to analyse the macro environment of a company's business, which includes political, economic, environmental, social and technological factors, that imposes risks to which a multinational company is very often exposed. Whereas, small and medium enterprises operating mainly in the microenvironment, (which includes their customers, suppliers, competitors and stakeholders) have a limited need to capture long-term uncertainty, as their business activity does not involve a large amount of external risks. According to Hartman and Philippens (2004) SMEs feel external risks do not have much impact on their way of doing business. However, the consequences of change in the macroenvironment can influence the company more than changes in the microenvironment (e.g. the occurrence of wild card events);
- foresight activities are conducted in order to identify trends and drivers that might have considerable impact on a company's strategy in the long term. This aim is realised by large companies. SMEs do not plan many years forward, instead they focus on identifying short term trends, setting short term objectives and building short term plans. Entrepreneurs of small and medium companies prefer to work on concrete products, technologies and market needs regarding futures research as soft and changing rapidly.

Although foresight projects are less common in small and medium enterprises, there are some SMEs that do perform some foresight activities. However, due to the limited resources of SMEs, they do not perform the large scale foresight exercises common to bigger companies and government. Instead, foresight tools are closely integrated into the existing R&D and day to day operations of the company, as is the case in Lunar Design Incorporated, and Institute Straumann (Andriopoulos & Gotsi 2006; Savioz & Blum, 2002; Trumbach, Payne & Kongthon, 2006). According to Savioz and Blum (2002, p. 99), this strategy of imbedding foresight in the day to day activities of the company helps to create an "open minded company culture" that is favorable for foresight.

Being heavily embedded in other R&D projects and the day to day operations of the company, the foresight is usually conducted by employees in addition to their existing tasks. This puts the organizational model in Becker's Collecting Post (Becker, 2003). Foresight is conducted internally, with a focus on information gathering rather than on organisational changing, placing it at the information gathering end of Cuhls and Johnston's (2006) scale.

The motivation for foresight in SMEs is almost always innovation. Innovation is very important to SMEs. Trumbach, Payne and Kongthon (2006, p. 938)

assert that SMEs are often built around a single new technology or innovation. They also state that "research has found that small firms have a higher rate of innovations per employee, patents per employee, and output per dollar spent over large firms." They claim that this is because small firms are more flexible and are therefore better able to adapt to rapidly changing circumstances and emerging trends. All three of the SMEs studied used foresight primarily for innovation, only the larger mid-sized Institute Straumann listed corporate strategy as an additional motive (Savioz & Blum, 2002, p. 91). In the case of the Hungarian SME the on-going process of constructing and shaping the organisational future was not directly called as "foresight" but in the practice of the enterprise several elements could be found in similarly to other SMEs in the country. (Gáspár, 2015.) In Poland in 2009-2013 and in Hungary in 2012 an interactive foresight process for creating regional future concepts was developed, where personal meetings with SMEs and stakeholder groups was organized, and the networking created the interconnection between the stakeholders in the process of shaping regional future ideas (Kononiuk & Gudanowska, 2013; Hideg et al., 2014). This regional foresight activity also enriched the foresight tools used in the participating SMEs in Poland in 2009-2013.

5. FUNCTIONAL FORESIGHT APPROACHES DEDICATED TO ENTERPRISES

The results of the analysis of the described case studies were the basis for the elaboration of the functional approaches in case of implementation of foresight projects in enterprises. The key factor determining the choice of a particular procedure is the goal the company is aiming at when pursuing foresight initiatives. Due to the purpose of implementing the foresight process, the following approaches were proposed in the company:

- functional foresight approach for strategy building,
- functional foresight approach to stimulate and support innovation creation,
- functional foresight approach to navigate through opportunities and threats,
- functional foresight approach to set strategic directions and investment priorities.

Tab. 2 shows the main characteristics of the procedures, including the following: methods used (key method and supporting methods), industry sector (characterized by long or short product life cycles), time horizon (short, medium and long term), size of enterprise, model of foresight implementation in the company (Collecting Post, Observatory, Think Tank, Outsourcer).

The key factor determining the choice of a particular procedure is the goal the company is aiming at when pursuing foresight initiatives. Other factors include: the sector in which the company operates, the time horizon of the foresight exercise, the size of the company.

Assuming the sector and the time horizon of the exercise as a criterion of division of foresight approaches it should be noted that:

- for companies that operate in sectors with long product life-cycles (i.e. chemical, pharmaceutical, automotive, medical), where research activities are long-term oriented, the recommended approaches are: functional foresight approach for strategy building (based on the scenario building method) or the functional foresight approach to set strategic directions and investment priorities (based on key technologies method);
- for companies that operate in sectors with short product life-cycles and rapidly changing market conditions (i.e. electronics, telecommunications, IT), the short- to medium-term time horizon is required in foresight. The recommended procedures are: functional foresight approach to stimulate and support innovation creation (based on creative methods) or the functional foresight approach to navigate through opportunities and threats (based on technology monitoring methods).

Whereas, taking into account the size of the enterprise, the feasibility to implement the three of the four proposed procedures both in the smaller company (employing up to 50 employees) and in the larger company. It concerns namely: the functional foresight approach for strategy building; the functional foresight approach to navigate through opportunities and threats; or the functional foresight approach to set strategic directions and investment priorities. An exception is the functional approach used to stimulate and support the transfer of innovation, where, due to the high degree of interactivity of the foresight research conducted among all employees, it is recommended to implement it mainly in a smaller company.

Tab. 2. Functional foresight approaches dedicated to enterprises

	FUNCTIONAL FORESIGHT APPROACH FOR STRATEGY BUILDING	FUNCTIONAL FORESIGHT APPROACH TO STIMULATE AND SUPPORT INNOVATION CREATION	FUNCTIONAL FORESIGHT APPROACH TO NAVIGATE THROUGH OPPORTUNITIES AND THREATS	FUNCTIONAL FORESIGHT APPROACH TO SET STRATEGIC DIRECTIONS AND INVESTMENT PRIORITIES
Key method(s)	scenario building	• blue-sky projects • brainstoming • modeling and simulation • trend analysis • environmental scanning • technology scanning • technology monitoring • technology scouting • weak signals	technology roadmapping/ technology scanning	key/critical technologies
Supporting methods	• SWOT • workshops • brainstorming • modeling and simulation • trend analysis • Deplhi • surveys • interviews • foresight literature review • cross-impact analysis • technology roadmapping		• technology scouting • SWOT • workshops • brainstorming • trend analysis • weak signals analysis • wild cards • environmental scanning • STEEPV	• foresight literature review (previous projects case studies) • workshops • brainstoming • brainwriting • STEEPV • SWOT • Delphi • surveys • interviews • patent analysis • bibliometrics • trend analysis • scenario building • technology roadmapping
Industry sector in terms of technology life-cycle	longer technology life-cycles (i.e. chemicals, materials)	short technology life-cycles (i.e. ICT, electronics)	short technology life-cycles (i.e. ICT, electronics), and/or longer technology life-cycles (i.e. chemicals, materials)	longer technology life-cycles (i.e. chemicals, materials)
Time horizon	long-term	short-term (within product life-cycle)	short to medium-term	long-term
Foresight model	• Collecting Post • Observatory • Think Tank (for a larger company) • Outsourcer	Collecting Post	• Collecting Post • Observatory • Outsourcer	• Collecting Post • Observatory • Think Tank (for a larger company) • Outsourcer
Implementation approach	top-down or bottom-up	bottom-up	top-down or bottom-up	top-down or bottom-up
Company size	10-50 or 50-250 employees	10-50 employees	10-50 employees	10-50 or 50-250 employees

Taking into account the high volatility of the external environment, the identified obstacles to implement foresight in smaller companies, and considering the need to build foresight capacities among SMEs the authors decided to focus on detailing the foresight approach that allows to navigate through opportunities and threats. The recommended approach is feasible to initiate and to implement in SMEs. It is also self-explanatory for company managers and it will help them understand how foresight could support their decision-making procedures and increase their innovation orientation in times of uncertainty.

The recommended approach is specifically suitable for enterprises operating in industries characterised by rather short technology life cycles in order to be able to keep up with new developments within and outside the company's main industry and act
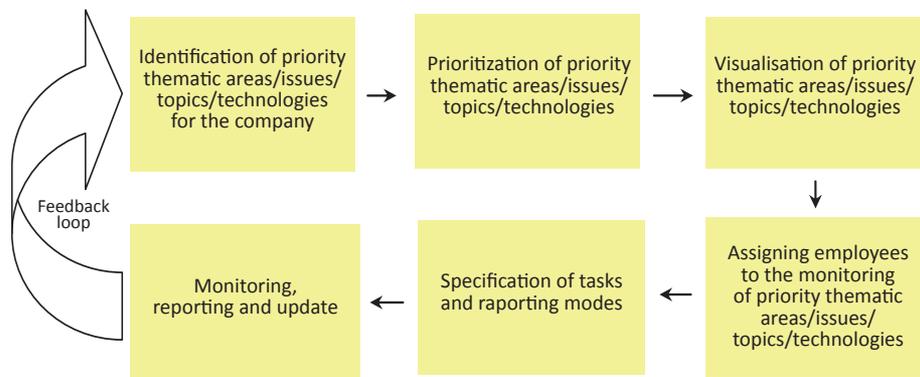
Fig. 2. The stages of functional foresight approach used to navigate through business opportunities and threats

Source: authors' elaboration based on (Savioz & Blum, 2002).

accordingly. That's why the suggested time horizon for foresight is that of strategic planning (5 years). Preferred modes of foresight activities include an independent department (Observatory); or temporary task forces (Collecting Post). In some cases (a highly innovative company, which provides high returns on investments) an Outsourcer model can be selected. Subsequent phases of the foresight approach are shown in Fig. 2.

The purpose of using the illustrated foresight approach is to identify and anticipate trends and achievements occurring in the company environment through their constant and systematic monitoring. The resulting knowledge is stored and used in the company's knowledge base. A key element here is to identify a link between the observed phenomena with the strategy of the company and vice versa.

The following stages of the procedure include:

- identification of priority thematic areas/issues/ topics/technologies for the company. For this purpose, two implementation approaches can be applied: top-down or bottom-up. In the top-down process, the starting point is the strategy and mission of the company, to which the management team of the company explores, analyses, assesses and assigns strategic, forward-looking areas of the company activities. In the bottom-up approach, these areas are defined by the employees of the top and middle level managers (medium-size enterprise) or by all employees (small company). They key methods involved are: workshops, brainwriting, brainstorming. Additional methods used at this stage include: SWOT analysis, interviews, literature review (foresight projects: national, regional, sectoral), trend analysis, internal Delphi;

- prioritization of priority thematic areas/issues/ topics/technologies. At this stage there is a division of all identified priorities into:
  - key areas, which are to be monitored constantly and in detail (information about them is needed at present as it supports ongoing decision making),
  - important areas, which are to be monitored periodically (information about them is needed within a medium time perspective),
  - additional areas (issues, which are monitored occasionally as the data regarding them is scarce and the directions of their prospect development are highly uncertain);

- visualisation of priority thematic areas, issues, topics, technologies. At this stage it is recommended to develop a strategic map of the areas presented in graphic form. This will help, among other things, to disseminate the examined key issues among employees and raise awareness (internally) towards the company's development priorities;

- assigning employees to the monitoring of priority thematic areas, issues, topics, technologies. The choice of such persons is made by the management of the company. They are usually the employees of the company, who are either most competent in the field or whose personal and professional skills allow them to easily explore the external territory and project the results on the company's strategy. The monitoring of a specific area of interest is usually an additional task of the employee. A company may also choose to involve external experts (technology scouts) in this activity;

- specification of tasks and raporting modes. Those responsible for monitoring individual issues use information derived from the analysis of the following sources: technology, market, competition to identify emerging changes and developments in these areas. The methods used at this stage include: literature review (professional press, popular press), social media monitoring, following online professional networks discussions, patent analysis, licensing; participation in conferences, seminars, interviews, online surveys. In order to make the activity sustainable, it is necessary to agree on the structure and frequency of reporting to the company management. It should be noted that an expert in charge of a subject collects and analyzes information systematically so that he constantly identifies potential opportunities and threats to the company and disseminate this information among key company employees;
- monitoring, reporting and updating a map of key areas/technologies for the future of the company.

The recommendations given by personnel who monitor the key areas, are used by the management of the company to decide whether to launch new projects or to cease financing of selected unpromising initiatives. Updating a map of areas and technologies that are crucial for the company's future by adding, deleting, or re-ranking existing priorities should be conducted once a year. In this way, the use of the procedure – alongside its main goal of the "identifying opportunities and market threats" – becomes a strategic planning tool, reflecting the company's strategy and its readiness for the future. Similarly, when the initial set of priority thematic areas, issues, topics or technologies is regularly updated, the approach enables to reinforce the company's innovation orientation.

The key message for company managers who could be potentially interested in applying the above described procedure is that it has been successfully verified in practice in BEWA company in 2015. The study aimed to develop a database supporting the identification and monitoring of upcoming opportunities and threats present in the FMCG sector. BEWA continues using the database and the method internally, while regularly consulting the outcomes and possible upgrades of the tool and the monitoring process with the strategic foresight consultancy (4CF), which designed and coordinated the company's internal foresight process. The detailed description of the process are given in Sacio-

Szymańska et al. (2016, pp. 61-63), whereas its key outcomes and managerial implications are described in Sacio-Szymańska and Nosarzewski (forthcoming).

CONCLUSIONS

From the practical point of view – summarizing the answers to the research questions on the manner and approach of the activities – the carried out analysis demonstrates that foresight research may be useful for the company when it faces such external phenomena as growing competition in the sector, technological development, identification of the relevant future fields. The most significant internal factor for the foresight research in the investigated companies was a planned company re-organization and thus a necessity to redefine the company mission and corporate strategy. Other rationales of undertaking foresight initiatives in the analyzed companies were: striving towards raising the innovation level and strengthening the position on the market, determining technological development directions, and identifying potential market opportunities and threats.

The size of the company – coming back to the research question on the motivators of foresight introduction – was the reason which determined the differences in companies' motivation. In the case of the companies representing the SME sector, the most significant motives were the internal ones, especially striving towards raising the innovation level in the company. However, in the international corporations, there were both external and internal factors which constituted the most significant impulses to undertake foresight initiatives. The most common external factor was growing competition, and the prevalent internal factor was striving towards strengthening the company's position on the market. The authors of the article have also identified five major objectives of executing foresight projects, namely: priority setting, direction setting, innovation catalyzing, anticipatory intelligence and strategy formulation. Moreover, as a result of case studies analysis, four basic models were identified of corporate foresight implementation in companies: Collecting Post, Observatory, Think-tank, and Outsourcer.

The theoretical contribution of the paper to the fields of Management consists in the introducing a detailed functional foresight approach dedicated to SMEs in order to enhance their decision-making

processes and increase their innovation orientation. The posited by the authors approach takes into account foresight methods, features of a sector, in which a company operates, time horizon, foresight model, management style and a company size. In the focus of the paper there were the SMEs which highlighted the strategy of imbedding foresight in the day to day activities of the company, emphasizing the creation of an open minded, flexible company culture that is favorable to foresight.

Literature

Alsan, A. (2008). Corporate foresight in emerging markets: action research at a multinational company in Turkey. *Futures*, *40*(1), 47-55. doi:10.1016/j.futures.2007.06.009

Andriopoulos, C., & Gotsi, M. (2006). Probing the future: Mobilising foresight in multiple-product innovation firms. *Futures*, *38*, 50-66. doi:10.1016/j.futures.2005.04.003

Battistella, C. (2014). The organisation of corporate foresight: a multiple case study in the telecommunication industry. *Technological Forecasting and Social Change*, *87*, 60-79. doi:10.1016/j.techfore.2013.10.022

Becker, P. (2003). *Corporate Foresight in Europe: A First Overview*. Brussels, Belgium: European Commission.

Bidaurratzaga, E., & Dell, M. M. (2012). Strategic foresight in SMEs: challenges and solutions – the "future garage process". *The Proceedings of The XXIII ISPIM Conference*. Retrieved from http://www.ispim.org

Cuhls, K., & Johnston, R. (2006). Corporate FTA (Future-oriented Technology Analysis). *International FTA Seminar*. Retrieved from http://foresight.jrc.ec.europa.eu/fta/documents/anchor/FTA%20Anchor%20paperversion28-7rj%20revn.pdf

Daheim, C., & Uerz, G. (2006). Corporate Foresight in Europe: Ready For The Next Step? *Second International Seville Seminar on Future-Oriented Technology Analysis: Impact of FTA Approaches on Policy and Decision-Making*. Retrieved from http://forera.jrc.ec.europa.eu/documents/papers/Seville-GU-CD-Draft-8-2006-e.pdf

Daheim, C., & Uerz, G. (2008). Corporate foresight in Europe: from trend based logics to open foresight. *Technology Analysis & Strategic Management*, *20*(3), 321-336. doi: 10.1080/09537320802000047

Denzin, N. K., & Lincoln, Y. S. (2009). *Metody badań jakościowych* [*Qualitative research methods*]. Warsaw, Poland: Wydawnictwo Naukowe PWN.

van der Duin, P. A. (2006). The Use of Scenarios in Innovation Processes. Two case studies. *Second International Seminar on Future-Oriented Technology Analysis: Impact of FTA Approaches on Policy and Decision-Making*. Retrieved from http://forera.jrc.ec.europa.eu/documents/papers/paper_Van%20der%20Duin_FTA%20in%20Business%20Context.pdf

European Foresight Monitoring Network. (2008). *Collection of EFMN Briefs*. Luxembourg, European Commission.

Fidler, D. (2011). Foresight defined as a component of Strategic Management. *Futures*, *43*(5), 540-544. doi: 10.1016/j.futures.2011.02.005

Fikirkoca, A., & Saritas, O. (2012). Foresight for science parks: the case of Ankara University. *Technology Analysis & Strategic Management*, *24*(10), 1071-1085. doi:10.1080/09537325.2012.723688

Gáspár, J. (2015). *How Future is Being Constructed in the Corporate Strategy-Making Practice?* [PhD Dissertation]. Budapest, Hungary: Corvinus University of Budapest.

Gracht, H. A., Vennemann, C. R., & Darcow, I. L. (2010). Corporate foresight and innovation management: a portfolio-approach in evaluating organizational development. *Futures*, *42*, 380-393. doi:10.1016/j.futures.2009.11.023

Hartman, R., & Philippens, V. (2004). Toekomst Wijzer: A challenging method to make SME's aware of future trends. *New Technology Foresight, Forecasting & Assessment Methods*, *6*, 49-67.

Havas, A. (2006). Futures for Universities. *Second International Seminar on Future-Oriented Technology Analysis: Impact of FTA Approaches on Policy and Decision-Making*. Retrieved from http://foresight.jrc.ec.europa.eu/documents/papers/Futures%20of%20universities_paper.pdf

Hideg, É., Nováky, E., & Alács, P. (2014). Interactive Foresight on the Hungarian SMEs. *Foresight*, *16*(4), 344-359. doi: 10.1108/FS-12-2012-0091

Iden, J., Methile, L. B., & Christensen, G. E. (2017). The nature of starategic foresight research: A systematic literature review. *Technological Forecasting & Social Change*, *116*, 87-97.

Jarvis, D. (2012). Business foresight. How companies explore the future. *Business Foresight & Futuring*. Retrieved from https://www.slideshare.net/dajarvis/mgt581-business-foresight

Joint Research Centre-Institute for Prospective Technological Studies. (2008). *For-Learn On-line Foresight Guide*. Retrieved from http://forlearn.jrc.ec.europa.eu/guide/A1_key-terms/corporate.htm

Jun, S. P., Seo, J. H., & Son, J. K. (2013). A study of the SME technology roadmapping program to strengthen R&D planning capability of Korean SMEs. *Technological Forecasting and Social Change*, *80*(5), 1002-1014. doi:10.1016/j.techfore.2012.10.022

Kononiuk, A., & Gudanowska, A. (Eds.). (2013). *Kierunki rozwoju nanotechnologii w województwie podlaskim. Mapy. Marszruty. Trendy* [*Directions of nanotechnology development in Podlaskie Voivodship. Maps. Roadmaps. Trends*]. Bialystok, Poland: Oficyna Wydawnicza Politechniki Białostockiej.

Major, E. J., & Cordey-Hayes, M. (2000). Engaging the business support network to give SMEs the benefit of Foresight. *Technovation*, *20*, 589-602. doi:10.1016/S0166-4972(00)00006-7

Munnecke, M., & van der Lugt, R. (2006). Bottom-Up Strategies in Consumer-Led Markets. *Second International Seminar on Future-Oriented Technology Analysis: Impact of FTA Approaches on Policy and Decision-Making*. Retrieved from http://www.academia.edu/3040350/BOTTOM-UP_STRATEGIES_IN_CONSUMER-LED_MARKETS

Palmer, D., & Kaplan, S. (2007). *A Framework for Strategic Innovation. Blending strategy and creativity to discover future business opportunities*. San Francisco, USA: InnovationPoint.

Peter, M. K., & Jarratt, D. G. (2015). The practice of foresight in long-term planning. *Technological Forecasting & Social Change*, *101*, 49-61.

Phillips, J. (2013). *Technology foresight for small- to medium-sized enterprises*. Edmonton, Canada: Lambert Academic Publishing.

Pirttimäki, A. (2006). *Foresight in a Research and Technology Organization*. Helsinki, Finland: Helsinki University of Technology.

Rohrbeck, R. (2010). *Corporate foresight: towards a maturity model for the future orientation of a firm*. Berlin, Germany: Physica-Verlag Heidelberg.

Rohrbeck, R., & Gemünden, H. G. (2011). Corporate foresight: its three roles in enhancing the innovation capacity of a firm. *Technological Forecasting and Social Change*, *78*(2), 231-243. doi:10.1016/j.techfore.2010.06.019

Ruff, F. (2004). Society and Technology Foresight in the Context of a Multinational Company. *New Technology Foresight, Forecasting & Assessment Methods*, *4*, 51-52.

Ruff, F. (2015). The advanced role of corporate foresight in innovation and strategic management – Reflections on practical experiences from the automotive industry. *Technological Forecasting and Social Change*, *101*, 37-48.

Sacio-Szymańska, A. (Ed). (2016). *Corporate Foresight Potential in Visegrad (V4) Countries*. Radom, Poland: Institute for Sustainable Technologies – National Research Institute in Radom.

Sacio-Szymańska, A., & Nosarzewski, K. Anticipating and Managing Change in Large Organization Strategic Environment: Using Foresight and Organizational Policy to Enable Futures Literate Decision Making. In D. Schreiber, Z. Berge (Eds.), *Managing Rapid Change in Technology, Globalization and Workforce Diversity: Using Foresight and Organizational Policy to Ensure Futures Thinking* (forthcoming). London, England: Palgrave Macmillan.

Sarpong, D., Maclean, M., & Alexander, E. (2013). Organizing strategic foresight: a contextual practice of "way finding". *Futures*, *53*, 33-41. doi:10.1016/j.futures.2013.09.001

Savioz, P., & Blum, M. (2002). Strategic Foresight Tool for SMEs: How the Opportunity Landscape Interacts with Business Strategy to Anticipate Technological Trends. *Technovation*, *22*, 91-100. doi:10.1016/S0166-4972(01)00082-7

Slaughter, R. A. (1995). *The foresight principle: cultural recovery in the 21st century*. London, England: Adamantine Press.

Trumbach, C. C., Payne, D., & Kongthon, A. (2006). Technology Mining for Small Firms: Knowledge Prospecting for Competitive Advantage. *Technological Forecasting and Social Change*, *73*, 937-949. doi:10.1016/j.techfore.2006.05.018

Vecchiato, R., & Roveda, C. (2010). Strategic foresight in corporate organisations: handling the effect and response uncertainty of technology and social drivers of change. *Technological Forecasting and Social Change*, *77*(9), 1527-1539. doi:10.1016/j.techfore.2009.12.003

Vishnevskiy, K., & Egorova, O. (2015). Strategic Foresight for SMEs: Choice of the Most Relevant Methods. *Conference Proceedings. XXVI ISPIM Conference – Shaping the Frontiers of Innovation Management*. Retrieved from http://www.ispim.org

Vishnevskiy, K., Meissner, D., & Egorova, O. (2015). *Foresight for SMEs: How to overcome the limitations in small firms?* Retrieved from https://wp.hse.ru/data/2015/08/13/1087591629/45STI2015.pdf

Will, M. (2006). Making Innovation and Technology Analysis (ITA) Feasible for SME. Striving for Sustainable Innovation. *Second International Seville Seminar on Future-Oriented Technology Analysis: Impact of FTA Approaches on Policy and Decision-Making*. Retrieved from http://foresight.jrc.ec.europa.eu/documents/eposters/pdf/FTA_paper_v1.pdf