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The state of foresight in small and medium enterprises: literature review and research agenda

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Abstract

Small and medium-sized enterprises (SMEs) are the backbone of many economies. In today's world of VUCA (Volatility, Uncertainty, Complexity, Ambiguity), SMEs face diverse challenges to survive and stay competitive. SMEs must prepare themselves for these challenges by practicing foresight. However, foresight, and especially corporate foresight, has been conceptualized and researched in the context of large corporations. Applying foresight in SMEs is therefore complicated by the question of how to implement foresight in the context of SMEs given their specific requirements and limitations. This article provides an overview on the literature on the application of foresight in SMEs is, along with a summary of the extent to which SMEs conduct foresight from an organizational and individual perspective. Besides offering a compendium on the state of foresight in SMEs, a research agenda is formulated, incorporating the idea of a toolbox tailored to SMEs based on existing approaches and prior works.

Keywords Foresight, SMEs, Organizational perspective, Individual perspective, Literature review, Research agenda

Introduction

Small and medium-sized enterprises (SMEs) are viewed as the backbone of the global economy, as locomotives of innovation and engines for technological advancements worldwide [7, 18, 21, 26]. The European Commission defines SMEs in terms of two factors: staff headcount and either turnover or balance sheet total. Micro-enterprises employ fewer than ten employees and have a turnover or balance sheet total of less than €2 million. Small enterprises employ fewer than 50 people and have a turnover or balance sheet total of less than €10 million. Medium-sized enterprises are employ fewer than 250 employees and a turnover of less than EUR 50 million or a balance sheet total of less than EUR 43 million [14]. SMEs make up more than 90% of the world's businesses [7, 14, 16, 35, 44]. Like other organizations, they confront an environment which isdescribed as VUCA (volatile, uncertain, complex, ambiguous) [4].

Foresight, or strategic, organizational, or corporate foresight, is coinedas a way of dealing with VUCA [37]. Foresight has been conceptualized as an activity which supports organizations in achieving long-term competitive advantage in changing environments by observing and interpreting changes or weak signals and trends in the environment, assessing their potential future environment and deriving implications for the respective organization in terms of the allocation of resources or change and transformation [31].

While one can assess a rise in academic and professional interest in Corporate Foresight (CF) [8, 12, 22, 34], along with contributions describing CF system's organizational structure as a critical success factor, one also observes a focus on large corporations [2, 31]. This, however, raises the question how SMEs, given their specific requirements (e.g., size and resources), can implement CF to develop foresight. Considering the fact that

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there have been prior ventures to offer access to foresight tools via so called toolboxes (e.g. Schulz, Volkmann [40]), this article aims to explore further dimensions of how to approach foresight from an SME perspective via individual and organisational dimensions (see chapter 3.2). Saritas, Burmaoglu, and Ozdemir [33] define different generations of foresight, seeing it as an evolutionary process. Based on and contributing to this evolutionary process from technological forecast to technology and social foresight, innovation foresight, and industrial foresight in the 2000s, this paper identifies a research gap focusing on CF and SMEs. Furthermore, recent research on CF [38] has emphasized the relevance of foresight as an individual capability, in addition to an organizational one. This is underlined by concepts such as peripheral vision [5] or futures consciousness [1, 20]. Given the size of SMEs, we assume that a focus of CF implementation can not only be on establishing processes but also on the capability of SME managers for individual foresight. We will therefore consider both the organizational and individual levels in our discussion of CF for SMEs.

The following research questions arise:

1) How is foresight applied from an organizational perspective in SMEs?
2) How is foresight applied from an individual perspective in SMEs?
3) Which foresight tools are especially suitable for SMEs concerning their specific size, resources, and requirements?

The paper is organized as follows: We will start with describing our research approach which is based on a semi-systematic literature review. Based on this literature review, we offer an overview of the current state of research on CF and SMEs. In the following, we discuss possible avenues for implementing CF and SMEs and suggest a research agenda. To do so we refer to different perspectival categories by looking either on organizational or individual dimensions of the aspects elaborated. We will close with a discussion, possible conclusions and recommended directions for possible research.

Research design

A semi-systematic literature review has been conducted for this research. In contrast to a systematic literature review, as applied by Marinkovic et al. [22] to assess the implementation of CF, a semi-systematic approach may be prone to more subjective biases concerning the selection and analysis of the sources used for review. The research gap which we identified for this paper especially aims towards the specific needs of SMEs in order to practice strategic foresight. Additionally, the review's preliminary stages involve a collaborative process of definitions, clarification, and improvement [45]. This paper follows the guidelines for the creation of a literature review, from Snyder [42], Tranfield et al. [45] and Marinkovic et al. [22].

Unlike a systematic literature review, which only allows for specific research questions, semi-systematic reviews encourage the formulation of broad research questions. A semi-systematic literature review approaches the search strategy systematically, but it is not required to accomplish this. In a semi-systematic review, research articles are used for the literature search, and the analysis and evaluation allow for both a quantitative and a qualitative evaluation. Quantitative articles characterize the sample in a systematic review. Semi-systematic literature reviews help to reflect the current state of knowledge and issues in the literature; systematic reviews of the literature offer evidence of impact and inform policy and practice. Furthermore, a semi-systematic literature review provides a historical overview of a research topic, research agenda, or theoretical model [42].

A narrative synthesis analysis was performed on the final sample. This approach was chosen because it is suitable for subjects that have already been investigated by numerous research groups across numerous disciplines. Motivations, activities and tools, enablers, and outcomes all fall within the definitional boundaries. The main drivers for businesses to implement and participate in CF processes appear to be related to specific motivations: Adaption and anticipation are the two categories that Marinković et al. [22] distinguish. From an organizational standpoint, adaption is a method for recognizing and quickly responding external changes, whereby businesses adopt an "outside-in" perspective. Assessing signals and trends on the one hand, and improving reactivity and developing responses on the other, are seen as the motivational forces behind adoption. In CF, the terms "activities" and "tools" refer to the iterative actions that are utilized as well as the specific tools that are applied and how they are used.

Organizational aspects, or "enablers" affect how CF tool usage and outcomes are related. The term "outcomes" refers to the ways in which CF influences a firm's operational efficiency and strategic behavior [22, 42].

In the literature, a variety of approaches for integrating foresight in SMEs can be identified: scenario building, roadmapping, opportunity landscape, knowledge management, future garage process, and collaborative foresight [26]. In general, companies, especially their strategists, forecasters, and futurists, use a variety of tools when dealing with CF [44]. However, because SMEs have limited knowledge, human and financial resources, most of these tools were created for application in large

companies [35]. Therefore, foresight tools cannot be implemented in SMEs the same way they can in large corporations [3, 18]. Consequently, in the following chapters, aspects that can be coined as advantageous as well as promoting development and innovation especially for SMEs will be categorized as benefits.

Current state of foresight in SMEs

We find ample evidence on the proliferation of CF in large corporations [22, 32]. Two more recent studies [39] find that the COVID-19 crisis seems to has created tailwind for the proliferation of CF in large corporations, this was the focus of these two studiesKlicken oder tippen Sie hier, um Text einzugeben.. In general, it is therefore possible to claim that foresight activities are on the rise in organizations when the uncertainty in the business environment increases. However, for SMEs establishing or increasing foresight activities is in particular a challenge, given the lack of financial and human resources, and time constraints [30].

The motivations for the implementation of CF at SMEs are the development of reactive strategies [10], support for strategic planning [7], the formulation of a long-term strategy for innovation [7], or the creation of long-term plans for the companies [7, 19]. Predicting and preparing for future changes is another motivation [7]. A further incentive for implementing foresight in SMEs is to increase agility and support the maintenance of the business' profitability and competitiveness [19]. Another motivation is to reduce the effects of market risks [19] or to pay closer attention to alterations in the business environment. The list of motivators can be expanded to include operationalizing sustainability in the business's domain [44].

Raising the level of innovation [7] and implementing product innovation [13] are additional reasons for foresight implementation in SMEs as well as assisting organizations in preparing for an uncertain future, extending future thinking, and facilitating intra- and cross-organizational learning and understanding [11]. Only one motivation, meeting customer needs to expand the market for the firm's technology, could be found in the literature review in terms of anticipating future markets and business fields [10].

In the following section we will discuss the enablers for the implementation of CF in SMEs and the benefits of CF for SMEs derived from our literature review.

Enablers for the implementation of CF

By facilitating or inhibiting foresight activities, foresight enablers can have a positive or negative impact on the outcomes of those activities [22].Formal, cultural, and configuration-specific enablers can be categorized [22]. Structural, processual, legitimizing, and communicative enablers fall into the *formal* category. The organizational and hierarchical structures, reporting levels, sphere of control, and decision-making instances are *structural* enablers.

Processual enablers are the design, composition, and pace of an internal, formalized decision-making process, particularly when it comes to strategic decision-making and value streams in a business. To communicate the transparency of CF in the procedural approach and the communication of CF results, *communication* as enabler is seen as a supporting factor.

The enablers of a *cultural* nature, such as openness to culture, managerial mindset, and shared values basis, make up the next category of CF-related enablers. The *openness of the culture* reflects how welcoming CF activities are accepted within the company.

The *managerial mindset* reflects how well-prepared the management level is to implement CF activities and the related future-focused changes. The general acceptance of CF in organizations is defined by *shared value base* as a cultural enabler. The three enabler factors of experience, contextual appropriateness, and multi-perspectivity comprise the third group: *configurational* enablers.

In their overview of the types of enablers, Marinković et al. [22] refer to them as *moderators*. The categories are illustrated in Table 1.

Foresight enablers can influence the results of foresight activities in either a positive or negative manner. This paper distinguishes between enablers who facilitate foresight by seeing its potential and the possibilities for change and innovation it offers and enablers inhibiting foresight by defining barriers, obstacles, difficulties, or challenges. The result of the literature review is illustrated in Table 2.

It is possible to identify a formal structural facilitating enabler for top-down and bottom-up approaches to change initiation in SMEs from an organizational perspective [7]. As can be seen in the top column, bottom-up approaches appear to work better than top-down approaches in SMEs. The role of the chief executive officer (CEO) is perceived much more as a sensegiver and sensemaker, whereas the top managers dominate as architects, assimilators, and facilitators in times of change. Managers are using micro practices of strategic sensemaking and sensegiving to influence and convince their environment to follow their respective interpretation processes. Authoritarian decision making is not favorable. This table shows that, from an organizational perspective, there is a need to expand formal enablers in SMEs, particularly around processual and communicational enablers. No findings could be obtained here during the literature research. On the one side, this may

Table 1 Analysis of CF-related moderators/enablers

Moderators		Key insights
A Formal	I. Structural	- Design and composition of structure (flat, deep or matrix) - Depth of hierarchy, reporting levels, span of control, instance of decision making
	II. Processual	- Design, composition and pace of internal and formalized decision-making processes - Bureaucracy, lean processes
	II. Legitimation	- Support for CF by high-ranked authorities (senior executives etc.) in the organization - Dependency on managerial engagement and prioritization of CF
	IV. Communication	- Supportive factor for fostering transparency during CF processes and for results - Enables inclusion of stakeholders
B Cultural	I. Openness of culture	- The degree of cultural openness reflects the openness toward CF activities in the organization
	II. Managerial mindset	- The degree of managerial willingness to conduct CF activities and changes - The managerial mindset sets the frame for employee willingness to engage in CF
	III. Shared value basis	- Defines common acceptance for CF in the organization - Enables the integration of different viewpoints into an overarching perspective
C Configurational	I. Experience	- The amount of time spent by an organization on CF activities with a certain number frequency - Usually higher in MNEs with a longer history in CF and more systematized approaches
	II. Contextual appropriateness	- Knowledge of the organization on how and when to apply certain CF activities to achieve a certain outcome
	III. Multi-perspectivity	- Aims to generate a holistic view of the future by including many viewpoints - Supports the comprehensiveness of CF activities

Table 2 Facilitating enablers in SMEs from an organizational perspective

Facilitating Enablers		Findings	Selected studies
Formal	Structural	- Changing initiation: joining top-down and bottom-up approach - Choosing the right approach ➞ top-down-approach (not working well) ➞ instead bottom-up-approach (makes people think in an extraordinary way, intersubjective opinion of all workshop-participants is considered the next best solution)	Ejdys, 2014 [7], p. 11 Savioz and Blum, 2002 [35], p. 99
	Processual	- No findings	
	Legitimation	- Top management team strongly influences the employees' sensemaking activities on the organizational ➞ level role of the CEO as sensegiver and sensemaker, top management's roles as architects, assimilators, and facilitators during times of change	Klos and Spieth, 2021 [17], p. 2
	Communication	- No findings	
Cultural	Openness of culture	- Favorable company culture	Savioz and Blum, 2002 [35], p. 98
	Managerial mindset	- Managers using micro practices of strategic sensemaking and sensegiving to influence and convince their environment to follow their respective interpretation processes - Top management acceptance and involvement	Klos and Spieth, 2021 [17], p. 3 Savioz and Blum, 2002 [35], p. 98
	Shared value basis	- Investments in internal change agency arise interest in future orientation	Ketonen-Oksi, 2022 [16], p. 543
Configurational	Experience	- Specialized training or expertise in forecasting in most firms	Hoover and Tashman, 2022 [15], pp. 45–46
	Contextual appropriateness	- Appropriateness of tools	Geldermann et al., 2007 [10], p. 1488, Ketonen-Oksi, 2022 [16], p. 546
	Multi-perspectivity	- Intermediaries providing service on a regional basis - Discussions with colleagues, basis opinion on the information of experts, discussing options with advisers	Major and Cordey-Hayes, 2000 [21], p. 591 Lahnamäki-Kivelä, 2022 [19], p. 5

suggest that no defined decision-making processes in SMEs are conducive to the application of foresight in companies. But, on the other side, only because such findings have not been addressed or made explicit in the literature, processual and communicative enabler cannot be considered as unrecognized and without meaning in practice. Further empirical research could possibly shed more light on the afore mentioned dimensions, as the literature analyzed here lacks further elaboration. Furthermore, literature suggests that there is a lack of internal communication structures that make foresight activities and their results transparent in the organizational units.

According to cultural enablers, a positive corporate culture, which entails having an open mind for a changing business environment, is a prerequisite for a culture that is open to foresight activities [35].

Table 3 provides an overview of the findings of the facilitating enablers in SMEs from an individual perspective.

It appears that both age and the educational background of those in charge in management positions define whether foresight will be implemented or not. Furthermore, SMEs that already apply foresight do have specialists in charge of these processes. Individual factors are decisive in the implementation of foresight in SMEs. However, the factors in the table are not comprehensive and would need to be supplemented further from an individual perspective. While openness of culture toward CF activities in the organization is considered an enabler from an organizational perspective, a personal interest of the employees in CF activities could be important as an individual enabler, in that the individual employees are open to activities in CF and have a strong interest in and need to implement such activities in the company.

In addition, the inhibiting enablers for foresight implementation in SMEs are examined from an organizational and individual perspective. Table 4 presents the findings in the literature review related to inhibiting enablers from an organizational perspective.

Based on the study's findings, it can be concluded that formal enablers are important barriers to foresight implementation in SMEs.

The literature indicates that inadequate or ill-defined organizational structures, functions, regulatory restrictions and a reluctance to assimilate future knowledge constitute formal structural enablers that prevent foresight implementation [3, 29]. A lack of organizational slack in SMEs creates another obstacle by making relationships with people outside the company more difficult [21]. The fact that short-term planning and considerations take precedence over a long-term perspective due to day-to-day business operations is another barrier to SME's' ability to develop foresight [7, 24].

The circumstance that staff members play multiple roles is one of the processual moderators that prevent foresight [21]. Nonetheless, SMEs lack the resources that are essential to the integration of foresight in businesses. For this reason, the literature review mentions nothing about the integration of SMEs into special foresight departments. There might be SMEs for which such structures could be useful, strongly depending on the individual set up of the company. Again, the wide range of possible sizes and resources of SMEs comes an is a limiting factor for answering such questions. Board level and management support are necessary for the development of a new foresight system or a methodical foresight process. From a structural standpoint, the C-suite's view of foresight initiatives as lacking legitimacy is a hindering enabler [16].

The implementation of foresight in SMEs has been hindered by organizational silos and policies that restrict communication [3], faulty strategic conversations [24], a lack of time to discuss the process' goals and means, and inevitably conflicting expectations [16]. Due to a lack of resources, it can be assumed that all formal inhibiting enablers in micro, small, and medium-sized SMEs vary substantially. Since all size categories were referred to as SME in the literature search, no distinctions among the size categories could be found. Inhibitors to putting foresight into practice are commonplace in the managerial mindset. Another obstacle is that the company does not benefit from the knowledge and application of strategic foresight, which is restricted to a few experts [16]. There are also negative attitudes to foresight, and the introduction of future knowledge may even be viewed as dangerous.

Table 3 Facilitating enablers in SMEs from an individual perspective

Facilitating Enablers		Findings	Selected studies
Cultural	Managerial mindset	- Age factor ➞ younger farmer keener to implement foresight actions in managing their farms - Educational background ➞ high eagerness to learn about the future ➞ explains tracking changes in the business environment	Lahnamäki-Kivelä, 2022 [19], p. 7 Lahnamäki-Kivelä, 2022 [19], p. 8
Configurational	Experience	- firms in which SFM is applied have specialists doing the forecasts - Orchestrator, who keeps the process running	Hoover and Tashman, 2022 [15], pp. 45–46 Ketonen-Oksi, 2022 [16], p. 546

Table 4 Inhibiting enablers from an organizational perspective in SMEs

Inhibiting Enablers		Key findings	Selected studies
Formal	Structural	- Insufficient structures and willingness to assimilate futures knowledge → Foresight function in the company is often isolated or fragmented	Pouru, Dufva and Niinisalo, 2019 [29], p. 86 Klos and Spieth, 2021 [17], p. 10
		- CEOs have a dominant position regarding technological change	Major and Cordey-Hayes, 2000 [21], p. 589 Battistella, De Toni and Pillon, 2015 [3], p. 2
		- Lack of organizational slack	Ejdys, 2014 [7], p. 9
		- Poorly defined organizational structures and functions, and regulatory constraints	Milshina and Vishnewskiy, 2018 [26], p. 701 Klos and Spieth, 2021 [17], p. 10
		- Lack of clear vision does not encourage innovation efforts affecting the long-term competitiveness	Ejdys, 2014 [7], p. 9
		- Dominance of operational processes with no chance to create strategic vision for the future	Ejdys, 2014 [7], p. 9 Ejdys, 2014 [7], p. 9
		- Focus on core competences instead of creating a long-term vision	Mietzner and Reger, 2009 [24], p. 286
		- Planning and implementation of strategic development plans, ensuring a gradual increase in innovativeness, and support for the development of intensive growth factor (knowledge, entrepreneurship, human capital)	Ejdys, 2014 [7], p. 9
		- Serious problems with elaboration and implementation of strategic development plan; lack of a clear vision of the functioning and development	Mietzner and Reger, 2009 [24], p. 286
		- No future action planning	
		- Little focus on the contextual environments	
		- Short-term planning → operation of the day-to-day-business	
		- Short-term considerations dominate over long-term perspectives	
Formal	Processual	- Multiple roles are being filled by staff	Major and Cordey-Hayes, 2000 [21], p. 589
		- Spontaneity to taking actions determines the way of obtaining and the quality of information which has a selective character and a low level of usefulness	Ejdys, 2014 [7], p. 9
	Legitimation	- Creating a systematic foresight process or a completely new foresight system needs team effort and cannot be achieved without the management and board level commitment	Ketonen-Oksi, 2022 [16], p. 543
		- Challenges partly due to the unforeseen changes in the company ownership, management, and employee status	Ketonen-Oksi, 2022 [16], p. 543–544
	Communication	- Organizational silos and policies that restrict dialogue	Battistella, De Toni and Pillon, 2015 [3], p. 2
		- Lack of time to discuss the objectives and means of the process, conflicting expectations not avoided	Ketonen-Oksi, 2022 [16], p. 543
		- Faulty strategic conversations	Mietzner and Reger, 2009 [24], p. 286
Cultural	Openness of culture	- Limited attention of internal stakeholders	Battistella, De Toni and Pillon, 2015 [3], p. 2
		- Long-term vision for the company not collectively shared and thus too abstract to guide its implementation	Ketonen-Oksi, 2022 [16] p. 543
	Managerial mindset	- Lack of management support	Hoover and Tashman, 2022 [15], p. 41;
		- Knowledge and use of strategic foresight limited in the hands of a few experts only and not shared within the company	Hoover et al., 2021 [14], p. 47 Ketonen-Oksi, 2022 [16], p. 543 Mietzner and Reger, 2009 [24], p. 286
		- Defensive management behavior	Pouro, Dufva and Niinisalo, 2019, [29] p. 86
		- Resistance to change	Pouro, Dufva and Niinisalo, 2019, [29] p. 86
		- Negative attitudes toward foresight → introduction of futures knowledge can be seen threatening	Pouro, Dufva and Niinisalo, 2019, [29] p. 86
		- Lack of competences and guidance and resisting attitudes	
	Shared value basis	- Foresight and futures knowledge are seen as more of a separate intellectual exercise as an integral part of the functions of the organization	Pouro, Dufva and Niinisalo, 2019, [29] p. 86
Configurational	Experience	- Scarcity of time	Major and Cordey-Hayes, 2000 [21], p. 589
		- Inadequate time capacities	Mietzner and Reger, 2009 [24], p. 286
	Contextual appropriateness	- Too general of a level and lacking a connection "to the real world	Pouro, Dufva and Niinisalo, 2019, [29] p. 86
	Multi-perspectivity	- no findings	

As foresight and futures knowledge are viewed less as an essential component of the organization's functions and more as a separate and rather abstract intellectual exercise, barriers emerge from the perspective of shared values [29].

In SMEs, time constraints [21] and lack of time [24] are configurational enablers that prevent the implementation of foresight regarding experience, or the length of time CF is used in businesses. Table 5 presents the findings in the literature review related to inhibiting enablers from an individual perspective.

SMEs frequently decide against participating in foresight activities due to resource constraints, such as time and financial constraints, a lack of methodological knowledge resources, and staffing issues [21, 23, 26, 41]. New ideas such as futures literacy and futures consciousness have been proposed to help people understand the future as a resource that can be influenced [25]. The ability to recognize, create, target, and apply one's anticipatory assumptions about the future is known as *futures literacy* [16].

Furthermore, when considering the cultural enablers from the perspective of shared values, foresight is more often viewed as an intellectual exercise than as a crucial component of an organization's functions [29]. Owners of SMEs are typically in charge of reviewing their business environment with the aim of tracking changes that substantially influence the development of their own venture,however, due to their involvement in day-to-day operations, they frequently lack the time for regular review. Thus, this has a bad effect on activities involving foresight [23]. Furthermore, implementing foresight in SMEs is complicated by staff members' limited managerial [3] and cognitive abilities [23].

Benefits for SMEs

Marinković et al. [22] categorize the outcomes of CF for SME as related to strategy, organization, innovation, and performance. Taking the perspective for our literature analysis of the application of CF in SME, we will again present our findings from the organizational and individual perspectives.

Outcomes from an organizational perspective

Strategic decision-making is used to support managerial decisions. *Strategic planning* is used to support strategy development. *Strategic flexibility* is characterized by an intensified organizational capacity to react and adapt to changes brought about by the outside world. CF is a powerful facilitator of *organizational change*. It is crucial to engage in improved *communication* as foresight. As the organizational scope of SME varies greatly, it appears difficult to employ specific CF methods. A critical examination for each SME willing to work with CF has to precede the introduction of a set of methods which may not be well suited to the size, resources and structure of each SME.

Technological innovation and portfolio innovation are outcomes related to *innovation*. *Technological innovation* can be seen as the most traditional CF outcome. The creation of new business models, products, and services constitutes *portfolio innovation*.

Profitability, an economic result, is formed by *performance-related* results [22]

One of the most frequently cited outcomes of CF capability at the organizational level is *performance*. A frequent well-known effect of foresight in corporations is *organizational learning*, described as the improvement of actions through increased understanding and knowledge [8]. Again, SME appear to be organized highly individually and may not be prone to a general approach for increasing performance.

Outcomes from an individual perspective

On an individual level, *changing mental models* is another result. These mental models provide the businesses with CF benefits. *Environmental change awareness* can also be established at the individual level. The main benefit of foresight is improved perception. As SMEs are located in different regional contexts with a range of trends influencing their businesses, the need to change mental models may also vary and require different sets of methods.

Understanding *complexity* is the third individual-level result. Foresight is associated with multi-perspectivity, multidisciplinary, and ecosystem viewpoint to analyze system complexity through organizational membership. The ability to recognize how components

Table 5 Inhibiting enablers from an individual perspective in SMEs

Inhibiting Enablers		Findings	Selected studies
Formal	Processual	- Multiple roles are being filled by staff	Major and Cordey-Hayes, 2000 [21], p. 589
Cultural	Shared value basis	- Foresight and futures knowledge seen as a separate intellectual exercise than as an integral part of the functions of an organization	Pouru, Dufva and Niinisalo, 2019 [29], p. 86
Configurational	Contextual appropriateness	- General lack of competencies related to foresight	Pouro, Dufva and Niinisalo, 2019, [29] p. 86

of a system (environment) interact, to foresee how the system might change abruptly in a significant way by anticipating component changes without strong early signals, and to recognize how organizational changes might become dramatically more pronounced in the future are all indicators of an understanding of complexity in organizations [8]. The extent to which SMEs are affected by systematically linked complexities or trends may also differ from each venture. Again, it may require careful consideration for each SME when it comes to methods introducing system thinking or understanding at levels of global, regional, or local complexity.

Finally, *creativity* is the last result at the individual level. Foresight and creativity are closely linked (Battista, 2014). Future studies have been designed to explore and assess potential futures. One should use one's own imagination when writing scenario narratives. Liveliness, playfulness, and empathy are necessary to convey future scenarios. Songs, catchy slogans, role-playing games, videos, podcasts, fictional personas, and decorated "future rooms" are all ways to present scenarios. All are results of significantly higher perceptions of a creative organizational climate among participants in scenario-planning exercises [8].

Table 6 summarizes the findings in the literature review on CF outcomes from an organizational perspective in SMEs.

The development of the company's long-term strategy was based on improved communication, considering the views of its managers, employees, as well as external stakeholders like customers and foresight researchers [18]. Employing foresight in businesses and demonstrating to employees the tangible results that lead to the dissolution of structural silos, enabling a certain diversity of thought and a growing interest in extending information seeking within and outside of the organization, as well as employee commitment [16]. The ability to affect specific technological frames for managerial sensemaking is another result of technology foresight activities. The amount of "no findings" in this realm implies the difficulty of applying CF in SMEs when it comes to organizational dimensions and the research gap on diversifying a differentiating SME as a category when it comes to CF.

Discussion

We will structure the discussion along four elements: implications from the literature review; a critical reflection; a research agenda; and a framework for foresight for SMEs.

Implication from the literature review

The identification of binding measures that would imply a promising introduction of CF into *all* SMEs appears difficult, given the range of ventures that can be considered SMEs. It appears that due to the imprecise definition

Table 6 CF-related outcomes in SMEs from an organizational perspective

Outcomes		Findings	Selected studies
Strategy-related	Strategic decision making	- No findings	
	Strategic planning	- Alternative scenarios, based on key factors - Future scenarios for a place, but rarely used to inform strategy; causal maps ➜ helped the participating organizations look forward imaginatively to identify where they wanted to be and what were the potential barriers and opportunities - Development of an innovative FSS - Have a vision, regularly update business plan	Ejdys, 2014 [7], p. 11 Goodier, Austin, Soetanto and Dainty, 2010 [11], pp. 220, 228, 225 Keller, Markmann and von der Gracht, 2015 [46], p. 25 [19], p. 6
	Strategic flexibility	- No findings	
Organization-related	Organizational change	- No findings	
	Enhanced Communication	- Communicate strategy internally and to stakeholders - Launch of a new internal communication channel - Determine the foresight maturity level of the company and to set strategic goals as well as directions of strategic intervention - Basis for the development of the company's long-term strategy, taking into account the opinion of its employees, managers and external stakeholders	Battistella, De Toni, Pillon, 2015 [3], p. 4 p. 542, Ketonen-Oksi, 2022 [16], p. 542 Kononiuk and Glińska, 2015 [18], p. 976 Kononiuk and Glińska, 2015 [18], p. 976
	Consensus	- No findings	
Innovation-related	Technological innovation	- Poland occupies one of the last positions in terms of level of innovativeness in SMEs	Ejdys, 2014 [7], p. 9
	Portfolio innovation	- No findings	
Performance-related	Profitability	- No findings	

of SMEs – focusing on staff headcount and either turnover or balance sheet total – applying the findings from the semi-structured literature review is problematic. The contextual appropriateness or the specialized training required – both elements of the configurational column – are rather blurry and may entail completely different measures for ventures with 25 or 250 employees. Despite the fact that there is a number of tools free to use or a foresight-toolbox especially designed for SMEs, it may make sense to search for a more differentiated set of criteria to learn about specific enablers and their application for companies. The SME may require further differentiation as an analytical category and appears less than useful in this context.

Foresight methods applicable for the target group of SMEs therefore may need to be selected carefully in terms of self-explanation, resource efficiency and egalitarian usability for all team members. A selection of criteria for SMEs may be hard to achieve due to the wide and broadly defined category of SMEs. As shown in the analysis, configurational factors appear highly dependent on the size and resources of the venture at stake. Only a small percentage of the existing SMEs may have the budget to hire specialists who focus solely on CF and the connected processes, workshops, and documentations. SME as a category again does not seem useful. Again, it might be doubted that the criteria of SME can be solely accounted for reluctance on a structural level, as only a small percentage of companies have tried to initialize their future-oriented capabilities and competences [16].

Based on our literature review, we can formulate several recommendations that could be useful for the implementation of foresight in SMEs. We start from an organizational perspective. It is important to foster an organizational culture of openness to activities involving foresight. Internal stakeholders should receive more consideration and be presented with a long-term company vision. It goes without saying that this is a prerequisite for organizations of all sizes that intend to introduce foresight into their processes. Foresight – not only in SMEs – cannot be implemented without a managerial mindset within the organization. To drive the integration of foresight, the use of communication before, during and after the planning processes across all areas of the organization is essential [27]. It is also advisable to open new internal communication channels [16].

Another important aspect of communication is that it should be continuous and open. Open discussion and debate foster an atmosphere of informal information sharing and motivate staff to exchange ideas. Open spaces without managerial supervision may be suitable for an egalitarian setting to exchange ideas and discuss them. None of these criteria fit SMEs defined by their size, turnover and resources, but rather appear to be general prerequisites for all ventures, independent of the defining criteria.

Due to their focus on operational issues and strict resource constraints, SMEs are advised to work cooperatively during the implementation of foresight with the assistance of intermediaries in a network or ecosystem to acquire, assimilate, transform and exploit future knowledge in companies [26, 29]. As the best opportunities frequently arise where market spaces, technologies, and industries overlap, working with partners and intermediaries from ecosystems around distinctive SMEs is advised [36]. Intermediaries are communities that support business, such as in the innovation process [3]. Open SMEs ought to use trade associations and chambers of commerce for assistance as they usually lack their own departments and therefore need resources to do CF on their own. Involved SMEs should seek support from universities and professional organizations to implement foresight in their companies [21]. Additionally, clusters can work together to predict the future. Due to the synergy created by the interaction between cluster members, including SMEs, in collaborative foresight, internal and relational resources are combined, adding to the multiplicative effect on the firm's performance [26]. The cultivation of such network clusters may be one specific asset which may make sense for SMEs due to their resource capacities and the shared benefits for themselves and for the other members of the clusters.

SMEs should therefore strengthen their connections with intermediaries and acknowledge the important roles of these organizations. SMEs should look for wider and deeper connections outside of their current networks [21]. Many organizations struggle with issues related to globalization, increasing speed, and complexity. Therefore, foresight work should be outsourced to outside consultants and purchase "Foresight-as-a-Service." Due to resource limitations, SMEs frequently lack familiarity with, understanding of, or likelihood to use foresight methods to manage their businesses. Moreover, the methods frequently do not fit the company or conform to a branch's requirements. To achieve results that can survive in a more-than-ever VUCA world, coined by wars and pandemics, it is advised to gather a variety of tools, methods, and techniques for SMEs that can be readily understood and used and resources in the form of a toolbox with foresight tools customized to the requirements and resources of SMEs. As there is already a number of such toolboxes existing (e.g. Schulz, Volkmann [40]) More businesses than ever are using free or inexpensive software for forecasting and to supplement their in-house business management knowledge. Combining software and training could create a growth path for the adoption

of a methodical forecasting process that could not only guide large companies to the successful introduction of CF into their everyday business but also prove valuable to SMEs [14].

Some recommendations are made from an individual perspective. Managers and employees must acquire knowledge of the future and learn how to shape it. One way to achieve this is to incorporate the study of foresight into the academic curricula as early as possible. Another suggestion is for intermediaries like Business Links, training and enterprise councils (TECs), Chambers of Commerce, innovation and technology centers, professional institutes, trade associations, and research and technology organizations (RTOs) offer courses. Knowledge should be searchable in the organization's internal databases. Small films and presentations on foresight and that can stimulate interest in the subject among employees frequently suffice. Regular jour-fix meetings and small in-house training sessions should include discussions of foresight to refresh, deepen, and apply learned knowledge in a company-specific manner. All these measures can work both for large companies and for SMEs.

It became evident that to implement foresight in businesses, from an individual perspective it is crucial to have an orchestrator who constantly manages and monitors it [16]. To make the process meaningful, this person should also be knowledgeable in the field of foresight. For SMEs, a problem could be that any investment in the training of one specific person could be lost if that person leaves the company.

Critical reflection

We have described our findings from the literature review on foresight on SMEs. Several aspects should be highlighted.

The specific challenges for SMEs also seem relevant for larger organizations. A much clearer differentiation on what SMEs are and a much more granular view on the different types of SMEs is needed. So far, this is conspicuously lacking in the publications analyzed. We often see the implementation of foresight activities within smaller units of an organization which of course also have resource limitations. While the notion is common in the literature that SMEs have these restrictions, they offer no insights on how to address them. In other words, how can CF be designed in a way that SMEs can implement?

Furthermore, the literature review shows that certain aspects that appear crucial for the evaluation of CF and its necessity for SMEs have not been addressed in publication or even researched at all. "No findings" concerning processual enablers or communication, as shown in the charts above, offers multiple ways into new research ventures on the application of CF in SMEs.

Besides contradictory statements (e.g., outsourcing foresight activities vs. using freely available tools), we know little about how SMEs implement foresight. Oversimplifications like the suggestion to add foresight to curricula of management education are off topic. As the category of SMEs is so wide and imprecise, measures for ventures with 20 employees appear to be evaluated with the same parameters as for companies with 200. This results in a blurry picture when it comes to evaluating measures' usefulness for SMEs.

The literature review on the implementation of foresight in SMEs tells us above all that there is no significant knowledge on this topic. From an empirical perspective we cannot quantify the application of foresight in SMEs. Further, the literature review does not shed light on how the implementation of foresight in SMEs could be designed and executed. Further research appears as a useful next step for evaluating CF measures in SMEs.

Research agenda

The critical reflection on our literature review helps us to formulate a research agenda on the use of foresight in SMEs. When considering a possible research agenda, its central aspect and core agenda must be precise enough to differentiate and elucidate SMEs. One must consider the differences between the SMEs with 10 employees, 250, or any number in between. Additionally, an SME in the high-tech-sector should be evaluated differently from a large repair shop. SMEs cannot be considered as a single object but need to be viewed in light of more differentiated criteria. Further, the way in which the regional specifies of an SME need to be reflected merit exploration. Obviously, more precise categories as mentioned in the introduction (e.g. micro enterprises) have the potential to paint a clearer picture of analytical approaches.

Our main point is, however, to understand what level of sophistication of foresight activity can be applied to which SME. From our perspective, this needs to be matched with freely available foresight inputs, such as trends, or simple workshop formats, as provided by the megatrend hub of the European Commission [9]. In addition, the matching expectations of what foresight can deliver should be considered. Furthermore, the rise of generative AI tools concerning their use for groups and branches of SMEs needs to be highlighted in respect how useful foresight insights can be generated when considering that checking results of AI tools always requires a human intelligence to double check and balance the findings, as works concering AI and scenario planning have shown [43].

As this is one of the main results of the analysis presented in this paper, further research offers deeper insights into singular cases of SMEs [6] or even qualitative ethnographic research into applying foresight methods in different ventures [28].

Framework for SMEs developing foresight

The literature review, critical reflection, and research agenda for developing foresight at SMEs leads us to propose a framework for the development of foresight at SMEs. As shown in the figure, we propose a framework that reflects the size of the organization and establishes a relationship with the sophistication of foresight activities. This should naturally reflect an organization's experience with developing foresight.

We have presented several examples here; further research is needed to conceptualize this framework. A small SME with little experience with foresight would benefit from a primer on what foresight is and why it matters, in addition to being exposed to trends and asking what they could imply for the organization. A with foresight more experienced and larger SME could consider scheduling trend reviews or scenario exercises on a small scale while a smaller SME might continue discussions on trends and consider available scenario reports (Fig. 1).

Conclusion

This paper explains SMEs apply foresight. Three research questions were formulated to ask about the individual and organizational dimensions in which SMEs apply foresight and the tools that are most suitable. In this regard, the research concludes that the integration of foresight in large companies started much earlier than in SMEs but approaches to the integration of foresight have been implemented in just a small number of SMEs. This paper therefore offers insights into a possible research agenda for creating a foresight framework for SMEs which could contribute to the evolution of different generations of foresight. The afore mentioned toolboxes can be a useful starting point in order to further differentiate and evaluate foresight practices concerning their usefulness for the target group of SMEs.

In response to the second question, how foresight is applied in SMEs from an organizational perspective, only a selected group of experts possesses knowledge and experience in applying strategic foresight in SMEs; this makes CF in SMEs an exclusive venture. Bottom-up strategies are more effective at implementing foresight in the company than top-down strategies. CEOs are key players in putting foresight into practice. Therefore, managerial support and the corresponding organizational structures combined with egalitarian spaces for exchange without managerial supervision in the businesses that provide the subject with a justification are crucial for the integration of foresight in have been termed SMEs. As implied above, a more differentiated catalogue of criteria could further improve the evaluation of possible CF approaches for SMEs.

According to the response to the third research question, extent to which foresight from an individual perspective been integrated in SMEs, every employee in an organization contributes significantly to the integration of foresight. Individual cognitive abilities are required for this across the workforce. The C-suite is crucial because it is responsible for detecting, seizing, and transforming perceptions from the outside world into the business and deriving the necessary actions from them. Younger business owners are more likely to rely on foresight to run their company. Higher levels of education have a more positive effect on the application of foresight. Other dimensions that could be of interest are the regional

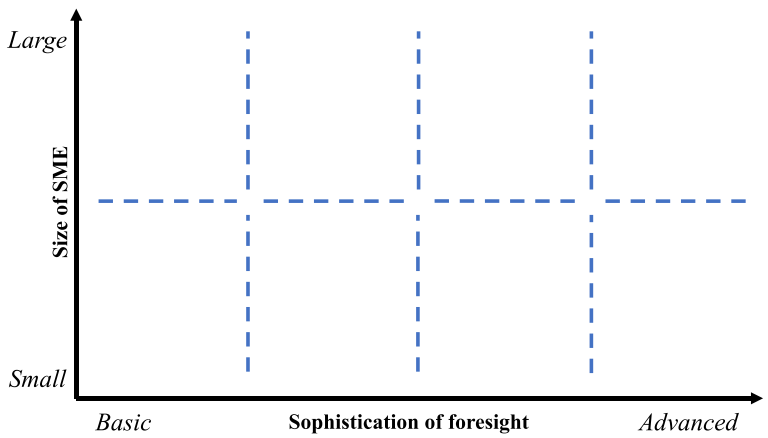

Fig. 1 Foresight-SME-Framework

peculiarities or infrastructural aspects that facilitate or hinder the introduction of CF into SMEs.

Even though a semi-systematic literature review was used to obtain both a quantitative and qualitative understanding of the development of the research area, some limitations must still be taken into consideration. First, this analysis, was limited to a review of journal articles. No book chapters, book reviews, conference abstracts, of presentations containing more detailed analyses or new research directions in the field were included. Second, it is possible that some articles relevant to the topic were overlooked. Moreover, only two databases were chosen to conduct the search [42]. Another limitation is that one of the authors alone chose the articles to be included to keep the number of articles found manageable [42]. However, this runs the risk of many articles being excluded.

Due to a lack of resources, it can be assumed that all formal inhibiting enablers in micro, small, and medium-sized SMEs vary substantially. Since all size categories were referred to as SMEs in the literature search, no distinctions between the various size categories could be found. Therefore, further research needs make clearer differentiations among the different types of SME, most of which lack the essential resources needed for the integration of foresight in businesses. For this reason, there are no findings from the literature search regarding the degree of integration that SMEs have already experienced with special foresight departments. Additional research should focus on the benefits of foresight for SME also concerning the specific branch the ventures are employed with and how to reap them in the right balance with the required approach to foresight and the requisite resources.

Abbreviations

SME	Small medium enterprise
VUCA	Volatility, Uncertainty, Complexity, Ambiguity
CF	Corporate Foresight
CEO	Chief Executive Officer
TEC	Training and Enterprise Councils
RTO	Research and Technology Organization

Authors' contributions

The main analysis of the articles/data was done by Ulrike-Sabine Doerr. Jan Oliver Schwarz was responsible for contextualizing the findings and classifying them connected to recent research to Corporate Foresight. Gerhard Schönhofer acted as the main coordinator of the writing process. Explanation of why the manuscript should be published in *European Journal of Futures Research*: The manuscript offers relevant new insights into the specific field of research presented. Furthermore, it contributes to new perspectives and viewpoints which represent a research gap. It therefore connects to recent publications and comments them critically. The manuscript has not been published anywhere else before and does not aim for any specific issue of the journal.

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