Abstract

Purpose – To further extend the understanding of multidimensional engagement of stakeholders embedded in service systems, the purpose of this paper is to explore the antecedents that constitute stakeholder engagement in inter-organizational service ecosystems where stakeholders co-create innovations over time.

Design/methodology/approach – An explorative, longitudinal case study design is employed to analyze stakeholders’ engagement in co-innovation in an inter-organizational service system in an engineering context.

Findings – The study identifies eight antecedents for stakeholder engagement in innovation in the context of a B2B environment. Building on related engagement research, the empirical data show how stakeholder engagement is influenced at both individual and organizational levels by the antecedents friendship, common experiences, self-representation, trust, a common goal, resource dependency, level in the hierarchy, institutional arrangements, and local proximity.

Originality/value – The paper extends current understanding of engagement and illuminates stakeholder engagement on a micro level, addressing four key issues for stakeholder engagement in a service ecosystem. How can stakeholder engagement be maintained over time? Does stakeholder engagement at specific hierarchical levels enhance or hinder inter-organizational co-innovation? Is strong engagement necessary for innovation activities? Are the different engagement antecedents linked?

Keywords Case study, Antecedents, Engagement, Service ecosystems, Co-innovation, Stakeholder engagement

Paper type Research paper

1. Introduction
Marketing research interest in the concept of engagement has increased rapidly in recent years (e.g. Brodie et al., 2011; Chandler and Lusch, 2014; Jaakkola and Alexander, 2014; Vivek et al., 2016). To date, this research has tended to focus on customer engagement with firms or brands (e.g. Brodie et al., 2011; van Doorn, 2011; Vivek et al., 2012), as a dyadic concept (e.g. Cui et al., 2015; Roberts et al., 2013; van Doorn et al., 2010). But some recent studies have addressed engagement between partners (Breidbach et al., 2014; Jaakkola and...
Alexander, 2014; Vivek et al., 2012), as well as the nature of engagement among actors embedded in service ecosystems (Storbacka et al., 2016; Hollebeek et al., 2016; Maslowska et al., 2016). An ecosystem perspective on engagement accommodates new categories of actors (Alexander and Jaakkola, 2015), as well as other types of empirical settings, such as inter-organizational environments (Hollebeek et al., 2016). These additions to the initial dyadic engagement concept suggest a need for further elaboration of the applications and antecedents of engagement (see Marketing Science Institute (MSI), 2014-2016; Tier 1 Research Priority).

Storbacka et al. (2016) conceptualize engagement as the microfoundation of co-creation in service ecosystems, conceptually including antecedents of engagement (Felin et al., 2012, 2015). The essential idea of microfoundations is that a phenomenon (including anything from e.g. a theory like service-dominant logic to the innovativeness of a corporation) can only be explained at a level of analysis lower than that of the phenomenon itself. Although marketing-related discussion of microfoundations is in its infancy (e.g. Hinterhuber and Liozu, 2017; Storbacka et al., 2016), the idea has been applied in management studies for over a decade (for an overview, see Felin et al., 2015). In the same way as engagement can be seen as a microfoundation of value co-creation (Storbacka et al., 2016), Conduit and Chen (2017) commended researchers to examine the microfoundations of engagement.

Jaakkola and Alexander (2014) have linked customer engagement in service ecosystems (including customers and other stakeholders) to innovation processes, and several scholarly researchers have also begun to view innovation in service ecosystems as a collaborative process (Aal et al., 2016; Koskela-Huotari et al., 2016; Lusch and Nambisan, 2015; Edvardsson et al., 2014; Vargo et al., 2015), facilitated by knowledge sharing and dialogue (Frow and Payne, 2011) between multiple stakeholders (Normann and Ramirez, 1993; Kowalkowski et al., 2013; Lusch and Vargo, 2014; Vargo et al., 2015). Granted the emphasis on co-creation in service ecosystems, as in joint innovations (e.g. Lusch and Nambisan, 2015; Edvardsson et al., 2011), there remains a lack of knowledge about innovation processes that occur below the organizational level. After an innovation project has been initiated, most firms implement innovations through projects (Hobday, 2000; Sydow et al., 2004), engaging business-level units (within and between organizational entities) over time, which is, as we argue, driven and shaped by stakeholder engagement.

To date, engagement is being treated as a “multidimensional” concept, broadly comprising behavioral, cognitive, and emotional dimensions (Brodie et al., 2011). But as Conduit and Chen (2017) put forward, research needs to explore the microfoundations of engagement by investigating what underpins and drives the iterative and interactive nature of co-creation for stakeholders in service ecosystems. To better understand the underpinnings of stakeholder engagement in complex, dynamic settings, this paper investigates the constituting antecedents of the three engagement dimensions in a service ecosystem for innovation. This paper investigates how engagement comes into play when stakeholders in a service ecosystem engage over time to co-create an innovation. To deepen understanding of stakeholder engagement, the present study accordingly addresses the following research question:

RQ1. What are the constituting antecedents of stakeholder engagement in intra- and inter-organizational service ecosystems when stakeholders co-create innovation over time?

Engagement research on service ecosystems, especially in industrial settings, is relatively new (Hollebeek et al., 2016). The present study contributes both theoretically and empirically by enhancing the understanding of multi-party engagement from a longitudinal perspective and clarifying the conceptualization of engagement and innovation research (cf. Lombardo and Cabiddu, 2016). It is argued here that
stakeholder engagement can be understood as a microfoundation for cocreative activities such as innovation processes, helping to explain why and how stakeholders contribute resources to an inter-organizational service ecosystem (e.g. Storbacka et al., 2016). That said, within an innovation process, each stakeholder’s engagement will vary over time; some may drop out, and others may enter.

The paper is structured as follows. First, the service system perspective in the engagement literature is outlined and discussed. Subsequently, the single-case approach to collecting and analyzing empirical data from an individual service system is described. The study’s qualitative findings are then presented and discussed. Finally, implications are drawn for future research and managerial practice.

2. Theoretical foundations

2.1 Engagement research

Organizational aspects of engagement were initially considered a social psychological trait of work (Kahn, 1990). Kahn argued that personal engagement arises when “people bring in or leave out their personal selves during work-role performances” (Kahn, 1990, p. 702), and engagement was assessed in terms of the extent to which an employee’s cognitive, emotional, and physical self was reflected in their work-role performance (Kearsley and Shneiderman, 1998; Terenzini and Pascarella, 1991). Schaufeli et al. (2002) adopted this psychological view to investigate engagement as a means of improving an employee’s work performance.

In contrast, the external organization school of thought (Dawkins, 2014; O’Riordan and Fairbrass, 2014; Manetti, 2011) conceptualized engagement as a “stakeholder dialogue” (Waddock, 2001; Burchell and Cook, 2006; Pedersen, 2006). Rather than cognitive, emotional and physical dimensions of engagement, this approach focuses on behavioral dimension, emphasizing “activities which are undertaken to create opportunities for dialogue between an organization and one or more of its stakeholders with the aim of providing an informed basis for the organization’s decisions” (O’Riordan and Fairbrass, 2014).

In marketing research, studies of engagement were initially social psychological, focusing strongly on an individual customer’s engagement with a specific object such as a brand or transportation services (Brodie et al., 2011; Jaakkola and Alexander, 2014; Vivek et al., 2014; Chandler and Lusch, 2014). It has been perceived as a multidimensional concept comprising cognitive, emotional, and/or behavioral dimensions (Hollebeek, 2011), and defined as a “psychological state, which occurs by virtue of interactive customer experiences with a focal agent/object within specific service relationships” (Brodie et al., 2011, p. 7). The cognitive dimension was understood as the individual’s degree of awareness (Luthans and Peterson, 2002) or a personal state of mind (Hollebeek, 2011; Vivek et al., 2012) with regard to a specific object, such as a brand. The emotional dimension was seen in terms of individual feelings toward that object, such as concern, empathy, inspiration, or pride (Hollebeek, 2011; Luthans and Peterson, 2002). Finally, the behavioral dimension of engagement was understood as an iterative and sustained process or level of energy (Patterson et al., 2006) in interacting with or influencing the behavior of the object in question (Hollebeek, 2011; Resnick, 2001).

Engagement has also been investigated in relation to context-specific aspects of customer engagement, both offline and online (Calder et al., 2016; Hollebeek et al., 2016), including media engagement (Calder et al., 2009), reviewer engagement (Mosteller and Mathwick, 2014), audience engagement (Scott and Craig-Lees, 2010), customer brand engagement (Hollebeek, 2011), customer engagement behavior (Jaakkola and Alexander, 2014), and social media engagement behavior (Dolan et al., 2016). In general, such research has sought to better understand engagement within a specific context of dyadic co-creational processes (Calder et al., 2016).
2.2 Stakeholder engagement

More recently, marketing research has begun to conceptualize engagement as occurring within and between ecosystems (Chandler and Lusch, 2014; Maslowska et al., 2016; Storbacka et al., 2016), so encompassing more categories of actor than “just” customers. For example, a service ecosystem has been defined as a “complex, self-adjusting system of resource integrating actors connected by shared institutional arrangements and mutual value creation” (Vargo and Lusch, 2016). The actions and interactions in service ecosystems can be investigated on three related and embedded levels: micro level (dyadic interactions), macro level (triad interactions as e.g. in organizations, families, etc.) and macro level (complex systems and networks) (Banoun et al., 2016; Wieland et al., 2015; Pohlmann and Kaartemo, 2017).

Storbacka et al. (2016) conceptualized actor engagement as the microfoundation of value co-creation in service ecosystems, manifested in observable engagement issues or activities (e.g. behavior). This approach refers back to the concept’s origins in an organizational context (e.g. Kahn, 1990) but shifts the perspective from the single organization to the service ecosystem. In this way, it becomes possible to zoom out from discrete dyadic transactions on micro level, focusing instead on resource integrations between any numbers of actors for the well-being of each individual actor and for the system as a whole (McColl-Kennedy et al., 2012; Vargo and Lusch, 2015). This approach links engagement to previous research on network constellations (Normann and Ramírez, 1993; Kowalkowski et al., 2016) and network dynamics (Achrol and Kotler, 1999; Håkansson and Wulczewski, 2007), emphasizing how the ecosystem is constituted (Vargo and Lusch, 2015) and how actors are embedded within its structure (Granovetter, 1985). This echoes Chandler and Lusch’s (2014) argument that the relational and temporal connections surrounding an experience strongly influence the actors’ level of engagement. Moreover, this reasoning can be linked to Burt’s (2009) observation that some actors in the system possess strategically positioned resources such as unique relationships or other vital resources essential to the innovation.

In adopting a service ecosystem perspective on engagement, all engaged actors are seen to be part of a larger structure, which may enhance or diminish engagement between those actors. This more holistic view invites further investigation of the antecedents of engagement that occur both in intra- and inter-organizational collaboration projects as well as at the level of the individual actor. The literature discusses the influence of psychological state and of the individual customer or actor on engagement (Brodie et al., 2011; Storbacka et al., 2016), as well as “the framing of this psychological state” (Chandler and Lusch, 2014, p. 4) in terms of the physical surroundings.

Aligning with the systemic view of engagement (e.g. Chandler and Lusch, 2014; Storbacka et al., 2016), the argument elaborated here (following Greer et al., 2016) is that the term stakeholders more precisely captures engagement in specific innovation projects rather than generic actors or partners. In other words, the concept of stakeholder relates more to a disposition to a specific course of action – in this case, an intra- and inter-organizational innovation process – than to the more generic unspecified actor. In this sense, actors become stakeholders within the ecosystem as they engage in a specific course of action, and stakeholder engagement is “determined by its present-day connections in the service ecosystem and the social and institutional roles assigned to it” (Storbacka et al., 2016, p. 6). Based on Brodie et al’s (2011) and O’Riordan and Fairbrass (2014) work, stakeholder engagement is defined here as a psychological state that occurs by virtue of stakeholder experiences throughout an interactive process within a specific service ecosystem.

2.3 Stakeholder engagement in intra- and inter-organizational innovation

Engagement of external actors in a collaborative innovation process is discussed in several research streams, including open innovation (Chesbrough, 2003; Dahlander and Gann, 2010); collaborative or user innovation (Von Hippel, 1988; Baldwin and Von Hippel, 2011); and
co-innovation (Ramaswamy and Gouillart, 2010; Lee et al., 2012). Research on open innovation and co-innovation commonly adopts a single-firm perspective and investigates that firm’s ability to manage external knowledge flows. User innovation studies focus on the external innovator (often a user) and their ability to either gain a firm’s acceptance or to protect the innovation from commercialization. In contrast, a service ecosystem perspective takes account of all stakeholder perspectives in innovation processes (Jonas et al., 2016), focusing on behavioral, cognitive, and emotional dimensions underpinning stakeholder engagement. This emphasis distinguishes stakeholder engagement from related concepts in innovation studies, such as participation (e.g. Fang, 2008; Piller and Walcher, 2006), which is a pre-designed task or offer to customers and other stakeholders reflecting “the degree to which the customer is involved in producing and delivering the service” (Dahbolkar, 1990, p. 484). Similarly, the concept of integration (of the customer, user, or stakeholder) commonly refers to opportunities to co-innovate with a firm (e.g. Edvardsson et al., 2012; Perks and Rihela, 2004). Another related concept is involvement (Alam, 2006; Carbonell et al., 2009), referring to “a person’s perceived relevance of the object based on inherent needs, values, and interests” (Zaichkowsky, 1985, p. 342); this is linked to an individual state of mind that may be influenced but cannot be directly steered or designed. However, engagement is more closely linked to value co-creation (Jaakkola and Alexander, 2014), serving as its microfoundation (according to Storbacka et al., 2016).

Antecedents of stakeholder engagement in intra- and inter-organizational innovation. Innovation processes are seen to be highly complex, uncertain, multi-faceted, and dynamic activities, in which collaboration between multiple stakeholders increases complexity (Freeman, 1984; Greer et al., 2016). Collaboration in innovation affords individual stakeholders a more diverse resource base to draw on, supporting innovative and creative solutions (Brown and Duguid, 1998; Russo-Spena and Mele, 2012). At the same time, this renders that each stakeholder is cognitively dependent on others’ resources (Burt, 2009; Håkansson and Snehota, 1989), which over time forms resource dependencies. Stakeholder engagement in such complex settings is thereby linked to the cognitive, emotional, and behavioral dimensions of engagement, and accordingly the antecedents driving individual stakeholder engagement.

For innovation to be sustainable, stakeholders’ engagement is crucial for this process, both for the activity of exchange resources but also through self-representation (Vargo et al., 2015). Each stakeholder tries to influence and mobilize support for their argument within the ecosystem by signaling their unique value to the innovation project and to the well-being of the ecosystem. This is strongly linked to previous organizational studies research on stakeholder engagement (Dawkins, 2014; O’Riordan and Fairbrass, 2014; Manetti, 2011), concerning how one stakeholder may seek to influence the content and value of the resources that reaches other stakeholders and “whether the actor is trying to influence, is open to influence or trying to mobilize support or access to resources” (Storbacka et al., 2016; p. 6). This can be achieved through hierarchical structures, either informally through a structural hole (Burt, 1992) or formally through organizational size or legal boundaries.

Looking at the emotional dimension of dimensions of engagement, Harrison et al. (1996) argue that stakeholders need at least some aspects of friendship formed through shared history if they are to collaborate successfully. Stakeholder engagement among emotionally attached stakeholders with unique resources and information bases (Nooteboom, 2000) can undermine interpretive obstacles (Dougherty, 1992), and assist in coordination (Bechky, 2003). This directs attention to which stakeholder should be involved (Tatikonda and Rosenthal, 2000) in the intra- and inter-organizational innovation process and who can be trusted (Mayer et al., 1995; Rousseau et al., 1998; Morgan and Hunt, 1994). That is, to whether, emotionally, a stakeholder can trust others to remain engaged in the innovation process over time.

Aligning resources and competences toward a common goal during inter-organizational innovation (Mora-Valentin et al., 2004; Linnarson, 2005) is a crucial aspect for facilitating
behavioral dimensions of stakeholder engagement. The common goal encompasses both the progress of the innovation and the purposeful behavior (Dwyer et al., 1987; Moorman et al., 1992) of all stakeholders for the well-being and continuity of the ecosystem. In this sense, the common goal is broader than any stakeholder’s individual goal (Vargo and Lusch, 2016) as it relates to stakeholder rationales within different institutional arrangements (Edvardsson et al., 2014; Koskela-Huotari and Vargo, 2016; Thornton et al., 2012). For stakeholder engagement in innovation processes, the establishment of shared institutional arrangements (e.g. Vargo and Lusch, 2016) is both a bridge that corrects asymmetries between the engaged stakeholders and a potential barrier to enter and leave the service ecosystems (Knoben and Oerlemans, 2006). The opportunity to engage in the innovation process relates thereby to activities offered by the service ecosystem itself (Powell et al., 1996; Carlile, 2002; Storbacka et al., 2016). Institutional arrangement antecedes, fosters and impacts the behavioral aspect of engagement as well as the nature of organizational boundaries, innovation processes, and cultures (Easterby-Smith et al., 2008). To summarize these aspects of stakeholder engagement, Table I presents the proposed antecedents of stakeholder engagement on intra- and inter-organizational level.

### 3. Methodology

#### 3.1 Single case study approach

The present study contextualizes antecedents of stakeholder engagement in service systems by employing a single case study approach (e.g. Eisenhardt and Graebner, 2007; Siggelkow, 2007). The case study approach reveals the world as seen by participants in a system (Swanborn, 2010), reflecting the underlying systems thinking of this approach. In this way, case study research deepens understanding of perceived realities and elicits patterns and meanings through an interactive process (Creswell, 2012; Guba and Lincoln, 1994). Additionally, a case study approach facilitates the systematic but open assessment of experiences in their real-life context (Miles et al., 2013), with simultaneous inclusion of theoretical constructs implicit in underlying processes (Swanborn, 2010; Symon and Cassell, 1999) as they play out over time (Siggelkow, 2007).

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Antecedent</th>
<th>Description and examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive</td>
<td>Self-representation</td>
<td>Individual stakeholders engage in an innovation process in order to gain a better position within the service ecosystem (e.g. Burt, 1992; Storbacka et al., 2016)</td>
</tr>
<tr>
<td>Cognitive</td>
<td>Resource dependence</td>
<td>Individual stakeholders are dependent on other stakeholders engagement for the benefit for their own viability as well as the benefit for the whole service ecosystem (e.g. Håkansson and Snehota, 1989; Russo-Spena and Mele, 2012)</td>
</tr>
<tr>
<td>Cognitive</td>
<td>Hierarchical level</td>
<td>Individual stakeholders engagement is based on their hierarchical position within the service ecosystem, based on size and formal structures (e.g. Cook and Emerson, 1978)</td>
</tr>
<tr>
<td>Emotional</td>
<td>Friendship</td>
<td>Individual stakeholders engagement is linked to their friendship with unique other stakeholders in the ecosystem, based on their common experience and history (e.g. Harrison et al., 1996)</td>
</tr>
<tr>
<td>Emotional</td>
<td>Trust</td>
<td>Individual stakeholders engagement is built on their emotionally trustworthiness that other stakeholders will be active over time in the innovation process (e.g. Mayer et al., 1995; Rousseau et al., 1998)</td>
</tr>
<tr>
<td>Behavioral</td>
<td>Common goal</td>
<td>Individual stakeholders engagement in the innovation process is based on the perceived purposeful behavior from the other stakeholders toward a common goal (e.g. Mora-Valentin et al., 2004; Linnarson, 2005)</td>
</tr>
<tr>
<td>Behavioral</td>
<td>Institutional arrangement</td>
<td>Individual stakeholders engagement is based on the formation of shared rules, norms, values and beliefs within the service ecosystem (e.g. Koskela-Huotari and Vargo, 2016; Vargo and Lusch, 2016)</td>
</tr>
</tbody>
</table>

### Table I

Antecedents of stakeholder engagement in innovation at individual and inter-organizational level
Based on a theoretical sampling approach (Bryman and Bell, 2015), Leistungszentrum Elektroniksysteme (LZE) (www.lze.bayern/en) was chosen as an extreme case that offered opportunities for uncommon research access (e.g. Siggelkow, 2007) and in situ exploration of social interactions in service systems as proposed by Edvardsson et al. (2011) and Echeverri (2017). LZE is a service system for collaborative innovation (e.g. Baldwin and Von Hippel, 2011), aiming to connect companies, research institutes, and university departments (Fraunhofer IIS, Fraunhofer IISB, and FAU Erlangen-Nuremberg) in the development of new technologies in the field of electrical engineering. Initiated in 2014 as a pilot for networked innovation among independent collaborating entities, LZE was chosen as a revelatory case because of its extraordinary set-up as a service system for collaborative innovation and for its openness and accessibility over a longer period of time. LZE was also considered a suitable case by virtue of its explanatory power in relation to the present research question. The formal and informal structure of the LZE service system of several units from three organizations (university and two research institutes) can be understood from longitudinal data on the dynamics of stakeholder engagement, which are accessible and observable in their natural context. As an innovative form of stakeholder engagement in interdisciplinary collaborative innovation across organizational borders, this case provides insights into the antecedents that promote stakeholder engagement.

3.2 Data collection

Data collection was based on: 30 face-to-face, in-depth interviews with key informants (see Fontana and James, 1994) from all three participating organizations, enriched by; observations of meetings, presentations and workshops conducted by two researchers; and secondary data such as meeting protocols, internal documents, presentations and the like. To capture the antecedents of stakeholder engagement, managers and employees who are regularly and directly involved in the innovation process were selected as key informants (Marshall, 1996). To ensure a sound base for empirical research, the interviewee selection strategy sought to identify stakeholders from all participating faculties and organizations, from every organization within the LZE service system, as well as representatives from all hierarchical and work experience levels (Eisenhardt and Graebner, 2007). To capture each project holistically (see Figure 1), interviews with stakeholders in individual LZE projects were implemented sequentially. To reflect changes in perceived stakeholder engagement, interviews with the executive
committee were purposefully arranged across the data collection period. Interviews took the form of semi-structured conversations, following a guideline to allow for flexibility of interviewee input and interview direction as interesting new antecedents emerged (Swanborn, 2010). This meant that additional questions could be asked if an area seemed relevant and interesting, allowing clarification of unclear meanings as well as deeper questioning – in other words, better quality interviews. Interviews lasted approximately one hour and were conducted, recorded, and transcribed between December 2015 and September 2016. The rationale for conducting the interviews over time was to “tap the knowledge and experience” (Churchill, 1979, p. 105) progressively gained by participants. The number of interviews was determined by information redundancy and saturation (e.g. Lincoln and Guba, 1985); here, no new themes emerged after 30 interviews. Table I provides an overview of the interviews.

To capture stakeholder engagement and its’ antecedents as holistically as possible, additional primary data were gathered over the 12-month period through participant observations of six strategic workshops. The informal participant observations were implemented by joining network events, workshops and weekly meetings discussing the daily work across the three different organizations. This analysis provided insights into the antecedents of engagement and interactions across organizational boundaries in their real life context. In addition to the participation at these meetings and workshops, the authors had access to background information that included meeting protocols, predefined work package dependencies and the lists of employees formally participating in the project. These secondary data helped to clarify complex processes and the positioning of stakeholders within and across organizational boundaries. This also served to validate results. From that material, it was also possible to identify those who were formally associated with the project but did not work on it (and vice versa) (Creswell, 2012) (Table II).

3.3 Data analysis

To clarify the antecedents of stakeholder engagement in an intra- and inter-organizational settings, primary and secondary data were analyzed using an abductive approach, in which verbatim transcribed interviews were first coded with an a priori thematic focus on the three dimensions of engagement (emotional, cognitive and behavioral) (Brodie et al., 2013). Rich examples from the data analysis (Sellitz et al., 1976) were used as representative instances to illustrate the phenomenon of stakeholder antecedents (Kothari, 2004), and new codes were assigned iteratively on the basis of themes emerging from the data. Using the constant comparative method (e.g. Spiggle, 1994), activity statements were identified, sorted, and structured by reading transcripts of the interviews and referring to the participant observations, notes from informal meetings with stakeholders, and additional data. This comparative content analysis (see Bryman and Bell, 2015) was implemented by means of a peer evaluation process (Miles et al., 2013), independent parallel analysis of data pieces, and investigator triangulation (Bryman and Bell, 2015), in which three researchers collected data in parallel to address the same research objectives. Coding of the shared body of data was performed by the three researchers and by one additional external researcher, who had not participated in collection of the data. This coding process facilitated re-extraction and re-coding of the data, which were subsequently tested and found valid according to the inter-judge reliability index (Perreault and Leigh, 1989).

The data were categorized according to the theoretically derived antecedents, with each antecedent related to one of the three dimensions of engagement, proposed by Brodie et al. (2013). In addition, the data also revealed “local proximity” as an additional antecedent in the behavioral dimension. Hence, the three antecedents – self-representation, resource dependency, and hierarchical level – were linked to the cognitive dimension. A further two antecedents – friendship and trust – were linked to the emotional dimension. A final three antecedents – common goal, local proximity, and institutional arrangements – were
linked to the behavioral dimension. Key quotations and insight-stimulating examples from the interviews (representing activity statements) were used in describing each antecedent, adding to transparency and depth of understanding (Patton, 1990).

4. Empirical findings
4.1 Introducing the case: LZE
A joint initiative by Fraunhofer-Gesellschaft, Fraunhofer IIS, Fraunhofer IISB, and Friedrich-Alexander University Erlangen-Nürnberg, LZE is a pilot project for collaborative innovation involving multiple parties. Building on existing cooperation between three organizations Fraunhofer IIS and Fraunhofer IISB in Erlangen and FAU Erlangen-Nuremberg, the project seeks to establish collaborative infrastructures and an agenda for joint research and innovation with industry partners. The pilot phase initiative comprises four projects, and the present case study includes three of these: engineering of microchips, wearables, and energy storage. Each is configured as an interdisciplinary multi-player project, with experts from different fields that include electrical engineering, physics, chemistry, sports management, medicine, and software engineering. Project members are drawn from various units of the partner organizations (see Figure 1).

In the first year, the inter-organizational teams developed project plans for work procedures and regular team meetings. According to project members, the exchange and

<table>
<thead>
<tr>
<th>No.</th>
<th>Interviewee alias</th>
<th>Position</th>
<th>Duration (min)</th>
<th>Time of data collection</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>FAU – LIKE (1)</td>
<td>Research associate</td>
<td>24</td>
<td>December 2015-March 2016</td>
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<tr>
<td>2</td>
<td>FAU – LIKE (2)</td>
<td>Research associate</td>
<td>68</td>
<td></td>
</tr>
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<td>3</td>
<td>FAU – LSE (1)</td>
<td>Research associate</td>
<td>48</td>
<td></td>
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<tr>
<td>4</td>
<td>FAU – LTE (1)</td>
<td>Research associate</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>IIS – OK (2)</td>
<td>Research associate</td>
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<td></td>
</tr>
<tr>
<td>6</td>
<td>IISB and LEB (4)</td>
<td>Research associate</td>
<td>48</td>
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<tr>
<td>7</td>
<td>IISB and LEB (2)</td>
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<td>21</td>
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<td>71</td>
<td></td>
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<tr>
<td>10</td>
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<td>Project leader</td>
<td>74</td>
<td></td>
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<tr>
<td>11</td>
<td>IIS (7)</td>
<td>Project leader</td>
<td>67</td>
<td></td>
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<tr>
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<td></td>
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<tr>
<td>13</td>
<td>FAU – CR (1)</td>
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<td>38</td>
<td>May 2016-June 2016</td>
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<td>14</td>
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<td>IIS (2.1)</td>
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<tr>
<td>16</td>
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<td>Member of executive committee</td>
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<td>IISB (3)</td>
<td>Project leader</td>
<td>59</td>
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<td>18</td>
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<td>Research associate</td>
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Note: Names of interviewees and organizations have been anonymized by agreement
joint work across organizational boundaries was perceived to be intensive and fluid despite legal and privacy constraints:

Since we are working so much together and often at the same workplace, I almost forgot that we are actually from different organizations. The collaboration is as intense as working with people from my own department (IISB and LEB (4)).

4.2 Cognitive dimension

In this dimension, self-representation indicates the individual stakeholder’s disposition to engage while resource dependencies and hierarchical level relate more to opportunities for engagement offered by the service ecosystem.

Self-representation. The importance of self-representation for stakeholder engagement is that stakeholders in newly formed project teams tend to be highly motivated and eager to display their knowledge and skills. This strong engagement is observable in how stakeholders present themselves and their work in the best possible light. In the present case, there was a need to impress those from other organizations by working harder and interacting more:

Contrary to what is often expected, project members from different organizations work harder than they would in normal projects. This may be because they want to display their skillsets and impress new colleagues (FAU – LIKE 2).

Interviewees confirmed that perceived engagement across all project team members was quite high at the outset – higher than it would be during a regular project start within their own organization. Dwyer et al. (1987) and Jap and Anderson (2007) have argued that stakeholders’ work motivation may be strong at the beginning of a co-innovation process and may decline over time, which can significantly influence the performance of service systems (Palmatier et al., 2013). This effect can be linked to Kahn’s (1990) emphasis on work psychology, but in this context, self-representation can be viewed as unique antecedent of stakeholder engagement manifested through recognition of expertise within and across organizations.

Resource dependency.

I have a lot of discussions with G because he has to incorporate the system I’m working with into a circuit. We discuss things on a technical basis, but without engaging with each other, it would not be possible to work things out (FAU – LSE 1).

Scheer et al. (2014) argued that the form, degree, and balance of resource dependency has a strong influence on engagement. In the present case, work packages were assigned across different organizations. These collaborative tasks inevitably created resource dependencies between stakeholders, so driving engagement. The data show that work packages and the resulting resource dependencies contributed significantly to enhancing engagement. Within a given work package, engagement commonly occurred because of a need to seek advice and to create work flows in pursuit of common goals. For instance, as sub-project No. 3 was interconnected with co-innovation processes more than to other projects, it was highly dependent on inputs from other sub-projects using similar technology. In this context, stakeholders emphasized the link between engagement, utilization of their respective knowledge, and completion of work packages:

We are lucky that we don’t have to wait for other work packages. Our processes are very lean, and I rarely have to wait for others’ work to be finished. It can be very annoying to work with others when they don’t deliver, and you sometimes tend to engage less with those people in the future (FAU – LIKE 2).

I have a really close relationship with Mr. F because we are working jointly on the LOHC Topic [Sub-Project of LZE] (IISB 5).
Vivek et al. (2016) suggested that while resource dependencies trigger engagement among stakeholders, a lack of resource dependency may diminish engagement. This view is only partly supported by the present findings; one possible reason may relate to the next antecedent: level in the hierarchy.

**Hierarchical level.**

[...] if I have a new idea, I contact my colleagues [in the other organization] directly rather than their bosses, as this is simply more effective, and the bosses will know about it soon enough anyway (IIS 7).

The empirical data confirm the strong relevance of engagement across different levels of organizational hierarchies. Interestingly, the data indicate homogeneity of engagement among stakeholders on the same level but heterogeneity across levels within the project. Overall, engagement was found to be strong at the top level, weak at project management level, and strong at operational level, even across organizational borders. At the top level, stakeholder engagement was high because connections are dense, and almost everyone at this level is included in the decision-making process:

Communication is vital for my daily work – especially communication with the other CEO, who is as involved as I am in the daily work [...] We often talk before we make hard decisions. It helps to get a second opinion, and it also helps to keep the information consistent within the project (IIS – 2.1).

It became apparent from the data that stakeholder engagement did not generally occur across different hierarchical levels – for instance, as a project member would not interact with someone from the executive board, engagement was not generally fostered between hierarchical levels. One of the CEOs said that he would like to engage more with individuals from lower levels, but that this is simply not possible because of time constraints.

Other views of engagement can be identified at other levels. Although it might be expected that engagement among project leaders would be as high as among strategic managers (because they deal with similar tasks, and such engagement might be advantageous), this was not the case here. This was highlighted by one of the managing directors, who said that he was irritated to find almost no engagement among project leaders; this was apparent in the lack of knowledge transfer between stakeholders, as a lot of best practice knowledge was not being exchanged. It also became clear that stakeholders at the lowest levels of the hierarchy, who are less reliant on others to accomplish their own tasks, often engage only with a small circle that typically includes sub-project members at the same hierarchical level and close, next-level project managers.

4.3 Emotional dimension

In this dimension, friendship indicates the individual stakeholder’s disposition to engage, and trust is seen as important antecedent in accepting opportunities to engage offered by the service ecosystem.

**Friendship.**

I would always ask C for personal advice; he is the one who employed me and I have known him for the longest time [...] we have a close friendship-like relationship (IIS 1).

As a voluntary, interpersonal relationship manifested through interactions and communication beyond work (Raile et al., 2008), friendship was identified as one of the main reasons for stakeholder engagement. Even where two actors performed unrelated tasks, friendship still influenced engagement, confirming Uzzi’s (1997) view that stakeholders from different organizations who know each other at a personal level are more likely to engage – for instance, by asking for work-related advice (Breschi and Lissoni, 2009). While friendship can increase the
level of interaction between actors, it may also create a sense of obligation that hinders productive collaboration (Uzzi, 1997). By way of illustration, the friendship between the directors of IIS and IISB (research institutes within LZE) enhanced their bilateral engagement, as well as the engagement of stakeholders in the two organizations. Even in cases where friends are not working together directly, they may offer input in a social setting — for example, a second opinion about how to handle hard decisions or difficult tasks:

I do believe the engagement in this project is doing so well because [the directors of the two main organizations] understand each other very well, and this understanding is directly attributable to the two CEOs of the project. Their relationship influences other project members and so generates good collaboration within the project (IIS 5).

Trust. In the present case, emotional elements of trust contributed to engagement because the organizations had a history of working together on joint projects:

I do sometimes have issues sharing IP because Fraunhofer is known for keeping all the patents in-house, but this patent is a joint development, and I am not sure how this will be handled (FAU – LTE 1).

These empirical findings confirm the view advanced by Agrawal (2006) and by Chandler and Lusch (2014) that actors who have previously worked together are more likely to form high-engagement relationships:

I sense that A and Z work differently, simply because they have known each other for so long, and each knows how the other works (IIS 1).

Indeed, it is often hinted at that stakeholders knew each other in advance and were therefore more likely to engage. As one interviewee pointed out here, “it is therefore no surprise that they work together so closely” (IIS 5), as Fraunhofer IIS and Fraunhofer IISB have worked together on many projects and are part of the same corporate group.

Gould (2012) and Vivek et al. (2016) proposed that, in large inter-organizational settings, trust influences exchange of information, and a lack of trust may therefore lead to dysfunctional collaboration or slower progress. In the present case, the interview data did not indicate any such trust problems between the collaborating organizations. This is surprising, as policies for file sharing and data exchange in IIS and IISB seemed strict from an outside perspective; both organizations were impacted by a culture of strong IP protection and strict guidelines governed the use of shared data sources and collaboration tools. In practice, the project teams proactively created their own coping mechanisms for interdisciplinary groups with few overlapping core competencies:

I have worked on many research projects, often including many different organizations. Information exchange was indeed often a problem in such projects, but what’s good about this project is that there are no overlapping competencies. If, for instance, two organizations normally work on similar projects and have similar knowledge, it is often the case that no one wants to give information to the other group, as they might be potential competitors on the next project (IISB and LEB 3).

4.4 Behavioral dimension
In this dimension, common goal, local proximity, and institutional arrangements were seen as important antecedents of opportunity to engage as offered by the service ecosystem. These antecedents also have a direct impact on the individual stakeholder’s disposition to engage.

A common goal.

The Fraunhofer Institute IIS normally consists of independent departments [profit centers]. The LZE is torpedoing this classic approach, even though it is not formally allowed […] the clear advantage, in contrast to other projects I’ve worked on, is the common goal (IIS – 5).
Interviewees referred to a common goal as one of the most important antecedents enhancing engagement with other stakeholders across all levels of hierarchy, work packages, and organizations. This aligns with the evidence from a case study by Rubery and Grimshaw (2003), and with the findings of Kim and Lee (2010), who argued that an aligned goal can significantly enhance inter-firm collaboration. This is also linked to what Vargo and Lusch (2016) characterize as the collective well-being of the service ecosystem.

In the present case, the common goal had two dimensions. While the project task was to innovate at operational level, LZE’s overarching goal is to establish itself beyond the current pilot phase as Germany’s leading center for electronic systems. The current projects are therefore a means of displaying their skillset and attracting potential industry partners to join this collaboration. As this process is not unlike establishing a company, it can be argued that this approach also helps to foster goal alignment within both Fraunhofer Institutes or university faculties, and in other participating organizations that normally have a very different approach to work.

Local proximity.

I work differently with different colleagues, depending on who they are and where they are located […] the LIKE-department is a good example; I would always go to their offices and have a quick talk with them about certain topics. [The LIKE department is situated in the same building] (IIS 6).

Local proximity refers to the geographical closeness of organizations. In this case, the Fraunhofer Institute IIS and the Faculty of Information Technics both focus on communication electronics and are located in the same building. The other participating organizations also have high local proximity (within a 10 km radius), and this was commonly identified as one of the key drivers of regular open engagement practices. Interviewees frequently stated that they would prefer to engage with someone who was close by rather than with someone who might be better for the job but was situated further away. This confirms that engagement with a particular stakeholder increases with geographical closeness (although this could also have a negative impact, both on co-innovation in the project as a whole and on LZE’s overarching goal):

I often interact with F simply because he is sitting right on the other side of this wall. I just go over and ask him for advice or about the status of the project. It’s the same with other people here – they just walk by my office and ask questions […] communication with organizations that are farther away is harder, of course, simply because you have to schedule a meeting or wait for their answer (IIS 7).

Stakeholder engagement was also found to be high among members of the executive committee of the project, which straddled three organizations (Fraunhofer IIS, Fraunhofer IISB, and LIKE). Interviewees explicitly suggested that engagement among stakeholders on LZE’s executive committee was unsurprising, as they were located close to each other, with offices in the same building. The perceived positive impact of local proximity will be strategically fostered by offering joint office space to interdisciplinary project teams in the future.

Institutional arrangements.

For me, this is not inter-organizational. Look at Fraunhofer IIS and Fraunhofer IISB; they have been working together for so many years that they are, in my opinion, just like the same organization (FAU – LIKE 2).

Creating a shared understanding of how to communicate and work across organizational boundaries – for instance, by adopting and creating shared institutional arrangements as described by Vargo and Lusch (2015) – is an important coordinating mechanism for creating mutual engagement within the ecosystem as a whole. For example, there was a high level of
engagement between the two Fraunhofer organizations because they had worked together previously and work in a similar way, under the same umbrella brand. This similarity of institutional arrangements encouraged them to collaborate and to share information and knowledge in pursuit of a common goal (Knoben and Oerlemans, 2006; Vargo and Lusch, 2016). Among the other organizations, the level of engagement was not as high as expected; this confirms that the shared understandings that foster stakeholder engagement take time to develop and require multiple adjustments over time. Once meetings and discussions have specified a common goal, institutional arrangements will be mutually accepted (Zietsma and McKnight, 2009):

I talk to many people simply because I know them from regular meetings. If I don’t know people, I don’t interact with them at all (FAU – MK 1).

[…] To a certain degree, we even develop our own language (FAU – LSE 1).

One interesting manifestation of the lack of shared institutional arrangements was that professors from the various university departments barely engaged with each other, regardless of joint work packages and their employees’ engagement at operational level. This may be linked to pre-defined institutional arrangements within each academic discipline, and their location at different campuses did nothing to strengthen institutional arrangements. In general, the level of engagement was observed to be strong, but this varied according to each stakeholder’s institutional arrangements.

5. Discussion, implications and limitations

Engagement researchers have shown increasing interest in the micro-foundational perspective (Conduit and Chen, 2017; Storbacka et al., 2016), which can be regarded as a form of bottom-up theorizing (Foss, 2009). Examining the foundations and micro-constituents of engagement avoids black-boxing mechanisms (Felin et al., 2015) and may better explain outcomes of organizational innovation by examining their most proximate causes (Coleman, 1990). All organizational phenomena exist in nested arrangements that entail hierarchical relationships between concepts on different levels of analysis (Rousseau, 1995). While the rapidly growing literature on customer engagement provides a good basis to study antecedents, few empirical investigate the phenomenon’s microfoundations and antecedents (Felin et al., 2015; Storbacka et al., 2016). To the best of our knowledge, ours is among the first studies to undertake an empirical inter-organizational investigation (see also Jaakkola and Alexander, 2014) of the microfoundations of the cognitive, emotional, and behavioral dimensions of engagement (Brodie et al., 2013).

Following Storbacka et al’s (2016) remark on observable engagement activities, seven antecedents for stakeholder engagement were theoretically derived, and one additional antecedent was found from a rich data set capturing service system development over a 12-month period. Broadly, these antecedents’ direct attention to organizational aspects of stakeholder engagement and suggest multiple directions for research, opening onto a new and extensive field of knowledge. While previous studies have commonly centered on the individual actor’s or customer’s state of mind, several of the antecedents identified here were found to operate across organizational boundaries. Although the results of a single case study cannot be generalized, we suggest that these eight antecedents, relating both to stakeholder disposition and opportunity to engage, should be revisited for further validation.

The present findings confirm that stakeholder engagement with the same “object” (in this case, the innovation process) varies when viewed from individual, organizational, and inter-organizational perspectives, further extending the conceptualization of engagement. This invites both methodological questions about where engagement is to
be measured within an organization and theoretical questions about the impact of context. This latter issue has already been hinted at by Chandler and Lusch (2014), but it seems clear that more research is needed to explain the role of context in an inter-organizational setting. In this regard, it would be interesting to explore whether the eight antecedents identified here can be understood as microfoundations for the three dimensions of engagement across different industries and different project constellations. Another interesting finding (though again not generalizable) is that antecedents related to the behavioral dimension relate more to inter-organizational engagement while the cognitive and emotional dimensions are distributed between inter-organizational and individual engagement. Future studies should further explore this issue.

It is also significant that while traditional stakeholder theory views stakeholders as linked through a focal actor, we advance an alternative view based on systems thinking, in which stakeholders are inter-related beyond the dyadic relationships between focal firms and particular stakeholders. This links to Vargo and Lusch’s (2015) definition of a service ecosystem as a self-adjusting system of resource-integrating actors. Here, we argue that the main object of engagement within the ecosystem is a duality: the viability of the system itself and the execution of the specific task – in this case, an innovation. On this view, there is no focal actor, only systems thinking with no given central actor. Nevertheless, some stakeholders can be said to occupy a more central position, either by virtue of their actions or because of hierarchical structures.

Although, the eight antecedents were both theoretically discussed and empirically perceived to have impact on engagements three dimensions, it is only one of very few studies investigating stakeholder engagement in service ecosystems. In order to further establish our understanding of stakeholder engagement it would be interesting for future research to explore causality, both positive and negative, between these antecedents and their impact on the three dimensions. It would also be of interest to further investigate the impact of time on these eight proposed antecedents. Although the data focuses on an innovation process over time, we propose to analyze an even longer time frame that considers stakeholder engagement over a number of projects. Therefore, based on the present data, we propose four avenues for future research in the area of stakeholder engagement in a B2B context.

5.1 How can stakeholder engagement be maintained over time?
One interesting finding of this empirical case study is that stakeholder engagement in inter-organizational collaboration is commonly higher at the outset, motivated by self-representation when meeting new colleagues. However, as this effect is only temporary, and as inter-organizational activities often last for several years, it seems important to understand how stakeholder engagement can be maintained to ensure that the viability of the service ecosystem itself endures over time (Vargo and Lusch, 2016). For this reason, when theorizing about engagement, future research should devote more attention to the role of time by linking it to the formation of the antecedent institutional arrangements. For instance, it would be interesting to investigate whether engagement in service ecosystems follows the same trajectory as product lifecycle or the phases of a business relationship (Dwyer et al., 1987). Another interesting avenue for future research is linked to the antecedent of friendship. Here, we urge researchers to identify effective ways of maintaining and improving stakeholder engagement over the course of an innovation project and onward to a new project. This in turn invites consideration of mechanisms within an innovation project that might serve to maintain institutional arrangements, high positive valence, and stakeholder engagement between projects for the well-being of the ecosystem over time. While this case study has identified the antecedents of friendship, a common goal and institutional arrangements to engagement within a specific project, tracking the fluctuation of emotional, cognitive and behavioral engagement between projects would yield new and interesting insights for both theory and managerial practice.
5.2 Does stakeholder engagement at particular levels of the organizational hierarchy help or hinder inter-organizational co-innovation?

In confirming impact of the antecedent “hierarchy” on stakeholder engagement, findings invite questions about the individual stakeholder’s disposition to engage within a service ecosystem. For instance, our data show a lack of stakeholder engagement on the lower hierarchical levels. Does this imply that there is a need for fostering and developing stronger stakeholder engagement at low levels of the hierarchy to ensure effective and efficient innovation, or could it be that it is enough for these stakeholders and project members to follow orders from more engaged stakeholders at higher hierarchical levels?

In this context, it would also be of interest to understand how hierarchy – or rather, co-governance (Röndell et al., 2016) – relates to strong inter-organizational engagement and well-being of the service ecosystem over time. For instance, we want to ask if a high hierarchical position within the ecosystem is a consequence of previous strong inter-organizational self-representation, or are strong cognitive aspects of stakeholder engagement a consequence of high hierarchical position alone? Answering such questions can help to clarify how inter-organizational innovation processes can be managed more effectively. It would also be interesting to explore whether engagement has an isomorphistic effect (Deephouse, 1996) within and across teams in different organizations – for instance, by investigating the impact of shared institutions (Vargo and Lusch, 2015) on isomorphistic aspects of the relational context shared by those stakeholders. A further interesting question concerns how the introduction of new technology/stakeholders/legislation impacts current stakeholder engagement and co-governance structures within existing service ecosystems.

5.3 Is strong engagement necessary for innovation activities?

Although the recent literature (Gummerus et al., 2012; Brodie et al., 2013; Hollebeek et al., 2014) tends to present high engagement as an ideal state, the present findings indicate that while inter-organizational engagement is not always high, intra-organizational innovation results are generally excellent. This raises the question of whether inter-organizational stakeholder engagement always augments innovative output, or whether too strong cognitive, emotional and behavioral engagement across organizational boundaries may harm co-innovative outcomes. This in turn relates to the concept of strong and weak links (Granovetter, 1973; Krackhardt, 1992; Uzzi, 1996), and it would be interesting to further examine the connection between level of engagement for the whole ecosystem and individual resource dependencies to establish whether level of engagement with the object in question impacts on performance. In an innovation context, strong or unduly strong engagement may hinder or harm innovativeness in inter-organizational collaboration, information exchange, and interaction. It would also be interesting to investigate how different types of common goals influence engagement – for example, as in this case, does the creation of a new concept engage people more than the common goal of generating profits for the owners?

5.4 Are the different engagement antecedents linked?

The present analysis identified eight antecedents linked to the three engagement dimensions proposed by Brodie et al. (2013). Each antecedent was examined in detail to assess its unique influence. Future research should address the links between these antecedents and their strength (Granovetter, 1973). For instance, might one very positive antecedent neutralize a negative antecedent, or are certain antecedents essential to maintain stakeholder engagement? It would also be of interest to investigate any differences in these antecedents’ impacts. Are all antecedents equally important over time, or are some always more important? These mechanisms are significant for both academics and practitioners. If particular antecedents are found to be important or essential for positive stakeholder
engagement in service ecosystems, future research can devote greater attention to fostering and maintaining these elements. Turning to the individual stakeholder, it would also be of interest to compare the levels of engagement based on the antecedents “local proximity” in relation to hierarchical level. It seems also of interest to further investigate stakeholder engagement being linked to the flow of resource dependencies’ over time, as the resource-dependent stakeholder may subsequently become the resource provider, as the service ecosystem is formed dynamically through resource exchanges.

Managerial implications. The present findings indicate that stakeholder engagement is not only a psychological state of mind but confirm that it is also influenced by the environment (Chandler and Lusch, 2014). It follows that actors within an ecosystem influence each other’s engagement in co-creating an innovation, and in ensuring the viability of the system itself. This highlights the importance of single stakeholder strategic planning for engagement in inter-organizational innovation over time. The eight empirically derived antecedents offer managers insight and guidance for the strategic use of stakeholder engagement to protect the well-being of the system over the long term. This framework can also help managers to comprehend the complex nature of engagement, to identify critical antecedents for grounding or supporting engagement across stakeholders, and to understand why some fail to engage with sufficient intensity.

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