The objective of this article is to explore the value of networked foresight: foresight conducted in innovation networks for the benefit of the network and its partners with active contributions from the partners. Strategic management, specifically the dynamic capabilities approach and vast literature on corporate and strategic foresight argue that deficiencies like one-dimensionality, narrow-sightedness and myopia of closed corporate processes are remedied by incorporating external sources. A broad knowledge base promises to especially benefit foresight in multiple ways. Thus, created an analytical framework that integrates the dynamic capabilities approach with existing results on potential value contributions of foresight, enriched with existing findings in networked foresight and organizational design in the light of increasing importance of inter-organizational networks. We conducted a series of interviews and a survey among foresight practitioners in a network to explore the perceived value proposition of networked foresight for the network partners and the network itself. The analysis is based on data drawn from the EIT ICT Labs network of large industry corporations, small-and-medium sized companies, and academic and research institutes. Our study shows that network partners use the results primarily for sensing activities, i.e. data collection and to a lesser extend activity initiation. More sensitive and fundamental organizational aspects such as strategy and decision-making or path-dependency are less affected. Especially SMEs may benefit substantially from network approaches to foresight whereas MNEs are more confident in their existing corporate foresight processes and results. The value for the network itself is substantial and goes beyond value creation potential for companies as discussed in literature. The development of a shared vision—relatable to organizational learning and reconfiguration capabilities—was identified as particularly valuable for the network.

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Keywords:
Corporate foresight
Networked foresight
Innovation networks
Collaboration for innovation
Open innovation
Dynamic capabilities
emerged as a constant source of innovation in an increasingly complex and intertwined business world [7]. Some authors, e.g. Miles et al. [7], limit their discussion to ‘multi-firm networks’, a limitation that is deemed unnecessarily restrictive for this article. The substantially different resources and capabilities of firms and academic and research institutes increase the variety of assets available in networks [8]. Complementary resources and capabilities of the partner organizations can be combined to create an integrated innovation basis—data, information, knowledge, capabilities, resources and other assets—for the benefit of the network and its partners [9].

Foresight instruments that require a broad data basis appear to have the potential to greatly benefit from a network approach, especially from those with a heterogeneous partner structure. Thus, the emergence of ‘networked foresight’ as a new form of futures research appears to be imminent [10–12]. For example, van der Duin et al. [10] explore the use of foresight in network settings based on three cases. They conclude that activities that could be characterized as networked foresight are already in use. However, this does neither happen necessarily consciously, nor is it managed adequately. Despite many similarities to corporate and strategic foresight fundamental questions seem to be unanswered for networked foresight, including, but not exclusively:

1. Why is a network approach promising for foresight?
2. Does networked foresight create considerable value?
3. If so, for whom: the network as organization itself or its partner affiliations?

In our analysis we understand networked foresight as being similar to corporate foresight but as conducted in inter-organizational innovation networks with active contributions from the network partners and for the benefit for the network partners and the network itself. For finding first answers to these questions this article draws from research on strategic management and adjacent disciplines for the analysis. We use the dynamic capabilities approach as introduced by Teece [1] and advanced thereafter by several authors (e.g. [13–18]) as basis for an analytical framework and cross-reference this with findings on value creation through corporate foresight (e.g. [19–22]), contributions of network approaches to innovation (e.g. [23]), and research on organizational design for large-scale multi-party collaboration (e.g. [24,25]). The in-depth case study utilized for the analysis in this paper is the ‘Innovation Radar’ implemented by the EIT ICT Labs. EIT ICT Labs is a publicly funded European initiative of more than 100 partner organizations from academia and industry [26]. Its unique set-up and the foresight processes are described, followed by an in-depth analysis of these processes based on qualitative data that was collected in interviews, a survey among foresight practitioners that are linked to the EIT ICT Labs Innovation Radar and access to a wide range of documents and meetings of the network.

2. Theoretical foundation

2.1. Dynamic capabilities

Strategy research in general and dynamic capabilities research in particular aims at understanding how firms can gain and sustain a competitive advantage over time [14]. This includes identifying, responding to and creating environmental change, and it includes multiple levels of analysis such as information acquisition, managerial decision-making, organizational routines, competitive interactions and environmental change [15]. Dynamic capabilities research stems from the rationale that other research streams in strategic management such as the competitive forces approach emphasizing market power (e.g., [27]), the strategic conflict approach (e.g. [28]), or efficiency-based approaches such as the resource-based view (RBV) of the firm (e.g. [29,30]) do not adequately explain how and why some firms retain a competitive advantage in rapidly changing circumstances [1,16]. The RBV provides reasonable explanations of the firm as a bundle of resources that may lead to sustainable competitive advantage in case a firm has resources that are valuable, rare, inimitable, nonsubstitutable and allow for value-creating and hard to duplicate strategies. However, in case of rapidly changing competitive environments this has to be extended. Dynamic capabilities address integration, building, and reconfiguring internal and external competencies to act adequately upon identified changes [16].

Multiple approaches to the development of dynamic capabilities frameworks and definitions of dynamic capabilities exist, where four can be identified as being most influential [15,31]. Teece, Pisano and Shuen [1] originally defined dynamic capabilities as ‘the firm’s ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments. Eisenhardt and Martin [16] state that ‘dynamic capabilities alter a firm’s resource base, which includes its physical, human and organizational assets’ whereas Zollo and Winter [17] see dynamic capabilities acting on operational capabilities [15]. Helfat et al. [13] extended the approach further by defining dynamic capabilities as ‘the capacity of an organization to purposefully create, extend, and modify its resource base’.

Although details in the approaches of the above-mentioned authors differ, the basic logic remains similar: dynamic capabilities involve processes that allow firms to obtain, integrate, and evaluate resources, leading to new combinations or reconfigurations of the firm’s resource bases and eventually sustainable competitive advantage [13]. Core elements of the early framework for dynamic capabilities provided by Teece, Pisano and Shuen [1] in 1997 are organizational and managerial processes, positions and assets, and paths (dependencies) of enterprises. Later, Teece [14] specified the nature and microfoundations of dynamic capabilities further. Fig. 1 shows the simplified chain of logic—or ‘foundations of dynamic capabilities and business performance’ as Teece calls it—of the dynamic capabilities framework as defined by Teece [1,14]. As Helfat and Peteraf [15] explain, this is not in contradiction to the logic of the other defining articles named above, these rather specify dynamic capabilities further. For the creation of the analytical framework for networked foresight we proceed with the fundamental logic of dynamic capabilities as shown in Fig. 1.

The core dynamic capabilities are ‘sensing’, ‘seizing’ and ‘recombination and reconfiguration’. What Teece [14] calls ‘sensing’ or ‘opportunity identification’ is referred to as dynamic capabilities that ‘are related to the gain and release of resources’ or ‘for accessing outside knowledge’ through aligning by Eisenhardt and Martin [16]. Access to information is crucial to discover, develop and create new opportunities for the firm. It may lead to an ‘effective combination of internally generated
inventions; efficient and effective technology transfer inside the enterprise and between and amongst enterprises [1]. It involves ‘scanning, creation, learning, and interpretive activities’ to ‘scan, search, and explore across technologies and markets’ [1]. ‘Seizing’ then refers to the need to invest based on findings, i.e. actually acting on the insights to seize the opportunities [14,15]. According to Teece [1,14,18] sensing and seizing lead to new positions and paths, eventually resulting in competitive advantages for the firm. Recombination and reconfiguration may then alter the assets of a firm in time. If this is a continuous capability it enables the firm to maintain its competitive advantage even in times of rapid change [14,15].

2.2. Analytical framework: linking dynamic capabilities, foresight and inter-organizational networks

Past research has generated profound knowledge on foresight. For example, the ‘Strategic Foresight Issue’ of this journal (Technological Forecasting & Social Change, volume 77, Issue 9) provides a collection of 24 articles related to foresight. Various aspects of foresight have been examined: the need for foresight (e.g., [32]), foresight processes and methodologies (e.g., [2,3,6,33–37]), and analytical and methodological improvements of foresight systems (e.g., [2,3,38]). Also, interest in collaborative foresight seems to be increasing as work on the topic starts to emerge (e.g., [4,10]).

We aim to contribute to the discussion on value creation through foresight (e.g., [4,19,22,39]), specifically value created through ‘networked foresight’: foresight activities conducted in inter-organizational innovation networks. For this, we utilize the fairly continuous work about value propositions through foresight provided by Thom [20], Rohrbeck and Thom [21], and Rohrbeck [19], lately added to by findings from Rohrbeck and Schwarz [22]. For our analysis we integrate these findings with the basic concept of dynamic capabilities provided by Teece and other authors [1,13–15,18]. Further, we emphasize network aspects in this analytical framework based on Uotila et al. [23], van der Duin et al. [10], Vecchiato and Roveda [4,11] and the special issue on organization design in Organizational Dynamics (volume 39, issue 2; particularly [24]).

In his dissertation on Corporate Foresight, Rohrbeck [2] concludes that ‘corporate foresight systems can be regarded

---

**Table 1**


<table>
<thead>
<tr>
<th>Value proposition group (VPG)</th>
<th>No.</th>
<th>Value propositions (VP)</th>
<th>DC1: Sensing</th>
<th>DC2: Seizing</th>
<th>DC3: Reconfiguration &amp; reconfiguration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VPG1: Environmental scanning to enhance the knowledge base and trigger internal responses</strong></td>
<td>ES1</td>
<td>Identification of relevant external change</td>
<td>NF</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ES2</td>
<td>Early identification of competitor concepts and strategies</td>
<td>NF</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ES3</td>
<td>Identification of new internal needs</td>
<td>F</td>
<td>NF</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ES4</td>
<td>Ensuring state-of-the-art innovation activities</td>
<td>NF</td>
<td>NF</td>
<td></td>
</tr>
<tr>
<td><strong>VPG2: Starting and facilitating strategic discussions to enable strategic change</strong></td>
<td>ES5</td>
<td>Triggering new innovation activities</td>
<td>F</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SD1</td>
<td>Consolidation of opinions and triggering of discussions</td>
<td>F</td>
<td>NF</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SD2</td>
<td>Challenge and change of existing mental models</td>
<td>NF</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SD3</td>
<td>Initiation or moderation of strategic discussions</td>
<td></td>
<td>NF</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SD4</td>
<td>Support for breaking away from path dependencies</td>
<td>NF</td>
<td>NF</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SD5</td>
<td>Creation of common view of things within organization</td>
<td>F*</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>VPG3: Identifying and supporting acquisition of needed resources</strong></td>
<td>AR1</td>
<td>Search, identification and evaluation of external resources</td>
<td>NF</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AR2</td>
<td>Identification of new business models</td>
<td>NF</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AR3</td>
<td>Support for make-or-buy decisions</td>
<td>NF</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>VPG4: Additional value propositions</strong></td>
<td>AV1</td>
<td>Support of organizational learning</td>
<td>NF</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AV2</td>
<td>Shaping the future (e.g., by influencing other actors)</td>
<td>NF</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F: Conceptual proximity of Dynamic Capability and Foresight VP.

* Depends on the applied perspective (network partner organization vs. network organization).
as a dynamic capability that enables a firm to detect a need to renew its portfolio of resources.” This article is based on the basic set of dynamic capabilities presented by Teece [14]. But we do not see this as contradiction to Rohrbeck’s assessment, we rather understand his conclusion as an extension to Teece’s work.

The analytical framework integrating the strategic management perspective with the emerging foresight perspective is shown in Table 1. This analytical framework can be applied on various organizational levels. In line with the focus of this paper on potential value creation on 1) the partner and 2) the network level, we utilize it for analyzing the results on these two levels in later sections of this article. In the immediately following subsections we elaborate on the assumed links between foresight value propositions and dynamic capabilities as shown in Table 1.

2.2.1. Foresight and its link to dynamic capabilities

Foresight aims at sensing (ES1–ES5, AR1, AR2 in Table 1), explaining and interpreting (SD1, SD5, AV1), and utilizing signals for new developments to allow an organization to adapt accordingly (ES4, SD2–SD4, AR3). The reason for firms to implement foresight processes is that organizational decisions need to be made facing advancing uncertainty and increasingly complex and intertwined ecosystems. In fact, ‘the global economy has become open and the sources of invention, innovation, and manufacturing are more diverse geographically and organizationally’ [42]. Accordingly, the developments to be covered by foresighting are very broad and include technological, political and societal trends, business discontinuities and potential disruptions, the rise of future business fields, etc. [43]. Bringing together the knowledge from all these fields, foresight processes aim at providing a better understanding of future developments and at allowing a proactive approach to face the future [3].

A wide range of foresight methods and tools are available, e.g. roadmapping, scenario analysis, backcasting, s-curves or Delphi studies [3,38,44–46]. The application of these methods and tools can serve various specific goals such as developing new strategies in the light of new sociological, political, technological, environmental or competitive developments; testing these strategies, or identifying ‘white spaces in the current portfolio’ [47].

However, organizations are in danger of becoming one-dimensional, narrow-sighted, myopic or even blind towards external trends and change over time [48]. Thus, foresight processes are in danger of becoming ineffective due to a lack of relevant input. If not addressed adequately, organizational innovation potential and sensibility to change are weakened substantially and the long-term corporate survival is in danger [44]. To work against this threat it is vital to incorporate external information and knowledge into the innovation and foresight processes for opening up new opportunities [3,14,49,50].

The link between dynamic capabilities as described above and research streams concerned with the future orientation of organizations—environmental scanning, futures research, peripheral vision, and as integrative discipline corporate and/or strategic foresight—is recognizable in multiple ways. Key to the environmental scanning perspective is scanning for change in the environment [51,52]. Building up adequate corporate scanning processes for identifying technological and market developments is addressed by research on peripheral vision (ES1, ES2, AR1, AR2) [32]. Clearly, both potential value propositions are similar to ‘sensing’ as defined by Teece [14]: ‘Management must find methods and procedures to peer through the fog of uncertainty and gain insight. This involves gathering and filtering technological, market, and competitive information from both inside and outside the enterprise, marking sense of it, and figuring out implications for action’.

The futures research perspective is more focused on evaluating various possible futures and planning according to these possibilities (ES3, ES4) [53,54]. Teece [14] integrates ‘interpretative activities’ into ‘sensing’ while acting upon it (ES5, SD1–SD4, AR3, also ES4) is part of ‘seizing’ opportunities: ‘Once a new (technological or market) opportunity is sensed, it must be addressed through new products, processes, or services’. Also, ‘[…] corrective strategies encourage change through two basic mechanisms: (1) designing organizational structures, incentives and routines, to catalyze and reward creative action; and (2) developing routines to enable the continual shedding of established assets and routines that no longer yield value’.

Research on corporate and/or strategic foresight is broad and often addresses aspects from multiple or all the related research streams. It commonly aims at enhancing responsiveness towards change [55]. Richard Slaughter defines (strategic) foresight as ‘the ability to create and maintain a high-quality, coherent and functional forward view, and to use the insights arising in useful organizational ways. For example to detect adverse conditions, guide policy, shape strategy, and to explore new markets, products and services. It represents a fusion of futures methods with those of strategic management’ [56]. Conceptual proximity to foresight value propositions ES5, SD4 and AV1 can be recognized as Teece [14] states that ‘a key to sustained profitable growth is the ability to recombine and to reconfigure assets and organizational structures as the enterprise grows, and as markets and technologies change, as they surely will. Reconfiguration is needed to maintain evolutionary fitness and, if necessary, to try and escape from unfavorable path dependencies.’

2.2.2. Dynamic capabilities, foresight and inter-organizational networks

Substantial technological breakthroughs usually happen outside of an organization. As Day and Schoemaker [32] put it ‘[t]he key is to quickly spot those signals that are relevant and explore them further, filter out the noise, and pursue opportunities of the competition or recognize the early signs of trouble before they escalate into major problems.’ This can be associated to foresight value propositions ES1, ES2, ES4, AR1 and AR2 as listed in Table 1. Chesbrough as a prominent representative of the ‘open innovation’ paradigm states that ‘firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as firms look to advance their technology’ [57]. Several other studies came to the similar conclusion that organizations with complementary assets who cooperate will outperform those who innovate on their own [58–60]. A the core of the ‘open innovation’ paradigm is the importance of external search and integration of knowledge into an organization [14]. Powell, Koput and Smith-Doerr [61], for example, provide empirical data that points towards a locus of innovation that lies within the network of incumbent and
new firms, and research institutes in rapidly changing industries instead of internal developments [14,50]. In the light of an increasingly intertwined world with constant change and the need for organizations to adapt to it, inter-organizational networks with dissimilar but complementing partners, e.g., industrial and academic partners, bear the potential to provide necessary new knowledge and stimuli [14,57]. Dyervos and Singh [62] see collaboration-related capabilities as antecedent to competitive advantage. Teece, Pisano and Shuen [11], Helfat et al. [13], Teece [14], Rothaermel and Hess [63] and Eisenhardt and Graebner [64] take the same line and constantly emphasize the importance of the ability to utilize and leverage networks to adapt to changes in multiple occasions in their research on dynamic capabilities. Inter-organizational networks can also provide access to resources that are otherwise, e.g. through mergers or acquisitions, hardly available [65]. A heterogeneous partner structure of the network brings along differing—at best complementing—knowledge, new or additional resources, new perspectives, new ways of doing things, and different priorities. Thus, interpretative activities (SD1–SD4) that support seizing opportunities may benefit from network settings as well.

Research on corporate foresight focuses predominantly on Multi National Enterprises (MNEs). However, the foresight needs of Small and Medium-Sized Enterprises (SMEs) differ significantly from those of MNEs as Jannek and Burmeister [66] and Paliokaite [67]. Among other shortcomings, they show that SMEs should broaden their foresight horizons and should apply more sophisticated foresight instruments as they commonly do. In addition, they should draw from existing, external sources and adapt this knowledge to their own company and should seek involvement in networks as this is likely to trigger additional value associated with foresight.

When sourcing information from networks absorptive capacity becomes a key issue [68]. Cohen and Levinthal [69] originally defined absorptive capacity as ‘the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends’. Zahra and George [70] extend this definition by defining two types of absorptive capacity: potential absorptive capacity and realized absorptive capacity. The first refers to the acquisition and assimilation of external knowledge and enables the exploration of knowledge within networks. The latter refers to transformation of the collected knowledge securing the exploitation of knowledge. Uotila et al. [23] emphasize ‘the role of absorptive capacity as an important dynamic capability for an actor’s success in carrying out innovation processes’ and argue that an improved absorptive capacity improves the link of foresight processes and organizational innovation and learning activities. Moreover, they conclude that ‘competitiveness-securing resource configurations have to be considered at the level of innovation networks—as individual actors are embedded in these networks. The capacity to absorb future-oriented knowledge in a dynamic fashion is seen as a crucial competitiveness factor for individual actors and innovation networks’ [23].

In line with this argumentation both types of absorptive capacity are considered important for this article. First, potential absorptive capacity is crucial for actually identifying, collecting and especially interpreting knowledge that is won through foresight from the network. Second, the interpretative steps of foresight require realized absorptive capacities within the organization. At that, ‘organization’ can refer to both organizational types we include in our analysis: the partner organization of the network, and the network as organization itself. Both need to have absorptive capacity abilities to benefit from foresight processes.

When it comes to collaborative foresight some progress has been made recently. For example Jasner [71] describes the foresight project “Moonraker” initiated by the car manufacturer Volkswagen (VW). In this project, VW aimed at increasing the understanding of the US car manufacturing market. Success of foresight activities such as this was identified to depend on participation by a multitude of parties such as external experts, managers, decision makers, and other stakeholders [2,38,67]. Vecchiato [11] discusses the roles a firm can seek in a multi-party ecosystem. He distinguishes two fundamentally different approaches. First, similar to Porter [27] competitive forces approach in strategic management, organizations can adopt an exploratory approach aiming to position the organization in a mostly exogenous environment. Second, similar to the potential foresight value proposition AV2 as discussed by Rohrbeck and Schwarz [22], firms can adopt a normative foresight approach. Here, the firm recognizes its (somewhat limited) influences on the ecosystem and proactively seeks to be involved in the development of the relevant environment. van der Duin, Heger and Schlesinger [10] discuss the links of innovation networks and foresight from an innovation management perspective. Further, they explore the use of foresight in networks and applied instruments to some degree on an operational level and come to the conclusion that networked foresight is already in use in various forms, albeit neither necessarily consciously, nor managed adequately. Both shortcomings seem to be leading to a lack of utilization of the potential that networked foresight bears. Also on an operational level, Heger and Rohrbeck [36] explore the collaborative use of foresight methods for early tasks in the innovation process, in their case business field exploration.

3. Study design

3.1. Research strategy

For exploring the use and value of foresighting in network settings this paper is based on a study of a single case: the EIT ICT Labs. A case study makes it possible to dive deeply into the phenomenon by using multiple data sources. The full richness of the focal phenomenon can be explored while also taking into account very slight twists and turns that might be of relevance for the study’s objective. Thus, new meanings, different interpretations, and new theories, models and solutions can be identified and carved out [72]. For exploratory qualitative research characterized by little previous knowledge, case study research is therefore recommended [73–75].

For an optimal exploration of the alleged phenomenon ‘networked foresight’ a network with a large heterogeneous partner structure that focuses on innovation appeared to be suitable for several reasons: i) literature points towards benefits from a broad knowledge base that such a network has—see before—, ii) the implementation of foresighting processes involving several organizations of different types is more likely in large innovation networks than in other settings and iii) the potential use of foresight results in the network’s partner affiliations is increased. Additionally, to suit the analytical
framework as introduced before best it should be active in a rapidly developing industry such as ICT.

The EIT ICT Labs were chosen for this case study because it

i) has more than 100 partners from industry (small and large), academia and research institutes that potentially creates a huge knowledge base;

ii) advertises a foresight process called Innovation Radar that aims at the ‘identification of developments and trends in ICT and neighboring sectors’ and the ‘identification of innovation opportunities and commercialization potential’ [76];

iii) seeks to apply this foresight process for ‘achieving results through involvement of partners and making them available to partners’ and ‘creation of cohesion within [...] and EIT by referencing to internal experts’ [76];

iv) the study of van der Duin, Heger and Schlesinger [10] already identified it as a network that conducts foresight for the benefit of the partners and the network organization itself.

3.2. Data collection and sample

For data collection a series of 49 interviews and an online survey among foresight practitioners in the network were conducted. Additional material was used to gain insights into organizational processes and observe use of the data first hand.

3.2.1. Semi-structured interviews

The interview partners were chosen from different hierarchical levels within the partner affiliations and the EIT ICT Labs for minimizing biases and to allow for triangulation of results when associating them with other data sources. The interviews were semi-structured, meaning an interview guideline with a catalogue of questions was created (see appendix for details). The questions were selected depending on the role and function of the interviewee and context-specific. Of all 49 interviews 63% have been recorded and transcribed. In the remaining interviews the interview partners were hesitant to answer when being recorded, thus notes taken from memory after the interviews were compiled. See Fig. 2 for details of the interview partners’ functions, Fig. 3 for the distribution of types of partner affiliations. For the classification we defined MNEs rather broad as companies with annual revenues of more than 500 m EUR and operations in more than two countries. SMES are all companies that do not meet these criteria. Academic Institutes are universities and the like, i.e. institutes with a public teaching assignment whereas Research Institutes are Institutes focused on applied research without teaching assignments. At the time of the interviews, the CEO of the network organization was solely affiliated with the specially founded legal entity that is responsible for orchestration of the activities. Thus, although the number of interviews was 49, only 48 persons can be associated to partner affiliations. Anecdotal evidence has been cited for the purpose of induction, i.e. identifying or understanding new phenomena related to networked foresight.

3.2.2. Survey

The online survey was targeted at foresight practitioners that have or had access to results originating from the foresight activities in the network. For the development of the survey we

Fig. 2. Interview partners’ functions within partner affiliations and EIT ICT Labs.

Fig. 3. Interviewees’ partner affiliations.
relied on existing research on value propositions through foresight, in particular [19–21]. Potential value propositions AV1 and AV2 were not included in the survey since they were introduced by Rohrbeck and Schwarz [22] after the polling period. Still, the data allows drawing some conclusions for these potential value propositions. The method poll is based on the method collection and evaluation provided by Mietzner [77].

From 110 invited persons that were provided by the lead of the Innovation Radar 54 completed the survey (response rate = 49.09%). See Fig. 4 for the distribution of the survey participants’ affiliation types (see appendix for questionnaire). SurveyMonkey1 and the built-in possibilities for data analysis such as filters, cross-tabs and keyword-based text analytics were used for producing the enquete and for processing and evaluating the survey replies.

3.2.3. Additional data sources
Additional data that was utilized include access to key documents, such as internal strategy documents and participation in meetings, access to the network’s intranet, presentations and meeting minutes, workshop material, and observations through participation in management meetings.

4. Case: foresight in EIT ICT Labs

4.1. EIT ICT Labs

The European Institute of Innovation and Technology (EIT) was set-up by the European Commission (EC) in 2009 as an independent body to drive innovation in Europe. For this, the EC has put out tenders for three Knowledge and Innovation Communities (KICs) through the EIT, each one focusing on one of the priority topics climate change and mitigation, sustainable energy, and information and communication technologies (ICT). The basic prerequisites for EIT funding were integration of partners from industry and academia, partners from at least three EU countries and credible concepts for increasing innovation in one of the three priority topics [78].

EIT ICT Labs, one of the three initial consortia, aims at turning Europe into a global leader in ICT innovation for driving economic growth and quality of life [79]. The facilitation of the partners’ capabilities in the EIT ICT Labs is implemented along the generic innovation process of ‘innovation, initiation and creation’, ‘transition’ and ‘acceleration’ and within the two channels ‘new business creation’ and ‘innovation in established companies’ [26,80]. The organization was set up to embrace the ‘open innovation’ notion, to create an attractive environment of innovation for entrepreneurs, researchers, developers, and investors and to work closely with end-user communities. The regional ‘nodes’ operate physical ‘Co-Location Centres’ (CLCs), co-working spaces for the partners’ staff and project teams to work collaboratively in seven European innovation hot-spots: Berlin, Eindhoven, Helsinki, London, Paris, Stockholm, and Trento.

Technology transfer, innovation transition and acceleration are supported end-to-end by various methodologies and instruments operated by the EIT ICT Labs. One of these strategic instruments of the EIT ICT Labs is the Innovation Radar. Innovation Radar is a foresight instrument that was created for utilizing the broad information basis at hand [76].

4.2. Networked foresighting in the EIT ICT Labs

The EIT ICT Labs Innovation Radar is an instrument for creating business intelligence and leveraging on information, mapping the future of ICT and building scenarios for the future, identifying disruptions and discontinuous change, utilizing the network of experts, and disseminating foresight results among the network partners.

When planning the EIT ICT Labs foresight activities a participative approach has been chosen [81]. Thus, for achieving the above objectives four basic streams were established:

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1 More information see https://www.surveymonkey.com
i) foresight workshops, ii) thematic foresight studies iii) white paper development and iv) an online platform. Tangible output of these activities include future scenarios for selected topics, future studies and reports and a dynamic ‘radar screen’ that matches and maps identified trends, technologies and ideas. Fig. 5 shows these streams and the results illustratively.

4.2.1. Foresight workshops & speedwriting

Foresight workshops are usually organized with the short-term goal to present material for a study, gather opinions on a specific topic and bring together the experts for this topic from the network partners. Besides common workshop formats such as brainstorming, speedwriting was adopted.

Speedwriting is more often employed in creative artistry, such as performance art or musical composition, than in management. Speedwriting as a tool for generating innovative ideas has old roots as classical brainstorming [82], having been introduced already in 1948 by Osborn [83]. It usually starts with a radical way of formulating observations on innovation. Subsequently, it proceeds with a session for noting down trends, ideas, and new concepts within the theme and discussing them with the peers present during the sessions. Thus, potentially new information can float freely between the workshop participants, concepts are discussed and inherently a common understanding of the topics at hand is created. Based on the group discussions and resulting clusters, writing groups are set up for each cluster that elaborate further on the chosen topic within a pre-defined timeframe.

The output of a completed speedwriting process is not a coherent report, even after editorial efforts. Typically, buzzwords, slogans, provisos, tacit assumptions, as well as shorter pieces of text are produced. That said, speedwriting output may serve as well as background- or inspirational workshop material.

4.2.2. Foresight studies

Foresight studies are an integral part of the foresight process in EIT ICT Labs. They provide deep technical and conceptual insights into new trends, ideas and technologies. Based on initial expert workshops the foresight foci are defined. Results of the workshops include clearly defined topics, Action Points, deadlines, and lists of relevant internal and external experts. For subsequent steps experts from the network are selected based on a competence repository that sports a profile of competencies and interests. Additionally, external experts might be invited if deemed necessary.

A designated researching and writing period follows the initial workshop. During this period the writing team is responsible for acquiring additional input from the known experts and their personal networks. The expert base at hand includes technical and thematic researchers, business experts, investment managers and executives from the partner organizations. Virtual meetings, e.g., through phone or video calls, Google Hangouts or other online tools, and physical meetings are arranged as part of this process. Foresight reports undergo a thorough quality check with a formal feedback form, an editing process, and professional publishing support is consulted before completion and publication of the reports. First, only EIT ICT Labs partners have access to the studies via the network’s Intranet and digital circulation. After a grace period of around three months the studies are disseminated publicly. The time lapsed from study initiating to its public dissemination is less than one year. This is a constraint adopted to vouch for timeliness and beyond state-of-the-art analyses of disruptions and their associated challenges and opportunities.

4.2.3. White paper development

White paper development is a second formal foresight process within EIT ICT Labs. They have a broader scope and

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Fig. 5. Foresight set-up in the EIT ICT Labs and results.

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cover sociological, political and business aspects in addition to technical aspects. Middle management in the network that usually has deep thematic knowledge commonly initiates white paper development. Subsequently, the white papers are produced by writing teams consisting of experts from industry, research institutes, and academia and entrepreneurs from the thematic area. These teams are encouraged to draw information from additional sources that would usually not be available on this scale, e.g. corporate reports, scouts from multiple organizations or scouting material that is usually reserved for internal use but made available to network partners.

Sketches of the reports are subject to two peer-review rounds. In the first round, the reports are quality-checked by experts from within the same thematic area that may subsequently be involved deeply in the further white paper development process. Also, it incentives the reviewing efforts with involvement in the publishing process later on. In the second round, an editing team peer reviews the paper again, providing an additional fresh informant perspective helping to reduce possibly biases. At a deeper level, the online tool supports the dynamic nature of knowledge creation since experts at any time can login and update the digital material. Hence, the reports and the white paper become static reports of a dynamic knowledge acquisition and employment process.

4.2.4. Online platform

Due to the geographical distribution and the network's virtual character an online platform was recognized indispensable for supporting the collection and assessment of information in the networked foresighting efforts [84]. The tool in use since 2012 is built upon Atlassian Confluence. Its use is manifold as internal conferencing tool for expert discussions, repository for profiles including competences and interests of experts, sharing material within the network without being hampered by company restrictions on the use of other collaboration and sharing platforms such as Dropbox, Skype, Google Drive or Chat, etc., and displaying items (trends, technologies, products, services, etc.) related to thematic fields dynamically on a ‘radar screen’.

The currently prototypical dynamic radar screen displays the items based on three criteria in three different ways: 1) six arcs of the virtual radar screen categorize an item into political, economical, sociological, technological, environmental and legal developments; 2) the distance from the centre reflects the immediacy of their occurrence or relevance and 3) the color reflects the type of item, i.e. product, service, or other. Similar tools are in use in large enterprises, e.g. Deutsche Telekom [85]. The prototype currently in use in the EIT ICT Labs online displays all information dynamically, i.e. upon change of an item (currently manually) the view changes immediately as well, see Fig. 6 for an example.

5. Early empirical data on networked foresighting

In the following sections early empirical data on networked foresighting in the EIT ICT Labs is shown and discussed in the light of the analytical framework provided before. Before the data for the analysis of the three key questions guiding the article is discussed, we discuss context information that was retrieved in the interviews and the survey.

5.1. Context

Context information is emphasized as important when describing and discussing management theories, e.g. by the contingency theory or, specifically for foresight systems, by Rohrbeck [2]. In our study we take into account the foresight settings in the partner organizations, the preferred ways of processing foresight results and the openness of the partner organizations.

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2 For more information about Atlassian Confluence see www.atlassian.com/software/confluence/
5.1.1. Foresight settings in partner organizations

The large majority of survey participants is aware of foresight activities in their partner affiliation (78.3%). The highest value comes from Multi-National Enterprise (MNE) participants. The lowest value, though still 68.4%, applies to research institutes (see Fig. 7).

The range of instruments applied as foresight instruments within the partner organizations is broad (see Fig. 8). In total, research institutes (RIs) as a group have the broadest range of instruments applied for foresighting, whereas academic institutes (AIs) apply the most limited set of instruments. Single MNEs apply more instruments on average. Noticeably, methods based on quantitative data like trend extrapolation and patent or publication analyses are conducted more often by MNEs and research institutes. Sophisticated instruments (in terms of time, reach and thus costs [77]) like scouting networks and environmental scanning can be found mostly in MNEs. MNEs and Small to Medium-sized Enterprises (SMEs) value qualitative instruments like expert workshops and business modeling equally. SMEs avoid effortful instruments like trend extrapolation, patent & publication analysis and life-cycle analyses.

Conclusion 1: Multiple foresight instruments are in use in all four types of partner organizations. Whereas MNEs apply nearly all listed foresight instruments, SMEs are reluctant to apply sophisticated and thus costly methods like patent and publication analyses, trend extrapolation and environmental scanning. Thus, whereas all partners may benefit from improved foresight, the benefit may be especially high for SMEs.

5.1.2. Processing of foresight results

The core results of the EIT ICT Labs foresight activities include studies and reports, and dynamically and up-to-date displayed foresight information that is accessible at all times. One of the core differences of these two output formats is editing. Study and report development follows a similar approach to scientific publications. This means they undergo thorough editing and usually several feedback iterations with the involvement of methodology and thematic experts until a final version is approved, published and distributed (see Section 4.2.4 for the detailed process description). This process takes between several months and one year.

In contrast, experts also have access to the online platform and may enter new data anytime. As soon as new input is entered the data is integrated into the dynamic radar screen (currently manually)—providing up-to-date information at all times.

Fig. 9 shows the partner affiliations’ preferences for processing the foresight results. In total, 51.4% prefer studies, reports or similar professionally edited but static output. 48.6% prefer up-to-date online visuals that are mostly unedited but dynamic. Most strikingly, respondents from AIs favor the former, while respondents from SMEs and MNEs prefer up-to-date information.

Conclusion 2: Reliable, edited, but static reports remain valuable and are especially important to the scientific ecosystem. In contrast, companies value dynamic, up-to-date, but unverified data due to their immediate applicability.

5.1.3. Openness

The EIT ICT Labs’ mission is to ‘drive European leadership in ICT innovation for economic growth and quality of life’ [86]. One of two pillars of the implementation of the EIT ICT Labs strategy is ‘catalyzing open and collaborative ICT innovations strongly driven by perceived market opportunities’ [86]. A key part of this is sharing available foresight data with fellow network partners. Our data—both interviews and the online survey—indeed point toward an open attitude among the affiliations. One interview partner

![Foresight within the network' partner affiliations](image)

Fig. 7. Foresight-awareness in EIT ICT Labs partner affiliations.

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(Researcher & Technology Lead Innovation Management, R&D department, MNE) put it as follows:

It was natural for our organization to join and use the EIT ICT Labs since we as organization embrace open innovation and the EIT ICT Labs are effectively an ‘open innovation network’. For the industry partners I expect the goal to be actually practice open innovation instead of just propagating it.

[Researcher & Technology Lead Innovation Management, MNE]

The survey provides more nuanced results (see Fig. 10). 9.8% of all survey participants stated that their affiliation shares no information at all. However, of those that are sharing information a third selects the information to share and another third shares selected information with selected partners only. Thus, in total 68.3% differentiate when sharing information. In line with this is a statement from the interviews:

Actually, they [the partners] don’t want to do open innovation but they want to be involved somehow and be open in one direction only: outside-in.

[Research Policy Director, RI]

When it comes to foresight in the network about two thirds (65.9%) of the respondents state that they make suchlike...
information available to fellow network partners, i.e. nearly all that make any information available at all.

Conclusion 3: Partners show a generally open attitude towards sharing some information. This was expected since only partners from within the network were part of the interviews and survey, thus they have already come to the decision to join this network with its core notion of open collaboration. This may be seen as backing for the choice of the case since our aim was to analyse networked foresight, openness for collaboration is a pre-condition for this.

Fig. 9. Preferred processing method for foresight results.

Fig. 10. Openness of partners as indicated by organizational sharing of foresight data.
Conclusion 4: Information is shared preferentially in a somewhat controllable environment. Noticeably, academic institutes are most reluctant while SMEs are most open. The reluctance of academic institutes comes rather unexpected since academic institutes increasingly adopt open access mandates—a policy compelled to making publications freely accessible. It is explicable for unpublished data that lacks processing. The openness of SMEs is in line with conclusion 1 that already points to the high potential of networked foresight for SMEs.

5.2. Relevance of network set-up for foresight in the EIT ICT Labs

Before focusing on potential value propositions of networked foresight the general relevance of the network approach can be doubted, i.e. whether the network set-up has any recognizable effects on the results produced. The following two quotes indicate at least perceived effects of the network approach for the interviewees:

Given the network and the different expertise and perspectives—industry, R&D, policy-makers—represented, ICT Labs is in a position to achieve a much better coverage than a single institution.

[Area Head, RI]

With a more differentiated set of participants in foresight studies, with their own expertise and inside knowledge, the foresight [results] will become more accurate and cover more ground.

[Researcher & Teaching Assistant, AI]

One operational issue is how to share the information as one respondent remarked: [We] don’t know where to drop [the information].

78.9% of the survey participants indicated that the foresight results of a networked organization such as the EIT ICT Labs could potentially gain better foresight results than their own affiliation. A principal scientist of a RI takes the same general line of argumentation but qualified his statements when stating:

Broader expert base, familiarity with a broader multiple perspectives (education, research, business) [are benefits]. On the other hand it may [prove] difficult to develop a common language and coherent ways of working.

[Principal Scientist, RI]

As this statement indicates the picture changes slightly when analysing the results in depth. Whereas SMEs, RIs and AIs show very high confidence in the networked foresight results (100.0%, 85.7%, 83.3%) respondents of MNEs were more reluctant (50.0%), see also Fig. 11. One of the MNE respondents put it as follows:

[It] depends on the topic, but mostly activities that are done internally are more focused on the specific needs of the company. ... We are also fully connected and more focused.

[Strategy Consultant, MNE]

This comment and another comment from a MNE respondent—’the question is whether there are different results’—emphasize that MNEs (at least those of the respondents) have own foresighting activities and that its employees are confident in their results.

Conclusion 5: Data from our studies indicates that networked foresight provides richer and broader data than that within organizational boundaries, allows for additional perspectives and is especially relevant for data collection and activity initiation within the partner organizations. This points towards increased
coverage, and accuracy of the results, allowing us to connect this to value propositions ES1, ES2, AR1 and AR2, i.e. sensing from a dynamic capabilities perspective. At the same time the data indicates that either i) our hypothesis that internal issues, i.e. internal needs, mental models and path dependencies (ES3, SD2, SD4), would benefit from a network approach is not sustainable or ii) the survey participants and interviewees fail to see the potential value for internal issues that we expect. This aspect is clearly in need of further research.

5.3. Value creation through networked foresight

The EIT ICT Labs do produce foresight output. In 2012, two foresight studies, three foresight technical Reports, an annual trend report, and four documented workshops with more than 100 participants in total were developed and published. Nevertheless, the question whether this output created any value remains valid. In the case of foresight results originating from the network this question can be divided into at least two parts: i) was any value created for the network partners and if yes, what kind of value? ii) was any value created for the network itself and if yes, what kind of value?

The EIT ICT Labs is by statutes and constituent conventions an instrument for achieving the goals of the stakeholders. In the case of the EIT ICT Labs these are its industry partners, research and academic institutes, and the European Commission (EC) representing European society. For the former three partners question i) applies. The interests of society were prescribed in the terms for eligibility of a consortium to be funded by the EC. Thus, they are at the very core of the network’s strategy and are enforced by its management, thus making question ii) valid here.

5.3.1. Partner perspective

In the literature review we summarized the known potential value propositions of foresight and linked these to the dynamic capabilities framework. In our survey we were able to poll for the value that EIT ICT Labs foresighting created for the partner organizations based on the value proposition groups 1–3 (VPGs) of our analytical framework. As result, we were able to rank our data according to the perceived value of the foresight results emerging from the network for the partner affiliations (Table 2).

97.37% of all respondents stated that data originating from foresighting within the network is reused within their affiliation and that it creates value at least on an irregular basis. Noticeably, the lowest ranks are all directly linked to internal activities such as make-or-buy decisions, searching for missing resources, and identifying internal needs. These items are closely bound to organizational characteristics, are strategy-related and are commonly strictly confidential information.

Conclusion 6: Network partners predominantly see value originating from networked foresight in the EIT ICT Labs for sensing and seizing dynamic capabilities whereas little value is seen for activities that involve internal matters (by less than 50% of all respondents on a regular basis). This result appears to be in line with conclusion 5 and points towards a need for further studies.

In several interviews and descriptive responses in the survey a general doubt about the reintegration of information into the affiliation’s context was implied. For this, multiple reasons are possible: 1) low quality or a lack of accuracy of the results (see, e.g., [33,37]); 2) missing fit of the results (see, e.g., [2]); 3) a lack of incentives and involvement of relevant people (see, e.g., [2]); and 4) a lack of absorptive capacity—the organization’s “ability to recognize the value of new information, assimilate it, and apply it to commercial ends” [69]. More precisely, in this case the adoption capacity might not be designed for or not be mature enough or for this kind of information.

Conclusion 7: Exploitation, absorption and adoption of networked foresight data in the network partner organizations is not yet clear and needs further investigation.

5.3.2. Network perspective

In addition to the value creation through foresight activities for the partner affiliations as described above, the interviews and survey responses point to several aspects that are related to the network itself, not the partner organizations.

Table 2

Ranking of potential value propositions of networked foresight based on its acknowledgement by the partners.

<table>
<thead>
<tr>
<th>Rank</th>
<th>VP</th>
<th>Dynamic capability</th>
<th>Potential value proposition (VP)</th>
<th>% of partners acknowledging value creation through foresight for VP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Regular</td>
</tr>
<tr>
<td>1</td>
<td>ES4</td>
<td>DC1</td>
<td>Ensuring state-of-the art innovation activities</td>
<td>81.58%</td>
</tr>
<tr>
<td>2</td>
<td>SD1</td>
<td>DC2</td>
<td>Consolidation of opinions and triggering of discussions</td>
<td>78.95%</td>
</tr>
<tr>
<td>3</td>
<td>ES5</td>
<td>DC2, DC3</td>
<td>Triggering new innovation activities</td>
<td>65.79%</td>
</tr>
<tr>
<td>4</td>
<td>ES1</td>
<td>DC1</td>
<td>Identification of relevant external change</td>
<td>56.41%</td>
</tr>
<tr>
<td>5</td>
<td>SD3</td>
<td>DC2</td>
<td>Initiation or moderation of strategic change</td>
<td>53.85%</td>
</tr>
<tr>
<td>6</td>
<td>SD5</td>
<td>DC1</td>
<td>Creation of a common view of things within the organization</td>
<td>50.00%</td>
</tr>
<tr>
<td>7</td>
<td>SD2</td>
<td>DC2</td>
<td>Challenge and change of existing mental models</td>
<td>41.03%</td>
</tr>
<tr>
<td>8</td>
<td>ES2</td>
<td>DC1</td>
<td>Early identification of competitors’ concepts and strategies</td>
<td>35.90%</td>
</tr>
<tr>
<td>9</td>
<td>SD4</td>
<td>DC2, DC3</td>
<td>Support for breaking-away from path dependencies</td>
<td>30.00%</td>
</tr>
<tr>
<td>10</td>
<td>AR2</td>
<td>DC1</td>
<td>Identification of new business models</td>
<td>28.95%</td>
</tr>
<tr>
<td>11</td>
<td>ES3</td>
<td>DC1</td>
<td>Identification of new internal needs</td>
<td>25.00%</td>
</tr>
<tr>
<td>12</td>
<td>AR1</td>
<td>DC1</td>
<td>Search for, identification and evaluation of missing resources</td>
<td>23.68%</td>
</tr>
<tr>
<td>13</td>
<td>AR3</td>
<td>DC2, DC3</td>
<td>Supporting make-or-buy decisions</td>
<td>15.38%</td>
</tr>
</tbody>
</table>

* The ranking is based on % of partners acknowledging regular value creation for the stated item.
First, shaping and driving the ecosystem. In the case of the EIT ICT Labs the network was initiated to improve welfare of European society by driving European leadership in ICT innovation [78,88]. One capability that a network needs to possess for achieving this is shaping the innovation agenda to actually set the topics for the future instead of reacting to it, corresponding to AV2. For being able to set the innovation agenda a fundamental acceptance and reputation in the focal topic is essential. Also, the possibilities to have any effects on the environment appears to be higher in networks. Accordingly, the organization needs to be known for contributing highly valuable and novel input to the ecosystem, i.e., thought leadership needs to be achieved [2,80]. As an R&I Director (MNE) stated networked foresight helps ‘[l]eadinjg the innovation front in EIT’, a Project Manager (RI) directly mentioned ‘[s]hape the innovation agenda’ as one of the benefits of networked foresight. The statement ‘to provide evidence on new innovation opportunities to its ecosystem’ of the COO of a research institute implies the underlying assumption that networked foresight in the EIT ICT Labs might shape the environment. Likewise, a Senior researcher (MNE) stated that to ‘[c]ontribute to and initiate development in the ICT area’ is one of the benefits of foresight activities of the network.

Influences on the ecosystem as value proposition for the network partner (AV2) can be caused in various ways, e.g. through exploitation of market power, i.e. considerations according to the competitive forces framework [89] or by provoking reactions through competitive moves based on game theoretical assumptions [28], or by working collaboratively with other actors to shape influencing factors and other actors in a beneficial way as possible in the EIT ICT Labs. Thus, this value proposition seems identifiable on the partner level and the network level—assumed the goal of the network is in line with this.

Second, generation of external visibility for the network. Visibility is not considered a value in itself but may act as enabler for shaping and driving the ecosystem, AV2. This aspect could be classified as secondary benefit. Still, multiple interviewees and survey respondents identify visibility explicitly—i.e. by naming it—as benefit, e.g. a Research & Teaching Assistant (AI), the Head of Technology Exploration (SME) cited above, a Project Manager (RI), and a Business Accelerator (AI).

Conclusion 8: Respondents emphasize the possibility to shape and develop the ecosystem through the network. This value proposition is identifiable on the network partner and the network level—assumed the network’s aim include shaping the environment. Increased visibility for the network through the foresight activities was pointed out several times but is considered as important support for shaping the ecosystem only since visibility is not a value in itself in this context.

Third, development of a shared vision. For example a Principal Scientist (RI) identified ‘shared visions and reference frames’ as key benefit for the network. A Business Development Manager (RI) mentioned ‘helping planning future activities’, and a Management Consultant (MNE) stated that ‘better alignment’ is an important aspect of networked foresight for the network organization. The aspect is somewhat linked to the item AV1 ‘support of organizational learning’ and ‘support for breaking away from path dependencies’. Emphasis by the respondents was put on shared vision not learning, thus differentiating these two aspects. As for path dependencies Teece, Pisano and Shuen [1] noted ‘[w]here a firm can go is a function of its current position and the paths ahead. Its current position is often shaped by the path it has travelled.’ The value of a shared vision might be ambiguous in the light of this finding. From a backwards-looking point of view in the future the development of a shared vision in the presence might have limited the paths ahead. On the other side, the development of shared visions might serve to drive internal change in the network organization. For example, scenarios development was found to create emotional capacity, which—in turn—is regarded as vital for driving internal change especially in rapidly changing environments [22,90].

Conclusion 9: The data points towards the development of a shared vision for the network as potential value proposition. In the light of our theoretical framework a shared vision can be related to the recombination and reconfiguration dynamic capabilities via the collaborative development process that is the basis of a shared vision.

Finally, for initiating, conducting and driving innovation in a certain field the best possible partners need to be brought together. The availability and backing of a strong partner network from different fields (different industries, types of partners) is necessary to enforce the ambitious goals of the network [26,80]. In line with this, a Strategist (MNE) mentioned ‘bringing together many experts from Europe’ as value. The Head of Technology Exploration in an SME identified the activities as ‘basis for partnering’ just as a Scientific Director (RI) did by stating that to ‘identify right actors or partners’ is a key value of the foresight activities in the network. Teece, Pisano and Shuen [1] relate partnering directly to (inter-)organizational learning (AV1): ‘[t]he concept of dynamic capabilities as a coordinative management process opens the door to the potential for interorganizational learning. Researchers ([91,92]) have pointed out that collaborations and partnerships can be a vehicle for new organizational learning, helping firms to recognize dysfunctional routines, and preventing strategic blindspots.’

Conclusion 10: our data supports the general findings of partnering as vehicle for organizational learning specifically for networked foresight.

6. Discussion

The aim of this study was to determine the advantages of a network approach to foresight and to explore the value this approach might create. As discussed in the theory section, the analysis of value creation can be applied on multiple levels. We focused on the network partner level and the network organization itself for our analysis. The analysis of the alleged value proposition of networked foresight on these levels was not easy due to three reasons. First, the phenomenon is not yet formalized and clearly defined and even less the activities that may be categorized as networked foresight activities. Second, available research on potential value propositions of foresight focuses on firms, mostly MNEs. Thus, we expect that our collection of value propositions for research institutes and especially academic institutes is incomplete and thus the conclusions we may draw at this time as well. Third, although foresight that could be characterized as ‘networked foresight’ appears to be in use, in practice this may go unmanaged or even unnoticed [10]. This meant that it was not possible to create a comprehensive comparable study of multiple entities
that run networked foresight processes. Thus, for our study we relied on an explorative, qualitative study of the EIT ICT Labs as a network that created a foresight process with the clear intention to i) work in a multi-party, network setting, and ii) use the created knowledge for the network itself and to make the information available to its partners—even those that do not participate in the process [76]. If the use of networked foresight spreads and its characteristics are defined clearly we expect that it becomes possible to create larger samples that could then be utilized for quantitative research allowing statistical evaluations and coming to generalizable statements.

Our data is based on data from semi-structured interviews with people that are involved in the EIT ICT Labs to some degree and a survey among foresight practitioners that were involved in the EIT ICT Labs Innovation Razor. Thus, an unwanted bias in favor of networks will be present weighing into the very high values for some VPs. We still see support for the hypothesis that networked foresight creates value since the respondents are predominantly aware or involved in foresight activities in their partner affiliation, allowing the assumption that basic knowledge about foresight is present.

By design the study does not create generalizable results. Still, we hope to raise awareness for the phenomenon and have been able to add to knowledge of what organizations, including the network organizations themselves, may and may not expect when involving in foresight in a network set-up.

7. Conclusions

The aim of this article was to explore and better understand the use and potential value creation of foresight in networks, in this article referred to as networked foresight. Potential value contributions that were identified in the literature review were based on and categorized according to Rohrbeck, Schwarz and Thom’s research [19–22] and cross-linked to Teece’s dynamic capabilities approach [1,13–15,18]. This not only helped to prepare the analysis of the alleged networked foresight phenomenon but also to ground the study in strategic management. It also helped to understand the two levels of analysis that were considered for this study—the network organization and the network partners. We analysed the Innovation Razor of the EIT ICT Labs in detail, i.e. 49 persons with different functions in the network and the partner affiliations were interviewed and a survey with foresight practitioners that are linked to the network was conducted.

Evidence for potential effects of a networked approach to foresight can be found in literature and in our empirical data. First, research on foresight frequently highlights the importance of sourcing information from external sources, e.g. in the special issue of Technological Foresight and Social Change in 2010 (volume 77, issue 9). In the recent past, research specifically aiming to explore collaborative or networked foresight gained traction as well. Second, the dynamic capabilities approach highlights the importance of partnerships, alliances and involvement of external partners from its beginnings. Finally, we draw from research on multi-party cooperation and organizational design that recently covered inter-organizational networks in a special issue in Organizational Dynamics (volume 39, issue 2). In general, our empirical data backs our assumptions that networked foresight creates value. More specifically, it points to a larger value creation potential for SMEs. In the EIT ICT Labs partner network, SMEs were found to hesitate to apply sophisticated, complex and thereby expensive foresight tools. Thus, in a network that conducts comprehensive networked foresight they may benefit overproportionally compared to MNEs.

When it comes to value creation for network partners our data emphasizes the broadened knowledge and asset base that becomes available through a network approach. Summarized based on our two-dimensional analytical framework, the data shows that the networked approach seems to be valuable for the value propositions that are grouped under the dynamic capability sensing—spreading through three groups from a foresight point-of-view. Specifically, all activities that relate to scanning, identification and searching for new information and external change ranked high. Substantial value contributions to internal organizational settings, internal needs and decision-making seem to be out of scope. This contradicts our expectation based on the literature review and points to additional research needs. Finally, our findings for the potential value proposition shaping the future are twofold. First, statements indicate the network setting is valuable for partners since they may actively engage in shaping the future and the ecosystem. Second, respondents suggest it as valuable for the network organization as well, supported by increased visibility of the network through networked foresight. However, this might be attributed to the overall goal of the EIT ICT Labs as an instrument to shape and drive innovativeness in Europe.

When considering the EIT ICT Labs network as organization itself the development of a shared vision was emphasized as value that is created through the EIT ICT Labs Innovation Razor. In terms of our theoretical framework development of a shared vision can be related to the recombination and reconfiguration of dynamic capabilities via the collaborative development process that is the basis of a shared vision.

Several items in our study were identified as in need of further investigations. First, the differences of potential value propositions for the different types of partner organizations need further research, specifically the differences between MNEs and SMEs remain vague. Second, our data is conflicting to theoretical deductions concerning the potential value for internal use of foresight insights won through networked foresight. While theory let us believe that this is clearly a value proposition of networked foresight, our empirical data indicates otherwise. Likely related to this is the impact of absorptive capacity for foresight information from a network. We believe that there are substantial differences in the absorptive capacities of partners between information that is generated in an internal foresight entity to information that was generated in a network—even if internals were involved in the network.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.techfore.2014.02.002.
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Tobias Heger is an innovation manager at the EIT ICT Labs Germany GmbH and a research associate at the Chair for Innovation Management and Entrepreneurship of the University of Potsdam. His research interests are corporate and networked foresight, new business field exploration and innovation networks as well as innovation in information and communication technologies.

Magnus Boman is a professor in Intelligent Software Systems at KTH/ICT/SCS and an expert researcher at SICS, a part of Swedish ICT. He leads the Innovation Radar catalyst for EIT ICT Labs since July, 2011. He is an alumnus of IIASA, a TED member, and a mentor for students of entrepreneurship at the NUS Overseas College at Stockholm.