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Leveraging value in multi-stakeholder innovation networks: A process framework for value co-creation and capture

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ABSTRACT

To develop innovative solutions for complex societal and scientific challenges, organizations need to move beyond the boundaries of single firms and engage in collaborative networks. In these networks, multiple, diverse stakeholders are working together to co-create innovative value. Co-creation in a network creates new challenges in terms of changed processes and outcomes. Guided by grounded theory methodology, we explore these aspects by studying a public–private partnership involving 57 stakeholders. We take the number and diversity of stakeholders into account to shed light on the distinct processes through which value is co-created and captured. We also identify the types of value outcomes that accrue to the network and its participants. Overall, we present a multi-level cyclical process framework for leveraging value in multi-stakeholder collaborations and visualize these collaborations as a value space in which all stakeholders are uniquely positioned. In doing so, this study provides novel insights into the systemic, multi-actor nature of value co-creation and supports collaborators in maximizing value for both individual stakeholders and the network as a whole.

1. Introduction

The complexity of markets is forcing organizations to shift from the creation of offerings in isolation to the co-creation of value in collaborative innovation networks (Filieri, McNally, O'Dwyer & O'Malley, 2014). Because no single organization owns all the required expertise, knowledge, and credibility to develop innovative solutions to today's complex scientific and societal challenges (Lusch, Vargo & Tanniru, 2010), diverse stakeholders are interacting (e.g., in public–private partnerships) to create multiple types of value that transcend the boundaries of individual organizations (Nissen, Evald & Clarke, 2014).

In these multi-stakeholder collaborations, at least three aspects require consideration that have received limited attention in previous research. First, traditional firm-level outcomes such as patents or market share no longer fully represent the range of value created for diverse stakeholders in a network (Provan, Fish & Sydow, 2007). Because value co-creation in a network is more ambiguous (Dougherty & Dunne, 2011) and value perceptions are likely to differ between partners (Lepak, Smith & Taylor, 2007), new insights are required to determine which outcomes drive effectiveness in multi-stakeholder collaborations. Second, though distinct network-level features, such as collaborative processes and stakeholder characteristics, have become more relevant in multi-stakeholder settings compared with single-firm or dyad settings (Corsaro, Cantù, & Tunisini, 2012), few studies examine how value co-creation unfolds among multiple stakeholders at the network level (Freytag & Young, 2014). Third, we need to understand not just how value is created but also how stakeholders capture their share of value. If this process is unclear, stakeholders might be more conservative in their actions or less likely to participate in the network (Nambisan & Sawhney, 2011). For this reason, there is a need to examine the processes of value capture and their relationships to value creation (Adegbesan & Higgins, 2011).

Our research purpose is to focus on each of these aspects to advance our understanding of value co-creation and value capture in the multi-stakeholder setting. Our specific research questions are: (1) Why do stakeholders participate in innovation networks? (2) How is value created and captured in innovation networks with multiple, diverse stakeholders? (3) How does the number and diversity of stakeholders influence value co-creation? Because few studies provide sound theoretical or empirical guidance on these topics, we take an inductive, grounded theory approach (Glaser & Strauss, 1967). Moreover, because multi-stakeholder collaborations represent complex processes, we use theory building from a single case study (Eisenhardt & Graebner, 2007). We ground our research in value creation, innovation, and stakeholder theory and present theoretical contributions to each of these literature streams.

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We contribute to value creation literature by explaining how value is leveraged in multi-stakeholder collaborations. We regard value leveraging as the overarching process of both value co-creation (network level) and value capture (stakeholder level). In line with Bizzi and Langley (2012), we take a process view to explain the dynamic pathways through which value is created and captured during collaborative innovation. By conceptualizing these processes as a virtuous cycle, we respond to calls to move from one-directional, structural equation models to system thinking (Vargo & Lusch, 2011; Woodside, 2005) and broaden our understanding of value creation.

We also offer a broad perspective that extends the point of view beyond a single organization. We thereby contribute to innovation literature by going beyond traditional firm-level innovation outcomes to identify multiple types of value created for individual stakeholders and the entire network.

Finally, we contribute to stakeholder theory by acknowledging potential differences between stakeholders and how those differences influence value creation. We argue that multi-stakeholder collaborations can be regarded as value spaces in which all stakeholders are uniquely positioned, depending on the outcomes they wish to achieve. Following calls by Aarikka-Stenroos, Sandberg and Lehtimäki (2014) and Vargo and Lusch (2011), we take the increased complexity of multi-actor systems into account.

2. Theoretical background

Our study draws on value creation, innovation, and stakeholder literature; we discuss each aspect separately before elaborating on their intersections. First, value creation research, particularly the service-dominant (S-D) logic, has put value at the center of research attention. Two foundational premises formulated by Vargo and Lusch (2004, 2008)—"value is always co-created" and "all social and economic actors are resource integrators"—point to the increasingly interconnected, collaborative nature of value creation (Vargo & Lusch, 2011). According to S-D logic, the interaction between actors creates value by integrating resources and capabilities (Vargo & Lusch, 2008), i.e., the co-creation of value. In line with McColl-Kennedy, Vargo, Dagger, Sweeney and van Kasteren (2012, p. 375), we regard value co-creation as the "benefits realized from integration of resources through activities and interactions with collaborators". We are particularly interested in the interaction and knowledge-sharing elements that underlie the co-production dimension of value co-creation (Ranjan & Read, 2014). In our study, we build on the S-D logic to look at co-creation in a complex and dynamic multi-actor system in which multiple types of value are created for diverse actors, which we refer to as stakeholders.

Second, from an innovation perspective, research shows that the locus of innovation is increasingly moving from the firm level to the network level (Schilling & Phelps, 2007). Recent work examines innovation networks as distinct organizational designs for innovation with unique processes that differ from traditional organizational models (Fjeldstad, Snow, Miles & Lettl, 2012). We build on research that examines how several factors (e.g., knowledge transfer and social capital) allow different types of networks (e.g., business networks, alliances, deliberately designed innovation networks) to create innovative value collectively (Freytag & Young, 2014). Authors make a further distinction between orchestrated networks (Dhanaraj & Parkhe, 2006) and networks that cannot be managed by one institution alone (Möller & Rajala, 2007). We look at how innovation is organized in a network in which no single firm is in charge (i.e., consortium model) but stakeholders act as partners whose characteristics need to be balanced.

Third, the stakeholder theory of the firm points to the importance of taking external stakeholders into account, thereby broadening the focus beyond consumers to "any person, group, or organization who affects and/or is impacted by an organization's decisions" (Freeman, 1984, p. 46). Donaldson and Preston (1995) elaborate on stakeholder theory by distinguishing three types: normative, instrumental, and descriptive/empirical. Prior research has focused on stakeholder theory from a normative perspective, for example, by addressing how firms should respond to stakeholder pressures (Driessen & Hillebrand, 2013). In our study, we build on empirical and instrumental research that describes the organization's stakeholders and explains their effect on performance (Bridoux & Stoelhorst, 2014). In particular, we investigate how diverse stakeholders, such as pharmaceutical companies and universities play an important role in various parts of the co-creation process.

These three literature streams have greatly contributed to extending theoretical perspectives on business-to-business (B2B) research by shifting the focus beyond the boundaries of a single firm and emphasizing a more complex, collaborative approach. Researchers have begun to integrate these theories to address phenomena at the intersection of the literature streams. Initial studies of the value creation–innovation intersection shed light on antecedents of value creation derived from different theoretical backgrounds, such as the resource-based view of the firm and network theory—including a firm's capabilities, routines, and social networks (Mahoney, McGahan & Pitelis, 2009). However, these studies focus mostly on how individual firms create value for themselves through co-innovation (Jacobides, Knudsen & Augier, 2006), without accounting for the role of actors' heterogeneity (Corsaro, Cantù, et al., 2012). We extend this research by going beyond the firm level of analysis to study the increased challenges of dealing with a variety of stakeholder interests at the network level.

Recent studies of the stakeholder-innovation intersection increasingly recognize the role of stakeholders' heterogeneity. They have distinguished between public and private partners (Nissen et al., 2014) and included a wider set of actors such as businesses, government agencies, users, investors, and research organizations (Rampersad, Quester & Troshani, 2010). However, few studies identify the exact number and diversity of stakeholders in the network under study. Moreover, many studies revolve around how innovation in a network can be facilitated, focusing on a single antecedent, (e.g., innovator roles; Goduscheit (2014)) or outcome (e.g., knowledge transfer; Filieri et al. (2014)). We extend these studies by clarifying the dimensions along which stakeholders differ and identifying the unique innovation processes and outcomes that underlie value co-creation with multiple stakeholders.

With regard to the intersection of stakeholder theory and value creation, researchers have paid attention to the drivers and dimensions of value creation (Eggert, Ulaga & Schultz, 2006) and studied how actors perceive and interpret value (Smals & Smits, 2012). Although such research acknowledges the importance of understanding and building value (Lindgreen, Hingley, Grant & Morgan, 2012), its context has been limited to the study of value creation in buyer–seller relationships and excluded the interplay between value creation and capture. Moreover, the value drivers and processes identified in these studies cannot be directly transferred to the innovation context, which has distinct processes and outcomes, such as the creation of new business models and networks. As proposed by Frow and Payne (2011) and Jaakkola and Hakanen (2013), we extend these insights by studying the broader network of stakeholder relationships and examining how innovative value outcomes are shared by actors.

Although research in the field provides valuable insights, there is little detailed theoretical guidance on how to co-create and capture value with multiple stakeholders in an innovation context. To our knowledge, few studies focus on the point at which the three literature streams coincide. Therefore, we integrate innovation, value creation, and stakeholder theory to study the distinct processes that determine how unique types of innovative outcomes can be leveraged, i.e. created and captured, to provide value to stakeholders in complex B2B innovation networks.

3. Methodology

Our study is based on a qualitative, grounded theory methodology as formulated by Strauss and Corbin (1990). In the following sections, we describe our research process.

3.1. Research context

The health care industry provides a setting in which the co-creation of value by multiple stakeholders is necessary for innovation. The Innovative Medicines Initiative (IMI) was set up in the European Union to stimulate innovation by supporting collaborative research projects between industrial and academic partners. The European Medical Information Framework (EMIF) project is a public–private partnership supported by IMI, with the aim of developing an information framework that allows access to patient-level data on a larger scale and at a higher level of detail than currently possible, offering new insights into diseases and treatments. To guide the development of the framework, EMIF is initially focused on research questions pertaining to Alzheimer's disease (AD) and metabolic complications (see Fig. 1).

The EMIF consortium consists of 57 public and private partners, with over 300 participating individuals and 14 European countries represented. Private partners include nine European Federation of Pharmaceutical Industries and Associations (EFPIA) members and eight small and medium enterprises (SME). The EFPIA partners are pharmaceutical companies that develop and manufacture medicines for human use in Europe. The SMEs involved in EMIF can be divided into two groups: consulting firms that support the management of EMIF and data custodians with a business model that revolves around the collection and sales of patient data. Most EMIF partners are public, including 37 research institutions such as universities, public bodies, and non-profit groups and three patient organizations. The research institutions have a clear scientific role, whereas the patient organizations represent the voices of patients and disseminate results to the wider public.

3.2. Data collection and analyses

3.2.1. Sampling procedure

We selected our case using purposeful sampling. In collaboration with a leading pharmaceutical company, we chose one information-rich case study, i.e. the EMIF project. The project is well suited to our research purposes for three reasons. First, it represents an extreme example of a multi-stakeholder collaboration in terms of the number and diversity of stakeholders involved. This size and diversity allowed us to include a wide variety of stakeholder perspectives from different organizational and functional backgrounds. Second, due to the large number and heterogeneity of stakeholders, we could clearly distinguish how their characteristics affected the co-creation of value. Third, the extent of collaboration made it possible for us to distinguish clearly between network and stakeholder levels of analysis, thereby supporting a multi-level approach to studying how value is leveraged. For these reasons, this single case allowed us to explore an unusually revelatory example of a multi-stakeholder collaboration (Eisenhardt & Graebner, 2007).

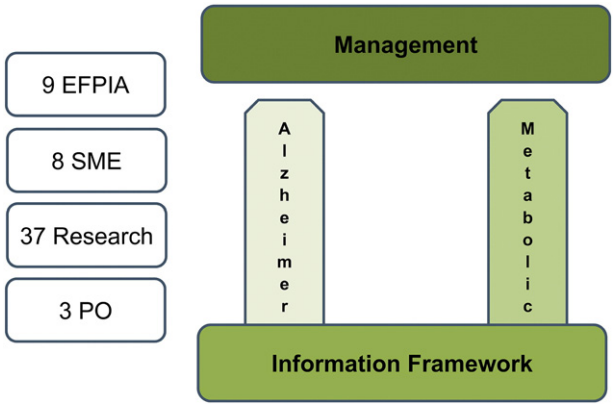

Fig. 1. Overview of EMIF structure. The EMIF consortium consists of nine European Federation of Pharmaceutical Industries and Associations (EFPIA) members, eight small and medium enterprises (SME), 37 research institutions and three patient organizations (PO). The work load is divided into four parts: (1) developing the information framework, (2) research on Alzheimer's disease, (3) research on metabolic complications, and (4) managing the consortium.

3.2.2. Data collection

Over ten months, we collected data from three sources: in-depth interviews, project documents, and prolonged engagement at the research site. First, we conducted 29 in-depth semi-structured interviews with key informants from the various stakeholders in EMIF (see Appendix A). We selected interviewees using a combination of formal and snowball sampling. Following grounded theory guidelines, we ceased the sampling process when we reached theoretical saturation, with no new insights generated from additional interviews. During the interviews, we used a semi-structured interview guide consisting of three main topics, in line with our research questions (see Appendix B). Following introductory questions, we asked respondents to describe how they were experiencing the collaboration and how the project was organized. We also asked them to elaborate on the role of multiple stakeholders and describe the outcomes they expected to receive from the collaboration. Interviews were recorded and transcribed verbatim. Second, we used internal project documents as a source of information. We were granted access to the online communication platform used to share documents, such as the project proposal, meeting minutes, and presentations. Third, one member of our research team had a passive, unobtrusive presence at the office in which the overall project was coordinated. This ongoing presence allowed us to gain a deeper understanding of how the collaboration was evolving, pick up on events that occurred, and have informal discussions. Interesting insights that emerged in this way were noted verbatim.

3.2.3. Analysis and interpretation

Following grounded theory guidelines (Strauss & Corbin, 1990), we employed a systematic procedure for analyzing our data. In the first round, we applied open coding and labeled passages, paragraphs, sentences, phrases, and/or words relevant to our research questions, staying as close to the data as possible (Charmaz, 2005). We did not start with a coding scheme; instead we allowed the codes to emerge during the coding process, following an emic approach for bottom-up theory construction. In the next step, we conducted axial coding by putting the empirically grounded codes together and grouping them into higher-order conceptual constructs (Spiggle, 1994). After coding the first few transcripts, open and axial coding began to occur simultaneously. We then applied selective coding techniques to seek patterns in our concepts and specify relationships between them, resulting in a conceptual overview. We conducted the coding procedure using the specialized qualitative text analysis software Nvivo.

3.2.4. Assessment of trustworthiness

To guide our case study methodology, we followed the guidelines presented by Piekkari, Plakoyiannaki and Welch (2010) on good case research in industrial marketing. To ensure the trustworthiness of our findings, we applied validation techniques and evaluation criteria recommended by grounded theory researchers (Lincoln & Guba, 1985; Strauss & Corbin, 1990). To increase the credibility of our study, we triangulated data from interviews, field notes, and project documents to collect rich data from the perspective of our respondents. We ensured the confirmability of our results by following the progress of the collaboration and conducting multiple visits at the coordinating office. We also sought respondent validation by presenting our findings to the EMIF participants at multiple stages, thereby further improving the confirmability and credibility of our results. In turn, we could generate credible and relevant theories for the participants in our research, reflecting a key aspect of grounded theory as described by Glaser and Strauss (1967).

4. Leveraging value in multi-actor systems: conceptual overview

Fig. 2 represents our inductively derived conceptual overview. It shows (1) value outcomes, (2) the processes through which they are co-created and captured, and (3) stakeholder dimensions as boundary conditions (see Appendix C for additional quotes).

4.1. Value outcomes

Three types of value outcomes emerged from our interviews: innovation, knowledge, and relational. As Table 1 shows, the concrete translation of these outcomes differed depending on the level of analysis (network or stakeholder level) and type of stakeholder (public or private).

4.1.1. Innovation outcomes

The first outcome was related to the development of innovative solutions to the defined research problems. At the network level, it entailed tangible, applied project outcomes, such as the establishment of an information framework and identification of biomarkers for Alzheimer's disease and metabolic complications. Respondents were also concerned about ensuring sustainability beyond the end of the project. They regarded the creation of a sustainable business model as a second network-level innovation outcome, offering value propositions for a wider range of stakeholders than those involved in EMIF.

When we probed indicators of added value at the stakeholder level, we found that network-level innovation outcomes enabled individual partners to improve their internal processes. Pharmaceutical companies were able to improve their research and development processes through better designs of clinical trials and by collecting post-launch information. These improvements supported the development of new diagnostics, medicines, and treatments, leading to better patient care. For research institutions, added value was associated with improved research processes. The co-created innovation outcomes—that is, the information framework and biomarkers—allowed them to exploit their research processes, in terms of publications and further dissemination and application of their research results.

4.1.2. Knowledge outcomes

The second outcome related to knowledge co-created by stakeholders. Three types of knowledge emerged from the interviews: technological, market, and managerial. Technological knowledge was associated with aspects such as how specific tools were implemented or how patient-level data were used and analyzed. Market knowledge pertained to a deeper understanding of the diseases and characterization of the patient populations under study; by pooling patient-level data, new insights could be gained into the evolution of diseases and the characteristics of patients suffering from the diseases. Managerial knowledge was associated with the collaboration process and how it could be organized and improved.

By tapping into these co-created knowledge outcomes, individual participating organizations were able to develop in-house knowledge. Our respondents differed in the way they viewed the value of these knowledge outcomes for their respective organizations. Pharmaceutical company respondents showed an interest in gaining knowledge about which technologies were most valuable and how data could be understood and applied. They also recognized the added value of gaining market knowledge because it allowed them to have a deeper understanding of patient populations and disease areas of interest to their organizations. In addition to technological and market knowledge, interviewees from both pharmaceutical companies and SMEs emphasized the value of improving their managerial knowledge. Their participation in EMIF allowed them to develop strategies related to the issues being explored by EMIF; it broadened their visions, challenged their procedures, and identified new opportunities. For research institutions, the benefits of EMIF mostly revolved around gaining technological knowledge and market knowledge in line with their own research questions.

4.1.3. Relational outcomes

Respondents perceived the creation of a network of relationships as a final important outcome. The collaboration of 57 stakeholders created connections between top organizations and experts. EMIF acted as a level playing field that lowered barriers to discussions with other stakeholders, including organizations that were direct competitors outside the project. The establishment of connections between organizations and experts also resulted in the co-creation of a new network of resources. For example, sharing data sets enabled them to conduct effective and efficient research with larger sample sizes.

By being a part of the EMIF network, both public and private stakeholders were able to improve their positions in their respective networks. On the one hand, stakeholders increased their numbers of connections by meeting new partners. On the other hand, organizations became better

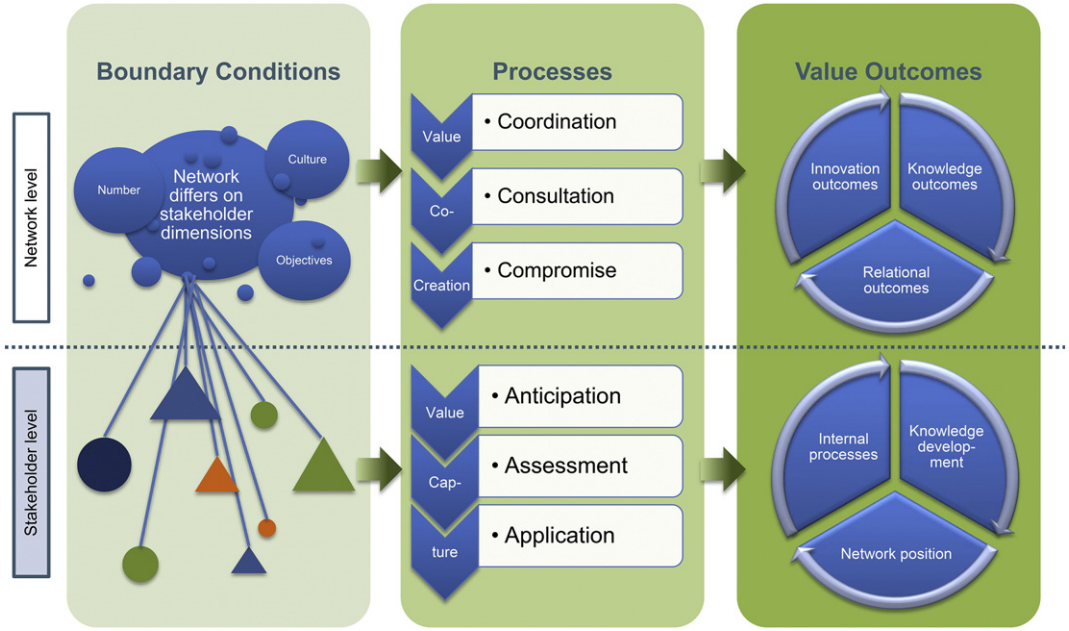

Fig. 2. Conceptual overview.

Table 1
Value outcomes at network level and stakeholder level.

	Innovation outcomes	Knowledge outcomes	Relational outcomes
Network level	• Developed solution "*To have integrated several major databases and by virtue of this information, to come up with some new biomarkers that will allow us to make a better diagnosis*" (*EFPIA2*, *interview28*) • Sustainable business model "*To have a platform that helps explore patient-level data in a better way and that can be offered to the outside world so that better and faster studies can be done that will improve healthcare in global*" (*SME1*, *interview15*)	• Technological "*Technical things such as how to merge datasets*" (*Research4*, *interview21*) • Market "*The goal of EMIF metabolic is to better understand obesity and core morbidities of obesity*" (*EFPIA4*, *interview17*) • Managerial "*You are obliged to work together in these projects, so it is kind of a training school*" (*EFPIA2*, *interview10*)	• Top organizations and experts "*You widen your relation network and perhaps this is the most important deliverable of these kind of projects, because outside of these project we also find each other*" (*SME2*, *interview7*) • Resources "*The data that we get now, we wouldn't get it if we would go solo, by ourselves we don't have access to that data or those partners, so the collaboration is very important*" (*EFPIA2*, *interview4*)

Stakeholder level	Improve internal processes		In-house knowledge development		Improve network position	
	Private partners "*EMIF will produce some incredible deliverables, namely that we can better perform our trials and improve the development of new and effective therapies*" (*EFPIA5*, *interview13*)	Public partners "*Half of the partners are academic so they should be interested in producing research and publications*" (*Research1*, *interview18*)	Private partners "*Senior management has put together a team to look at our overall strategy for real world data, so EMIF is an important part of that to understand how can we better utilize existing data for our purposes*" (*EFPIA3*, *interview14*)	Public partners "*Gaining knowledge about putting data into a network*" (*Research1*, *interview18*)	Private partners "*You have to make sure that you collaborate really well within those 5 years so that you can prove that you can collaborate and then you can collaborate again*" (*EFPIA2*, *interview2*)	Public partners "*It helps us have these contacts with the academics and pharmaceutical* companies, *so in the area we are working, it is really important to have this experience*" (*Research3*, *interview12*)

embedded in a group of collaborating partners in order to ensure future collaboration.

4.2. Value leveraging processes

Value outcomes were not achieved in isolation; they were the result of specific network-level and stakeholder-level processes that allowed the creation and capture of value (see Table 2).

4.2.1. Network level: value co-creation processes

Value was co-created when stakeholders interacted and contributed resources to jointly address agreed-upon research questions. When we asked respondents about the resources they contributed, both public partners and private partners identified their expertise, experience, knowledge, tools, infrastructure, and relationships. These resources were combined through simultaneous interactions between stakeholders. When our respondents elaborated hereon, three distinct processes emerged from the interviews: coordination, consultation, and compromise.

First, value co-creation required coordination of stakeholders and their activities. In EMIF, industry and academic representatives were jointly responsible for coordinating work between partners. This coordination required planning and following up on various activities and stakeholders. It also included sharing information between stakeholders to stimulate synergies and prevent overlap of activities. In addition, coordination required management of the needs and expectations of stakeholders and understanding of their contexts.

Second, value co-creation involved a consultation process between stakeholders. Consultation took place during regular face-to-face or telecom meetings. During the meetings, partners were invited to share and discuss thoughts, ideas, needs, and expectations. This consultation process was described as inclusive and participatory, such that it stimulated open dialogue.

Third, value co-creation in a multi-stakeholder endeavor required compromise. In the consensus model adopted by EMIF, all parties had to listen to and reconcile each other's points of view before making decisions. This gradual approach balanced multiple interests, motives, and expectations.

4.2.2. Stakeholder level: value capture processes

At the stakeholder level, processes were in place to allow stakeholders to benefit from network-level outcomes. We identified three distinct stakeholder-level processes. First, value capture depended on an

Table 2
Value creation and capture processes as value leveraging.

Value creation processes	Value capture processes
• Coordination "*The individual pieces have to be built into a nice pyramid which is strong enough and that takes a lot of planning and following up at all levels*" (*Research2*, *interview19*)	• Anticipation "*We ask ourselves, what is it going to deliver, what is the value that we will get out of it, everyone is continuously thinking about what are we going to end up with, what are we going to use it for*" (*EFPIA1*, *interview9*)
• Consultation "*We have a consultation process embedded, so through workshops we encourage discussions and strive to get people to open up their minds and share their thoughts and ideas*" (*EFPIA6*, *interview16*)	• Assessment "*Everyone in such a project should make the assessment if there is enough in it for them to continue or not, I just think that that will be local assessments because it is so diverse and complex*" (*Research6*, *interview1*)
• Compromise "*You try to achieve a balance, trying to include everything and gently try to pare down […]Getting everything heard is how we're moving things forward and people react to it and then you can sometimes reach, well not a unanimous agreement, but at least a majority of people feel that is a reasonable approach to take*" (*EFPIA2*, *interview25*)	• Application "*IMI or EMIF is a precompetitive collaboration, so what we are doing in internal projects and what we are investing our own money in, now EMIF is doing that for us*" (*EFPIA2*, *interview24*)
Value leveraging process	
"*We are translating the European experience internally and we then give our experience back to the European network, so it is a kind of cycle, a virtuous cycle*" (*Research1*, *interview18*) "*There is this leverage, you contribute this certain amount and by being a part of something much bigger, one partner actually gets a lot more out of it*" (*EFPIA3*, *interview14*) "*You get a good leverage between investment* versus *potential outcomes and you actually treat bottlenecks with multiple partners*" (*EFPIA2*, *interview2*)	

anticipation of the types of value to be created, before and during the collaboration. Respondents pointed to the difficulty of such anticipation, because tangible results would not be seen for a few years, and there was uncertainty about how the end solution would look. As a result, stakeholders had to continuously anticipate the value they aimed to capture by asking themselves what types of outcomes would be delivered and how they would be used.

Second, value capture involved assessing the value of the outcomes that partners intended to seize from the collaboration. Without a common outcome to keep all stakeholders motivated, value creation would be impeded if individual stakeholders did not perceive added value for their organizations. These assessments needed constant evaluation as the collaboration moved forward.

Third, another value capture process involved transferring the created value into each organization. This application of value occurred not only after the partnership but also during the collaboration, to improve stakeholders' processes, knowledge, and network positions simultaneously. As part of EMIF, organizations benefited from the result of shared resources, which they could use to substitute for or complement internal investments.

4.3. Overview: a cyclical process framework of value leveraging

In combination, network-level and stakeholder-level processes allowed value to be leveraged. Their interplay gave rise to a virtuous cycle. As Fig. 3 shows, both public and private organizations contributed resources to the collaboration. These resources were recombined through the value co-creation processes of coordination, consultation, and compromise, to co-create innovation, knowledge, and relational outcomes. Each stakeholder was able to capture the collaboration outcomes to improve current resources and apply enhanced infrastructure, knowledge, and relations to further develop the collaboration. This virtuous cycle created growth opportunities for individual organizations and the overall partnership. Moreover, it allowed partners to leverage what they invested and captured, to tackle problems they could not solve on their own.

4.4. Boundary conditions

The virtuous cycle was limited by boundary conditions. The number and diversity of stakeholders had an impact on how value co-creation unfolded, thereby influencing the value that could be co-created and captured. We identified distinct stakeholder dimensions that influenced the value co-creation processes (see Table 3).

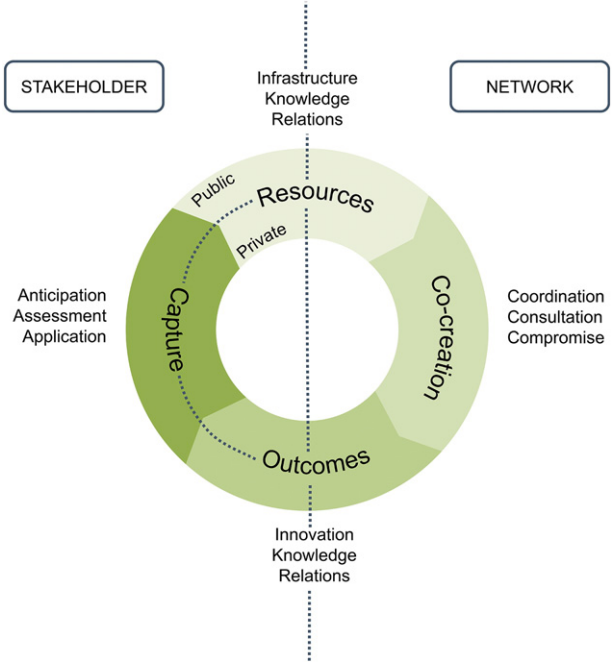

Fig. 3. Cyclical process framework of value leveraging.

4.4.1. Number of stakeholders

The first boundary condition related to the number of stakeholders who were collaborating. With over 300 participants involved, no one knew all the partners, and no one was aware of all available expertise and resources. Furthermore, the mix of stakeholders often changed when participants switched roles or were replaced.

This boundary condition affected the three value co-creation processes. Stakeholder coordination was challenging, because it was difficult to maintain an overview of stakeholders and prevent overlapping activities. With so many partners, it was challenging to identify synergies, or select the right partner(s) for specific tasks. As a consequence, respondents indicated that integration and coordination between stakeholders was lacking. Further, the large number of stakeholders influenced the consultation process. Respondents reported that it was difficult to consult with each partner individually and to have direct interaction and personal communication. As a result, inclusive, participatory discussion was often inhibited. Respondents also found it difficult to achieve a compromise involving all partners. Stakeholders acted as equal partners, and no party had dominant authority. Participants were in danger of adopting a wait-and-see approach instead of making true progress, because it was unclear which stakeholders could make final decisions. As a result, compromise was hindered.

4.4.2. Culture of stakeholders

The differences in the organizational cultures of EMIF partners were manifested in three aspects: working style, language, and perspective. First, with regard to working style, pharmaceutical companies and SMEs adopted a more defined, project-like approach, whereas academics had a stronger focus on freedom of operation. These ways of working were often institutionalized; partners chose their customary approaches. There were also differences in working style among the various functional backgrounds represented in EMIF that influenced how partners held meetings or planned projects. Second, stakeholders differed in language connotations. For example, words with a commercial undertone such as “business model” or “customer” resonated differently in an academic environment than a business environment. Moreover, jargon was often unfamiliar to partners from other backgrounds. Third, different types of stakeholders brought a wide range of perspectives to the table. Depending on their backgrounds, partners looked at matters in different ways.

This diversity in culture influenced the value co-creation processes between stakeholders. It affected the stakeholder coordination process: Sharing of information and management of stakeholder needs and expectations was challenging, because a multitude of working styles, languages, and perspectives came into play. As a result, stakeholders worked separately without being aware of one another's contexts. Moreover, distinct work practices, languages, and perspectives affected the consultation process. Differences in jargon impeded open dialogue and discussion, since stakeholders had to move through learning curves to understand specific terms. In addition, different working styles posed challenges to how communication unfolded. The process of compromise was also influenced by diversityin organizational culture. The tendency of stakeholders to stick to their own perspectives and ways of working impeded optimal consensus building.

4.4.3. Objectives of stakeholders

Because EMIF partners pursued different objectives, they had different motives, interests, and expectations. First, stakeholders had different motives for being involved in EMIF, ranging from commercial to scientific. These differences created tension between public and private partners. Private partners focused on delivering the end result as efficiently as possible (e.g., by buying or implementing existing technologies), whereas public partners were more focused on the research process and preferred to build their own tools. Second, stakeholders wanted to see different

Table 3
Boundary conditions and their influence on value creation.

Value creation processes	Boundary conditions		
	Number	Culture	Objectives
Coordination	"*There is no single person in EMIF who understands the expertise, the capability and the resources that are available to all the partners so there is no way for someone to say 'oh here you would be good at that' […] So I feel like there are a lot of smaller pieces of work going on that aren't necessarily well integrated*" (*EFPIA4, interview17*)	"*It has been a steep learning curve, in really understanding their language and also the way they plan their project. They plan their project in a stepwise way and they had done that kind of separate from us and they weren't completely aware of what we needed from them*" (*EFPIA3, interview11*)	"*You actually have two big groups in the platform topic […]at the moment they are still working separately, but they have to come together*" (*EFPIA2, interview24*)
Consultation	"*If you have a project with 10–15 partners, you can more or less follow up with each partner individually, but if you grow to a level in which there are 60 organizations involved, you need to manage things in a different way*" (*SME1, interview15*)	"*By and large you have the private company type approach and then you have academics and they work differently and it does come through in these communications and the way we work together*" (*EFPIA3, interview14*)	"*In a previous project there was a very clear path from the original work plan to what we were doing so if we were giving up some objective, it was more or less clear why this was happening, while I don't have the same clear image of what is happening in EMIF*" (*Research1, interview18*)
Compromise	"*It is very obvious that everybody is sort of dancing around the topic and I don't know who can make the decision, so you really need to agree, that is the consensus model*" (*EFPIA2, interview4*)	"*It is called open collaboration, but in all honesty, it isn't very open, what I notice is that everybody wants to see their own specific perspective realized or confirmed*" (*EFPIA2, interview23*)	"*You won't reach consensus, but it depends on how far the viewpoints are from each other, the further they are, the longer it takes for them to come closer*" (*SME5, interview3*)

priorities addressed, depending on the areas of interest in their respective organizations. Third, stakeholders differed in terms of their visions and expectations of what EMIF should be at the end of the project. Of the various business models that could be adopted, some were incompatible with the current business models of stakeholders, which created tension.

This diversity in motives, interests, and expectations had an influence on how value was co-created between stakeholders. Factions working separately made it challenging to identify synergies, which affected the coordination process. Moreover, due to the diversity of objectives, there was variation among partners about what needed to be achieved. As a result, some partners lacked a clear understanding of why certain actions were taken and certain decisions were made. This gap hindered open and inclusive discussion and inhibited the consultation process. The process of compromise also was influenced by differences in objectives. The information framework could be implemented in a variety of ways to fulfill several value propositions, but there was no consensus on what direction would be taken.

5. Discussion

To explore the increasingly systemic, collaborative nature of value creation, we studied a multi-stakeholder innovation network. We began by noting the general lack of understanding of how and why multiple stakeholders collaborate in innovation networks to co-create value. Because value creation has become a network phenomenon, we need new insights to identify the processes that support value co-creation and capture in multi-stakeholder collaborations, the value outcomes resulting from these processes, and the roles of multiple stakeholders. By using grounded theory methodology, we shed light on these aspects.

5.1. Theoretical implications

Our theoretical implications relate to research on innovation, value creation, and stakeholder theory. We contribute to existing value creation and stakeholder literature that emphasizes the multi-actor, systemic nature of value creation (Hillebrand, Driessen & Koll, 2015; Vargo & Lusch, 2011). In particular, we provide evidence of how value is leveraged in multi-actor systems through a virtuous cycle of value co-creation and capture. The process starts when stakeholders contribute both operant (e.g., knowledge, experience, skills, relationships) and operand (e.g., tools, infrastructure) resources to tackle complex problems (Vargo & Lusch, 2004). Stakeholders then interact and integrate their resources (Jaakkola & Hakanen, 2013) through ongoing processes of coordination, consultation, and compromise, leading to the co-creation of three value outcomes: innovation, knowledge, and relations. Following a processual perspective, we posit that these outcomes are not final results but rather are starting points for subsequent processes (Bizzi & Langley, 2012). The subsequent processes are the next step in the virtuous cycle; they entail capture of the value outcomes to improve organization's resources. Using this cyclical process framework, we identify the necessary processes for effective value creation and capture in multi-stakeholder collaborations. Moreover, we point to the interdependencies between network-level and stakeholder-level processes that are required for value to be leveraged by individual actors and the entire system. We argue that the entire value system needs to be in balance, because one part affects the other; imbalance may lead to value destruction rather than value creation.

We also add to innovation literature by presenting effectiveness as a multilevel construct to be assessed at both the network and stakeholder levels. Our findings extend traditional findings about outcomes in an innovation context measured at the firm level (Smals & Smits, 2012) or that provide only an aggregate performance measure (Rampersad et al., 2010). In line with Corsaro, Ramos, Henneberg and Naudé (2012), we emphasize the importance of assessing effectiveness on multiple levels, because success at the network level does not necessarily imply success for every network participant. For these reasons, it is important for organizations that participate in multi-stakeholder collaborations to have a clear understanding of the types of value outcomes that can be created and captured. To guide these insights, we argue that multi-stakeholder collaborations can be seen as a value space that represents the total amount of potential value for stakeholders. As Fig. 4 shows, innovation, knowledge, and relational outcomes are co-created value outcomes that combine to represent the total amount of potential value. These different types of values form the axes of the value space along which all stakeholders are positioned. Not all partners seek to achieve outcomes to the same extent; they are positioned along different axes, at varying rates. By regarding these collaborations as a value space, we identify the multiple types of value that are jointly created; we also show how they accrue to a total amount of value that single participants could not achieve. Moreover, the value space gives additional insights into the roles of various kinds of stakeholders and explains why partners participate in the absence of direct, tangible results. Most important, the value space offers a broader perspective of value creation that extends the point of view beyond a single organization and shows that interdependencies among stakeholders are vital for value creation. Overall, we call for a holistic understanding of the entire value space, and the positions of stakeholders within it, to maximize value creation and capture opportunities.

Finally, our study extends prior literature by providing a deeper understanding of the dimensions along which stakeholders may differ. From an

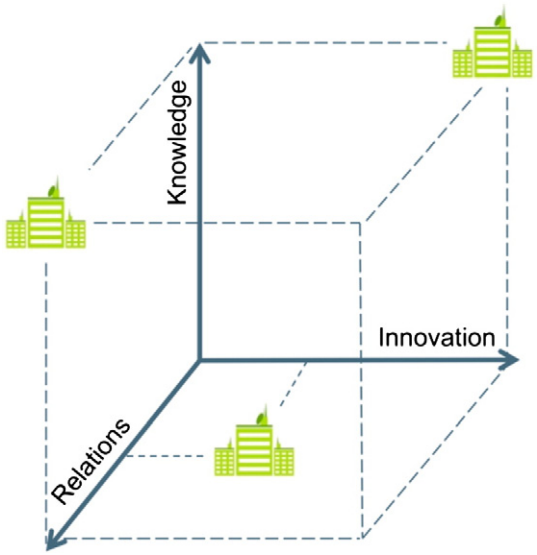

Fig. 4. Multi-stakeholder collaborations as a value space.

innovation perspective, some authors argue that partner diversity enhances innovative value creation, because different sources of knowledge and expertise can be accessed (Beers & Zand, 2014). However, from a collaboration perspective, others recognize that bringing several heterogeneous parties together requires additional coordination efforts and may create conflict (Nissen et al., 2014). Similarly, when the number of partners increases, additional complexities arise with regard to effective management and control of the collaboration and its outcomes (Li, Eden, Hitt, Ireland & Garrett, 2012). We add to this research by further categorizing these differences and explaining their effect on value co-creation. In particular, we identify sub-dimensions that affect the value co-creation processes. Our findings have important theoretical implications for both the cyclical process framework and the value space. First, stakeholder dimensions influence the virtuous cycle of leveraging value and challenge value creation across organizational boundaries. Although diversity is required for the creation of innovative value, we show that when there are too many divergent stakeholders, it limits the total amount of value that can be created and captured. Second, due to varying stakeholder dimensions, value co-creation takes place in a broad and complex system of stakeholders who hold different positions. The higher the number and diversity of stakeholders, the more these positions differ, thereby influencing the value space in which stakeholders participate and value co-creation takes place.

5.2. Managerial implications

The organization of collaborations with multiple stakeholders challenges traditional management practices and requires a significant amount of training and investment to operate in a complex, dynamic environment (Fjeldstad et al., 2012). Our study offers multiple practical implications for managers who participate in these collaborations. The first relates to the cyclical process framework of the co-creation and capture processes, and their interdependencies. This framework allows for the identification of bottlenecks that may result in a vicious rather than virtuous cycle. To maintain the latter, managers should evaluate the effectiveness of these processes and manage them at both the network and stakeholder levels. The second aspect is the value space and value outcomes that make up its axes. Managers should assess their positions and those of other stakeholders in the value space during each stage of the collaboration. At the beginning of the project, they should map each participant in the value space to get a clear indication of the different expectations of each stakeholder and identify clusters of stakeholders with similar interests. In later stages of the collaborations, they should reevaluate these positions to identify gaps between expected and actual outcomes and note any shifts that may have occurred. These positions should be taken into account during co-creation because they influence the circumstances in which stakeholders participate, thereby influencing value co-creation.

Because of our finding that boundary conditions affect value co-creation, we stress the importance of actively managing the number and diversity of stakeholders throughout the collaboration. By providing an overview of these boundary conditions, we point to obstacles participants may face during collaboration and encourage managers to harness stakeholder diversity. Overall, these insights can be translated into concrete guidelines, tools, and training sessions that will help participants navigate through multi-stakeholder collaborations and provide guidance when new collaborations are launched. Moreover, our findings allow policy makers to optimize the organization of partnerships in terms of the number and diversity of stakeholders involved.

5.3. Limitations and further research

Through this case study, we gained a deeper understanding of the co-creation and capture of value in multi-stakeholder innovation networks. However, we must take limitations into account. Our study of a single case means that generalizability of our findings to other projects or contexts may be compromised. However, when we asked our respondents to compare the EMIF project to other multi-stakeholder collaborations they were participating in, they repeatedly reported similar issues and challenges in other projects. This points to the potential transferability of our findings to other settings despite the extreme nature of our case study. Nevertheless, further research is required to validate and extend our findings.

We suggest four areas for further research. First, quantitative techniques such as network-level surveys and simulations can be used to complement qualitative case study findings. Second, an interesting extension would be to study value leveraging in different collaboration models. Compared with the consortium model adopted in this study, a model in which a lead firm is in charge may show different challenges to collaborative value creation. Third, we take a holistic approach to identify the processes, outcomes, and boundary conditions relevant to a multi-stakeholder setting. Future studies could focus on each of these aspects separately. For example, the routines and practices underlying value creation and capture processes could be specified. Moreover, the paradoxical effect of diversity could be examined in detail, to determine the optimal level in multi-stakeholder collaborations. Fourth and finally, further research could advance our understanding of how to manage innovation networks by investigating the types of resources and leadership practices that support value creation among multiple stakeholders.

6. Conclusion

In this study, we emphasize the systemic, collaborative nature of value creation and acknowledge its potential for a wide range of stakeholders to leverage innovative value. At the same time, we demonstrate the challenges of collaborative value creation and address these by providing a holistic understanding of the processes, outcomes, and stakeholder characteristics of multi-actor systems, thereby offering implications for theory and practice.

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Appendix A. Overview respondents

Interview	Type	Function	Function EMIF	Topic	Interview	Duration
1	Research	Professor	Co-lead Platform	PLATFORM	F2F	56 min
2	EFPIA	Global Head Neurosciences	N/A	IMI	F2F	50 min
3	SME	Managing Consultant	Member	PLATFORM	F2F	1 h50
4	EFPIA	Project Manager	Co-lead WP	PLATFORM	F2F	55 min
5	SME	Project Manager	Project Manager	AD	F2F	1 h34
6	SME	Professor	Member	AD	TC	30 min
7	SME	Director	Member	PLATFORM	TC	1 h00
8	Research	Professor	Co-lead WP	AD	F2F	50 min
9	EFPIA	IT Manager	Co-lead WP	PLATFORM	F2F	1 h14
10	EFPIA	Senior Vice President	N/A	IMI	F2F	1 h03
11	EFPIA	Human Geneticist	Co-lead Metabolics	METABOLICS	TC	1 h20
12	Research	Project Manager	Member	PLATFORM	TC	32 min
13	EFPIA	Director	Co-lead WP	AD	TC	1 h08
14	EFPIA	Director	Co-lead WP	PLATFORM	TC	1 h01
15	SME	CEO	Co-lead WP	MANAGEMENT	TC	1 h05
16	EFPIA	Senior Director	Member	PLATFORM	TC	1 h25
17	EFPIA	Associate Director	Co-lead WP	METABOLICS	TC	1 h35
18	Research	Researcher	Member	PLATFORM	TC	1 h30
19	Research	Professor	Co-lead Metabolics	METABOLICS	TC	40 min
20	EFPIA	Senior Director	Co-lead Platform	PLATFORM	TC	1 h06
21	Research	Clinician Scientist	Co-lead WP & co-coordinator	MANAGEMENT	TC	34 min
22	EFPIA	Senior Director	Co-lead WP & AD	AD	F2F	55 min
23	EFPIA	IT Director Research	Co-lead WP	PLATFORM	F2F	48 min
24	EFPIA	IT Manager	Co-lead WP	PLATFORM	F2F	55 min
25	EFPIA	Senior Director	Co-lead WP	AD	TC	1 h20
26	PO	Commercial Director	Member	MANAGEMENT	TC	1 h05
27	EFPIA	Senior Director	Co-lead WP	PLATFORM	F2F	45 min
28	EFPIA	Senior Director	Co-lead WP	AD	TC	1 h30
29	Research	Professor	Consultant	PLATFORM	F2F	43 min

Appendix B. Sample questions

Topic	Sample questions
Respondent	– What is your role in the project? – How did you get involved?
Collaboration	– What is your experience so far with the collaboration? – How is the collaboration compared to other internal/European projects you have participated in?
Stakeholders	– How is it to collaborate with this mix of stakeholders? – How do interactions take place?
Value outcomes	– What kind of outcomes do you expect from this collaboration? – How is this determined?

Appendix C. Additional quotes

Concept		Exemplary quotes
Value outcomes	Innovation outcomes	"*I think that is the ultimate success, when it becomes a self-sustaining entity with its own business plan and objectives and operation*" (*PO1, interview26*) "*By having access to much more data, we can develop better treatments for patients, so that is the ultimate value, better treatments, better medications for patients that need it*" (*EFPIA2, interview20*) "*We like to see research translated into real life treatment and real life behavior*" (*Research2, interview19*)
	Knowledge outcomes	"*You want to learn about the disease itself, you want to understand the pathology better, you want to understand the epidemiology better, so part of it is a quest for knowledge*" (*EFPIA2, interview28*) "*To learn from Europe to obtain knowledge about putting data into a network, this was the rationale also for participating in previous projects, to gain knowledge*" (*Research1, interview18*) "*You come across certain things that you might not know about and that you may pass on internally, so it is also partly doing market research by being involved in the project*" (*SME4, interview5*)
	Relational outcomes	"*The opportunity to sit with some experts and discuss critical questions that were marked for the research project is really important*" (*EFPIA5, interview13*) "*You build a network, you get in touch with the top level of the European research world, which is interesting for future projects*" (*EFPIA2, interview24*)
Value creation processes	Coordination	"*We try to actively make a link between AD and Metabolic, we started a joint study, a small project in which something is really done together, which creates a direct link. We also have an AD meeting and then you invite people from the platform and Metabolic when you think there are potential synergies*" (*EFPIA2, interview22*) "*There are expectations and needs that you need to manage, each partner has their own motivations […] so it is just a matter of understanding the different contexts and trying to get them aligned as much as possible*" (*SME1, interview15*)
	Consultation	"*If they come to our meetings and they hear what we're doing and we can have in-depth conversations about what we need, how we need it, then it just works so much better*" (*EFPIA3, interview11*) "*We try to engage as many people on the teleconference as possible so really asking for participation, asking for updates, rather than having it be a list of projects read off by the work package lead with all the updates, so it is really a participatory session where we try to get as many people to speak, to engage as possible*" (*EFPIA5, interview13*)
	Compromise	"*We need to make a lot of effort to balance out the interest from individual partner organizations with those interests and viewpoints with the other partner organization*" (*EFPIA6, interview16*) "*I think that there is no other way than to understand that you need to have a decent compromise somewhere in the middle, because in the end both parties will have to use the platform and they both have to explain to their followers and management why that is the right way*" (*EFPIA1, interview9*)
Value capture processes	Anticipation	"*The benefits of EMIF for our group are not going to be seen for another year or two, so it is very difficult to justify resources that you can't see the short term immediate impact of*" (*EFPIA4, interview17*)
	Assessment	"*For our organization it is not so tricky, we are a company and if I don't see an added value for my company, then I don't participate, if it helps to run my company in a better way, then I am in, then I can also help you better if you give me the resources*" (*SME2, interview7*) "*We are already in this project for half a year and I hear from different sides 'nothing comes out of it and why are we doing this and where are we heading' and now we just had a meeting and it is good that we showed to everyone what has happened in a year so that people realize 'hey something did happen' and it is useful and something comes out of it and the investment is positive and is reimbursed*" (*EFPIA2, interview22*)
	Application	"*I think everybody knows, the problem that we are tackling in EMIF and the platform, we are dealing with that internally as well, so if we can learn things because of EMIF that are useful for ourselves, well of course*" (*EFPIA1, interview9*)
Boundary conditions	Number	"*You get this during teleconferences in my work package, someone calls in and then I wonder, where do these people come from and who are they? We tried to resolve this once by having all participants send us a kind of bio sketch and we made an overview of all the people that execute a certain task somewhere, but that is already outdated for a long time by now*" (*Research5, interview8*) "*There are a lot of people with different tasks and it is hard for us to really get hold of who are doing what and that is a challenge*" (*EFPIA3, interview11*)
	Culture	"*The insights are not always the same, that partner wants to do it that way, the other wants to do it the other way, because they have been doing it that way for years*" (*SME2, interview7*) "*If you only mention 'business model' or 'customer', the academic world sits back […]so you really need to watch your words, how you position it, definitely not use commercial or business model or profitable, they are not in it for that*" (*EFPIA2, interview4*) "*Imagine you pull a variety of different people together with a very different background, not only training but also work background […]they follow different work practices and they are very often talking a different language, not only that in those European projects they are physically talking a different language, but because they are coming from different backgrounds: a scientist, a medic, an engineer, they are talking different languages*" (*EFPIA6, interview16*) "*Sometimes an IT person thinks differently about the same thing as somebody like I for example, I understand nothing about the IT side, to me it is a black box, but I know what I want as an end user, but there are so many different partners coming from different angles*" (*EFPIA3, interview14*)
	Objectives	"*There is always an internal conflict when you have EFPIA, because they have their priorities set based on the research that is ongoing in their particular companies, while we as academics may have other questions, understandings, mechanisms etc. which may not exactly be the priority of the EFPIA company*" (*Research2, interview19*) "*There are a number of ways this framework can exist and even though we have a vision and mission and so on and we have a clear description of work that needs to be done, but notwithstanding that we still, I think, run the danger that not everyone is entirely clear of what we want to achieve*" (*EFPIA3, interview14*)

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