# How Individuals Perform Customer Knowledge Absorption Practices – A Contextual Approach to Open Innovation

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## Abstract

Enabling individuals to perform open innovation practices requires an in-depth analysis of the context in which those practices are enacted. However, research on the context within which open innovation is practiced, is still in its beginning. This paper develops a theoretical framework of the relationship between open innovation practices, individuals performing those practices, and context factors that enable or constrain those individuals carrying out open innovation practices. Moreover, the paper reports empirical research on context factors enabling or constraining salespeople in performing customer knowledge absorption practices, a specific subset of open innovation practices, in a pharmaceutical packaging machines firm. The paper contributes to open innovation research by (1) advancing a contextual view on open innovation, (2) emphasizing the need to distinguish between open innovation practices that provide an analytical tool to unravel the social dimension of open innovation, and (3) identifying context factors that enable or constrain customer knowledge absorption.

# 1. Introduction

Since Chesbrough's initial work (Chesbrough, 2003), open innovation (OI) has gained widespread attention (Bogers et al., 2017; Huizingh, 2011; Van de Vrande et al., 2010). According to Chesbrough (2006, p. 1) "open innovation is the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively". In other words, sharing knowledge with external parties increases innovation performance (Ritala et al., 2015). Consideration of the external environment in the innovation process is not new (Trott and Hartmann, 2009) and has been elaborated in user research (von Hippel, 1988) as well as in knowledge management (von Krogh et al., 2001). Nevertheless, Chesbrough's introduction of the concept of open innovation, was well-timed, which explains why OI has found considerable recognition (Dahlander and Gann, 2010).

OI covers a variety of different practices that might broadly be categorized as inbound, outbound and coupled activities (Chesbrough and Crowther, 2006; Gassmann and Enkel, 2004). Inbound activities cover practices that absorb knowledge from external sources such as universities, joint ventures and alliances, competitors, suppliers, and/or customers (Fey and Birkinshaw, 2005). By contrast, outbound activities cover practices that externalize knowledge in order to increase speed of sweep (e.g., joint ventures) and coupled activities are combinations of inbound and outbound activities (Gassmann and Enkel, 2004). It becomes clear that those activities differ substantially from each other, even though they all belong to the OI paradigm. Consequently, research should consider differences between those activities as well as the practices they comprise.

At present, context factors that enable or constrain individuals such as customers, managers and employees in performing OI practices are largely unknown (Bogers et al., 2017; Huizingh, 2011; Sisodiya et al., 2013; West et al., 2014). Consequently, although we have some

knowledge about diverse practices within the OI paradigm, it is unclear how these practices are linked to context factors. We explore this research gap by applying a contextual perspective to OI practices. *The purpose of this paper is to unravel context factors that enable or constrain individuals in performing OI practices*. We focus on a specific subset of OI practices, that is, customer knowledge absorption (CKA) practices, and hereby account for extensive differences of practices covered by the OI paradigm.

The paper proceeds as follows. First, we explain the relevance of differentiating various OI practices and, consequently, focus on CKA practices. Second, we clarify the nature of those practices by unravelling the role of individuals that perform them. Third, we investigate context factors that enable or constrain employees in performing OI practices. We summarize those theoretical arguments by developing a framework of how context, actions of individuals and OI practices relate. Fourth, we identify concise contextual factors that enable and constrain individuals in performing customer knowledge absorption practices within PackCo, a bio-pharmaceutical packaging machines firm in North America. Finally, we discuss how our findings contribute to research and practice of open innovation.

## 2. Theoretical Background

### 2.1. Open Innovation and Customer Knowledge Absorption Practices

Several scholars have acknowledged that focusing on and differentiating between practices within the OI paradigm might be a fruitful approach to understand the phenomenon in more detail (Battistella et al., 2017; Chesbrough and Crowther, 2006; Huizingh, 2011; Spithoven et al., 2013; Van de Vrande et al., 2009). Huizingh (2011, p. 6), for instance, suggests that "taking a typology from literature, e.g., the distinction between inbound, outbound and coupled activities (Gassmann and Enkel, 2004), and then defining various practices for each of these activities" is a valid approach to further unravel OI. Similarly, Chesbrough and Brunswicker (2014) argue that distinguishing between practices is important to gain an understanding of how

firms actually 'do' open innovation. In other words, OI covers a variety of practices that differ substantially from each other, but share the involvement of external entities in innovation. Such practices refer to how open innovation is done (Huizingh, 2011).

Considering the relevance of focusing on specific OI practices, we therefore focus on customer knowledge absorption practices. Those practices have been found to be a relevant subset of practices within the OI paradigm (Gassmann et al., 2010; West and Bogers, 2014; West et al., 2014). Van de Vrande et al. (2009), for instance, stress the relevance of distinguishing between OI practices and subsequently identify eight different OI practices, customer involvement being one example. Battistella et al. (2017) define user innovation as a specific OI practice. Chesbrough and Brunswicker (2014, p. 20) use the term consumer and customer co-creation practices that they define as "involvement of consumers or customers in the generation, evaluation, and testing of novel ideas for products, services, processes, or even business models". Similarly, we define customer knowledge absorption practices as those practices that individuals perform in order to absorb the knowledge of customers to generate, evaluate and test new products, services, processes and business models.

Several arguments support the notion that CKA practices are vital for organisations. First, the role of customer and user knowledge in innovation is a popular theme in literature (Bogers et al., 2010; Henkel and von Hippel, 2005; Prahalad and Ramaswamy, 2004) as well as in practice (Ili et al., 2010). Early research argued that customer feedback is critical for companies to develop products meeting customer needs (Griffin and Hauser, 1993; Rothwell, 1977). Hippel went one step further and postulated that users not only provide valuable feedback but also create innovation autonomously, by, for example, recognition of need, problem solving, and building and proving the usability of prototypes (von Hippel, 1978; von Hippel, 1986; von Hippel, 1988). He found that users sometimes develop products independently and offer them freely to the manufacturer. In the 1970's, for example,

adolescents redesigned bicycles to be like motorbikes (e.g., with imitation tailpipes): consequently firms offered motorcycle-style bikes (von Hippel, 1986, p. 802). Moreover, Spaeth et al. (2010) show that consumers can inject information or knowledge into corporate innovation projects.

Second, performing CKA practices has several implications for innovation performance. Henkel and von Hippel (2005) posit that user innovation differs from closed innovation since users create products that closely fit their needs: these inventions also complement the knowledge and capabilities of the manufacturer. The latter aspect is important because users may apply out-of-the-box or unique solutions (Adamson, 1952; Birch and Rabinowitz, 1951; von Hippel, 1986). Moreover, their innovations may well reflect future market needs. This is especially applicable to lead users who face those needs earlier than others and, therefore, may profit greatly from the early innovation (von Hippel, 1986). Consequently, successfully performing CKA practices has positive performance effects (Fiegenbaum et al., 2014; Li and Calantone, 1998).

However, studying customer knowledge absorption has mainly focused on customers themselves rather than employees absorbing customer knowledge (West and Bogers, 2014; West et al., 2006). Focusing on customers, though, is insufficient in explaining CKA practices, because it is vital for firms to enable employees to obtain, analyse and transfer external knowledge (Chesbrough, 2017). This argument is convincingly supported by Foss et al. (2011). In their analysis of 169 Danish firms, they find that the link between customer knowledge and innovation is fully mediated by organisational practices. This implies that, to understand CKA practices, it is vital to focus on the organisations' ability to absorb customer knowledge, and, more importantly, on the employees and managers that perform those practices.

CKA practices, however, can be further reduced to the following practices: obtaining, analysing, transferring, and commercializing. First, employees have to perform practices that

enable them to obtain new customer knowledge (Chesbrough and Crowther, 2006; Slowinski and Sagal, 2010; West and Bogers, 2014). We define *obtaining* as a practice that associates perform to recognize and receive customer knowledge. Typically, these associates are the ones that actually work with customers (e.g., salespeople). Second, practices of analysing refer to whether knowledge that has been received is understood and interpreted appropriately (Du Chatenier et al., 2010; von Hippel, 1986). Moreover, analysing means understanding the relevance of knowledge obtained (Sawhney and Prandelli, 2000; West and Bogers, 2014). Hence, we define *analysing* as a practice that associates perform to evaluate the relevance and applicability of customer knowledge. Third, employees transfer knowledge within the organisation (West and Bogers, 2014).This step is also critical to the effectiveness of customer knowledge absorption because knowledge has to cross internal boundaries between the sales and R&D department (Hillebrand and Biemans, 2003). This step is directly linked to the combination of different knowledge bases of professionals, which is included in many models of cooperative knowledge creation. We define *transferring* as a practice that employees perform to convey knowledge within their organisation to associates (e.g., engineers, who can consider this knowledge when creating new products). Fourth, employees have to commercialize customer knowledge (West and Bogers, 2014). We define *commercializing* as a practice that associates perform to transform customer knowledge into innovative outcomes.

CKA practices frequently involve sales activities (Gibbert et al., 2002). Sales activities usually involve direct contact with customers and sales performance depends on customer knowledge (i.e., in knowing customer requirements for a product to be sold). In other words, "the sales process, which will determine the characteristics of the interaction with the customers, needs to be conducive to knowledge sharing" (García-Murillo and Annabi, 2002, p. 883). Obtaining knowledge and commercializing it are directly interrelated, because commercializing practices usually depend on the prior obtaining of customer knowledge.

Moreover, sales activities also involve the internal processing of knowledge. Particularly in those cases in which products are customized or developed according to specific customer requirements, salespeople have to interact with R&D engineers to develop and customize those products (Griffin and Hauser, 1996; Gupta et al., 1985).

In summary, understanding OI requires scholars to differentiate between the manifold practices that are covered by this paradigm, since those practices differ significantly from each other. CKA practices are a specific and important subset of practices within the OI paradigm, and emphasize how essential it is that individuals within an organisation obtain, analyse, transfer and commercialize customer knowledge. Since these practices are inherently social in nature, we now elaborate on the role of individuals within CKA practices.

## 2.2. The Role of Individuals for Customer Knowledge Absorption Practices

In general, research acknowledges that practices are performed by people and are, thus, inherently social in nature. "This approach is, to some extent, a reaction to an earlier emphasis in organisational theory that focused primarily on structural features while neglecting the agentic capacity of human action" (Feldman and Orlikowski, 2011, p. 1240). Similarly, Whittington (2006) argues that practices and practitioners are entangled. Consequently, individuals such as customers, salespeople, engineers and managers are at the core of CKA practices. This argument is also in line with OI research (Bogers et al., 2017; West et al., 2006). Bogers et al. (2018), for instance, point out that employees are commonly neglected in OI research and that it is important to consider them in order to understand the phenomenon. This view is also shared by Du Chatenier et al. (2010) who highlight the skills possessed by employees in OI teams. Similarly, Salter et al. (2014) explore how employees deal with OI-related issues. Battistella et al. (2017) explain that the implementation of OI practices requires companies to leverage interaction between diverse actors that perform those practices.

In order to further elaborate on the role of individuals within CKA practices it might be fruitful to distinguish between different groups of individuals. Whereas it is apparent that customers are an important group within CKA practices (see Section 2.1), we particularly highlight the role of another group: salespeople. Salespeople connect actors within and outside the organisation, which means they act as boundary spanners. These employees help organisations to be more innovative (Hsu et al., 2007; Lysonski and Johnson, 1983; Tushman and Scanlan, 1981). In performing CKA practices they connect the organisation with its stakeholders and contribute by providing knowledge about customer needs and market trends to the marketing and the R&D department and by connecting those parties with key customers (Foss et al., 2011; Malshe and Biemans, 2014). Therefore, salespeople have to understand customer needs and have to be able to build strong relationships with them (Du Chatenier et al., 2010). Secondly, salespeople interface with R&D departments: communication with engineers is critical for salespeople's performance and vice versa. Consequently, salespeople need sufficient technical skills to understand the technical specifications behind the products (Hsu et al., 2007; Mortara and Minshall, 2011). But even if they have these technical skills, misunderstandings and conflicts between these two departments are "the rule, rather than the exception" (Moenhaert and Souder, 1990, p. 96) (also see Griffin and Hauser, 1996).

In summary, due to the innate social dimension of CKA practices, individuals form a critical part of these practices. In the context of customer knowledge absorption practices, customers and salespeople are particularly important. Salespeople perform a mediating role in connecting the employees within the organisation (e.g., engineers) with its external stakeholders (e.g., customers). Since it is our aim to understand what enables or constrains those individuals in performing CKA practices, we highlight the role of context in the following section.

## 2.3.    The Role of Context for Customer Knowledge Absorption Practices

Research on the role of context in organisations builds on contingency theory. This theory claims that instead of striving to identify a common, best way of organizing, it might be more fruitful to focus on the context of organizing (Donaldson, 2001). Similarly, we argue that specific context factors *enable* individuals to perform CKA practices, whereas other context factors might *constrain* those practices. The social skills of salespeople, for instance, enable the performance of CKA practices, since employees possessing those skills may be more able to obtain relevant knowledge from customers and convince engineers to transform the knowledge obtained into innovative products. By contrast, if strategic goals of the organisation do not emphasize the need to act in a customer oriented way, this might constrain CKA practices.

The relevance of taking a contextual perspective has also been recognized in OI research (Bogers et al., 2017; Elmquist et al., 2009; Huizingh, 2011; Westergren, 2010). Elmquist et al. (2009), for instance, identify the important but yet underexplored aspect of how context factors affect OI. Huizingh (2011, p. 5) argues that "a contingency approach is needed (…) that focuses on the context characteristics determining open innovation effectiveness". Bogers et al. (2017) mention that contextual approaches to OI, such as exploring the role of employees in OI, remain underdeveloped. We, therefore, identify the influence of context factors on OI as an important area for future research.

------- Insert Table 1 about here ------

This is partly because comprehensive studies of context factors influencing OI practices are rare (see Table 1) and do not typically focus on specific practices. Consequently, we focus on some contextual factors that have been emphasized by other OI scholars as well. First, strategy and organisational structure are organisation-level contextual factors that enable or constrain OI practices. Several authors have argued that embedding OI practices in strategy and goal

setting is important (Bader and Enkel, 2014; Buganza and Verganti, 2009; Chesbrough and Appleyard, 2007; Herskovits et al., 2013; Huizingh, 2011). This argument implies that strategic goal setting should explicitly mention external knowledge search and exploitation to emphasize the implementation of OI practices from the top, and it should also align OI within business growth targets (Chesbrough and Crowther, 2006). Moreover, scholars acknowledge that OI requires supportive structures (Crossan and Apaydin, 2010; Du Chatenier et al., 2010; Elmquist et al., 2009). Chiaroni et al. (2010), for instance, show that in four Italian firms a change from closed to open innovation required a shift in organisational structure to be successful.

Second, (organisational) culture is another organisation-level contextual factor that enables or constrains OI practices (Mortara and Minshall, 2011). A culture enabling OI practices emphasizes mutually supportive values for sharing knowledge, networking and consideration of the external environment as a source of valuable information (Durst and Ståhle, 2013; Elmquist et al., 2009) as well as for taking risks and appreciating innovation (Stucki and Finger, 2009). Others have hinted at the not-invented-here syndrome as a cultural aspect that constrains OI practices (Burcharth et al., 2014; Herzog and Leker, 2010; Nakagaki et al., 2012; Salter et al., 2014; Tucci et al., 2016). Nakagaki et al. (2012), for instance, analyse the implementation of open innovation practices in a large pharmaceutical company and find that a change in culture and mindset was the cornerstone of successfully implementing OI practices.

Third, individuals that participate in OI practices contribute their skills, knowledge and motivation (Herskovits et al., 2013). Hence, skills might also enable OI practices and shape how those practices are enacted (Du Chatenier et al., 2010; Durst and Ståhle, 2013; Gassmann et al., 2006; Huizingh, 2011; Kallio and Bergenholtz, 2011). Du Chatenier et al. (2010), for example, argue that individuals in open innovation teams are of critical importance for open innovation success and identify skills those individuals require to perform in those teams. They find that social skills, among others, are significant in building trust and facilitating

relationships. Similarly, Bogers et al. (2018), show that employee characteristics positively relate to openness of innovation, emphasizing the "human side" of open innovation.

Fourth, formal processes and tools enable CKA practices (Herskovits et al., 2013). Formal processes are required to manage incoming knowledge and exploit it (Chiaroni et al., 2010; Renzl et al., 2013). Thus, defining formal OI processes as well as those employees responsible for their implementation are important contextual aspects (Durst and Ståhle, 2013; Herskovits et al., 2013; Van de Vrande et al., 2009; Westergren, 2010). Similarly, tools might enable CKA practices. Such tools, for instance, enable obtaining of customers' knowledge (Gassmann et al., 2010; Sawhney and Prandelli, 2000) or manage knowledge obtained internally (Chiaroni et al., 2010). Moreover, they might influence open innovation practices indirectly, for instance, when human resource management tools strive to develop relevant skills of employees who participate in CKA practices (Bogers et al., 2017; Du Chatenier et al., 2010).

----- Insert Figure 1 about here -----

The framework in Figure 1 illustrates the interplay of our theoretical arguments. This framework shows that the OI paradigm captures a diversity of different practices. We include the category of CKA practices as well as supplier knowledge absorption practices in our illustration, but several other practices also belong to the OI paradigm. CKA practices may be further reduced to practices of obtaining, analysing, transferring and commercializing. Individuals play a vital role in OI practices since their actions constitute those practices. Moreover, practices are embedded in contexts that either enable or constrain those individuals in performing practices. Since OI practices span organisational boundaries, the relevant context factors are both inter- and intra-organisational. Focusing on the internal context, which is

commonly overlooked, the categories strategy and structure, culture, employee's skills and tools and processes might be applied to analytically distinguish between different context factors. The concise context factors and their enabling or constraining effects on OI practices, however, depend on the specific practices at hand. In our point of view, current studies do not sufficiently account for the diversity of practices within the OI paradigm and the relevance of context. We fill this research gap by identifying concise context factors that are relevant for CKA practices in a pharmaceutical packaging machines firm.

# 3. Case Study

## 3.1. Company Description

The following case study of PackCo[1] empirically illustrates context factors that enable or constrain employees in performing CKA practices. PackCo is a market leader in the production of packaging machines covering several industries and globally employs more than 5000 associates. Their headquarters is located in Europe. Total revenue amounts to more than one billion dollars. PackCo offers bio-pharmaceutical packaging machines that are used to pack liquid as well as solid pharmaceuticals. The organisation analysed is a subsidiary in North America with approximately 100 employees.

## 3.2. Method

Our data came from three main sources – documents, interviews and an expert survey – to ensure validity through triangulation (Eisenhardt, 1989; Jick, 1979). Additionally, we participated in meetings and accompanied working salespeople over a period of five months. Table 2 provides an overview of the data collected and explains their specific role in our analysis.

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[1] Names have been changed in order to maintain confidentiality of data.

----- Insert Table 2 about here -----

First, we collected internal as well as external documents. We identified documents and tools providing customer knowledge. Those documents, for instance, included 27 customer satisfaction surveys provided by customers. Another document type evaluated was the lost project review. This form was used to ask prospective customers why they opted for a competitor. Moreover, we analysed human resource management related tools such as skill profiles, internal and external job descriptions and performance reviews of salespeople. Those tools particularly informed our understanding of salespeople's skill and performance management. Furthermore, we collected documents such as handbooks, e-mails, presentations and websites.

Second, we conducted interviews that combined semi-structured and critical incident techniques (Flanagan, 1954). In the first part of each interview, we asked informants for critical incidents, i.e., situations in which they successfully obtained, analysed and transferred customer knowledge. Critical incidents are past occurrences of human activities that were outstanding contributions to success or failure. A major advantage of this method is that it is less biased by the perception of the interviewees (Spencer and Spencer, 1993). Moreover, the critical incidents directly captured past behaviours of salespeople. Thus, they reflected the inherently social nature of CKA practices and formed a basis for context factors that enabled or constrained informants in performing CKA practices. In other words, this method seemed to be suitable for capturing the interplay between CKA practices and the respective context. In the second part of the interviews, we asked each informant for contextual factors that influenced CKA practices. This part of the interviews focused on aspects (e.g., culture), which were not obvious within the critical incidents. The combination of both techniques enabled us to double-check our results and gather a full spectrum of relevant context factors. We interviewed ten

salespeople of the subsidiary and two representatives from the R&D department to receive

multiple perspectives on CKA practices (Kallio and Bergenholtz, 2011). The average duration

of the interviews was approximately 60 minutes.

Third, we conducted an expert survey. We summarized context factors of CKA practices

identified by an interviewee from the R&D department and asked four colleagues to add further

context factors, specify existing ones and describe their relevance.

Data analysis followed traditional approaches to case study research (Eisenhardt, 1989;

Yin, 2013). In order to analyse our data, we applied a content analysis approach (Krippendorff,

2013). First, we coded the interview transcripts according to the practices of obtaining,

analysing and transferring customer knowledge as defined in Section 2.1. Second, we coded

context factors that enabled or constrained these CKA practices and categorized those context

factors into the dimensions "strategy & structure", "culture", "employee's skills" and "tools &

processes". Defining those dimensions can be understood as an iterative approach where we

cycled between OI theory (see Section 2.3) and our data. Third, we compared our findings with

the results of the expert survey. Fourth, we compared and complemented our findings with the

results from our document analysis.

### 3.3. Findings

We categorized the context factors that enable or constrain CKA practices into the dimensions

"strategy & structure", "culture", "employee's skills" and "tools & processes". The dimension

"strategy & structure" includes the context factors "strategic objectives" and "structure". The

dimension "culture" includes "lack of customer orientation" and the "not-invented-here

syndrome". The dimension "employee's skills" contains the context factors "social skills",

"technical and methodological skills" as well as "personal skills". The dimension "tools &

processes" contains the context factors "meetings", "knowledge structuration tools", "human

resource management tools" and "lack of formal processes and responsibilities". In the following, we explain our findings in detail.

### 3.3.1. *Strategy & Structure*

Our data reveals that organisational structure at PackCo constrained transfer of customer knowledge. An interviewee, for example, stated that large projects involve several business units that harm the lead time of sales activities. We found, to be more precise, that the interface between the subsidiary and the engineering department in Europe (i.e., structural separation of those departments) was a critical bottleneck for customer knowledge transfer. Consequently, structural separation constrained interaction between those departments and, thus, processing of customer knowledge within PackCo.

Those structural issues highlight the importance of strategically designing appropriate objectives that enable transfer of customer knowledge within the organisation. The subsidiary in North America was founded in order to increase geographical proximity to customers, thus highlighting opportunities to boost sales activities as well as to obtain new customer knowledge. The North American market has a vital function in respect to customer-aligned innovation since a lot of innovation in the pharmaceutical industry is generated there.

However, strategic goal setting at PackCo constrained customer knowledge transfer. Emerging, fast growing markets seemed to be the focus of the corporate headquarters. As a consequence, attention to the North American market was limited, resulting in reduced appreciation of knowledge being obtained from customers in the North American market. Fast growing markets also caused a high workload for the headquarters intensifying the issue since the capacity of the parent company to process knowledge was limited and the need to put more emphasis on the North American subsidiary was not recognized.

"Right now we are not the focus. There are other markets that are better, more profitable. […] They are doing much more business with those countries so that's their bread and

butter. We're an important market because we're driving a lot of what happens in the industry. So it's a huge problem." [Interviewee C]

In summary, structure and strategic objectives might enable or constrain employees in performing CKA practices. At PackCo, organisational structure created a bottleneck for transferring customer knowledge between the subsidiary's salespeople who had direct contact with customers and the engineers at PackCo's headquarter. Moreover, strategic objectives did constrain transfer practices. To be more precise, strategic objectives of PackCo did not sufficiently emphasize the North American market.

### 3.3.2.   *Organisational Culture*

Our data shows that PackCo's culture also constrained CKA practices. An interviewee perceived PackCo as risk averse, which implied that a creative and risk taking mindset to create innovation from customer knowledge was missing. Several other interviewees also emphasized the relevance of a customer oriented culture.

> "We don't spend enough time asking 'what is your opinion of the PackCo product? What can we do better down the road?' They [the customers] might give you a lot of good and bad feedback, but that is what we want to get. That's really key to deriving better products, talking to the customers who are using them. But again it is a shift of culture." [Interviewee A]

Hence, lack of customer orientation constrained obtaining practices since employees were not encouraged to approach and listen to the concerns of the customers. Another cultural aspect identified was the not-invented-here syndrome as shown in the following excerpt from an interview:

> "I think one that hinders it [customer knowledge absorption] is us not being flexible or open to some new ideas. I guess my company as a whole is kind of stuck in our way

where we think we are already the experts. So new ideas sometimes are not taken very well." [Interviewee E]

On the one hand, this issue referred to analysing customer knowledge. Although the not-invented-here syndrome might not directly affect obtaining, it affected the appreciation of customer knowledge obtained (i.e., analysing). On the other hand, this cultural aspect also referred to transferring knowledge from the salespeople in the North American subsidiary to the engineers working at the headquarter. The interviews show that knowledge that salespeople tried to transfer was oftentimes blocked by the R&D department. Consequently, the not-invented-here syndrome constrained workers in transferring customer knowledge.

In summary, culture was a contextual factor that constrained employees at PackCo in performing CKA practices. On the one hand, this aspect referred to obtaining customer knowledge, since a customer-oriented culture was missing. On the other hand, this aspect also referred to analysing and transferring customer knowledge, since the not-invented-here syndrome downplayed the relevance of customer knowledge.

### 3.3.3.   *Employees' Skills*

We found skills of salespeople to be an important enabler of CKA practices. First, social skills were important for obtaining and transferring customer knowledge. The salespeople were highly successful in obtaining knowledge from customers. Several interviewees revealed that strong relationships with both customers and inside PackCo, which were built on trust, enabled them to obtain customer knowledge. This aspect also involved appropriate communication. We found evidence for strong relationships with customers that were expressed in salespeople's social skills. For instance, a salesperson frequently met customers on the golf course in order to intensify their relationship. Other salespeople were aware that frequently visiting customers and bringing the relationship to a personal level by exchanging private information was crucial.

> "We had a few visits in Europe because of our projects and had good dinners. He [customer] is not a drinker and I'm not a drinker and he appreciates that, too. We could go out and we don't have the feeling that this is one of those late drinking events – it's just building a friendship." [Interviewee B]

Similarly, social skills – particularly communication – also enabled transferring of customer knowledge to the engineers at headquarters. This is shown in the following quote, in which a salesperson describes the relevance of communicating customer requirements to engineers.

> "When you have a machine that's designed specifically for what they [the customers] want to do and it's the customer saying 'no, I don't want that. I want something else. I want the other machine [to] do it'. That made it a little harder [to convince engineers], but I needed to communicate to the people here why it's important for the customer to go down this other path and the reasons behind it." [Interviewee C]

Second, we also found that salespeople's use of technical and methodological skills enabled analysing customer knowledge. These skills were particularly important because salespeople frequently actively participated in knowledge generation with customers: this entailed analysing the feasibility of customer knowledge.

> "We had designed something similar for another customer. So when I saw his [the customer's] information come in, it immediately reminded me that we have something similar already. That worked well and had value for that [second] customer, so I made that connection right away." [Interviewee A]

Moreover, salespeople had to understand customer knowledge in order to assess its meaning – they had to take the customer's perspective.

> "The customers are the ones using it [PackCo's products] and we are designing it for how we see it being used. But other ones actually have to deal with it day in and day out

and to do that most effectively they need equipment that meets their needs and makes their lives easier." [Interviewee C]

Third, our data revealed that salespeople at PackCo applied personal skills enabling obtaining and transferring practices. Those personal skills enabled them to be open to new impulses and show initiative. To be more precise, salespeople proactively approached customers and co-workers in order to enable CKA practices. Furthermore, salespeople were open to new impulses as exemplified in the following quotation that deals with fulfilling a new customer requirement:

"Joe [another salesperson] simply could have said that we don't have that machine, but he took the step to communicate it back internally and we didn't spend much time and got on a phone call with them [customers] and the next thing we know is that we have a concept for the machine." [Interviewee A]

In summary, salespeople's skills were a contextual factor that enabled and constrained CKA practices. We found that social, technical and methodological as well as personal skills enabled salespeople to perform CKA practices. Those skills also compensated for the constraining influence of strategy, structure and culture. For instance, even though structure created a bottleneck between engineers and salespeople, salespeople's skills enabled them to build strong relationship with engineers.

### 3.3.4. *Tools and Processes*

Tools and processes also affected CKA practices. First, meetings enabled obtaining and transferring practices. According to the interviews, it was crucial to offer platforms for face-to-face discussions with customers and inside the company. For example, a salesperson mentioned that customer visits were an excellent opportunity to obtain customer knowledge. Another interviewee also mentioned this aspect and added that customer knowledge could only be obtained if employees were face-to-face with the customer. A third interviewee provided an example in which a discussion of requirements during a face-to-face meeting with the customer

revealed relevant customer knowledge. Another interviewee even went one step further and explained that CKA practices might be enabled by bringing customers and engineers together. He describes a situation where customers rotated through different departments of the parent company and a team from the North American subsidiary was sent over to discuss important issues (e.g., improvement opportunities) with these customers and co-workers. He mentioned that these meetings were very valuable and helped to build trust and to absorb customer knowledge.

Second, knowledge structuration tools enabled analysing practices. We define knowledge structuration tools as tools that individuals use in performing their practices to document customer knowledge in a structured way. For instance, salespeople at PackCo used a requirement specification form to gather customer requirements in a structured way. As explained by a salesperson, this tool not only provides customer requirements, but also can be used internally to discuss opportunities and risks of a new development. Another category of tools that supports practices of analysing were modification lists. Modification lists structured discussions with customers and helped employees to remember past issues. Furthermore, contact lists enabled salespeople to structure knowledge about customers. This is shown in the following excerpt from the interviews:

> "I can't even describe how I met and know all those people. For each customer I have a list of contacts there. I mean for every single one. I update that list very often and we do marketing from that."

Third, human resource tools enabled obtaining and analysing practices. Handbooks defined the concise tasks of salespeople and, thus, their responsibilities. The annual performance review tied those responsibilities to performance management. Our document analysis revealed that salespeople had objectives in terms of revenue. Moreover, objectives reflected obtaining customer knowledge and knowledge transfer within the subsidiary. However, there was a lack

of objectives for salespeople in the subsidiary that enabled the transfer of knowledge from the subsidiary to engineers in the head office. In this vein, salespeople had objectives that enabled obtaining and analysing knowledge from customers, but not transferring customer knowledge within PackCo. Furthermore, skill profiles as well as job descriptions defined salespeople's skills and helped to close skill gaps. Hence, they indirectly enabled CKA practices by managing salespeoples' skills.

However, several interviewees mentioned that, although customer knowledge was obtained, a simple, formal process including clear responsibilities for analysing and transferring this knowledge internally was missing.

"The process is not real clear. Our salespeople talk to customers and they have those ideas, but they don't know what to do with it or to whom to talk to. We don't have a process." [Interviewee B]

This lack of formal process referred to both sides of the R&D-sales interface. On the one hand, salespeople were not sure to whom to forward feedback. On the other hand, R&D engineers needed salespeople who transferred customer knowledge as shown in the following statement of an engineer.

"I kind of rely on him [salesperson]. People like him tell me what it is I need to design because I'm in a vacuum here. I don't have a lot of customer contact." [Interviewee H]

In conclusion, tools enabled CKA practices. Knowledge structuration tools enabled analysing practices and meetings enabled obtaining as well as transferring practices. Additionally, human resource management tools enabled obtaining and analysing practices indirectly via performance management and skill development. However, a lack of formal processes and responsibilities constrained analysing and transferring practices. Table 3 shows the enabling and constraining effects of the context factors at PackCo on the CKA practices of obtaining,

analysing and transferring. Appendix A provides more detailed explanations and additional data material illustrating the context factors.

----- Insert Table 3 about here -----

# 4.       Discussion and Conclusion

The open innovation paradigm has revitalized the discussion about how organisations involve external entities in innovation. In this paper, we focus on customer knowledge absorption practices that have been found to be a relevant subset of practices within the OI paradigm. We conceptualize CKA practices as inherently social phenomena that are performed by actors such as salespeople and customers. Gathering rich qualitative data at a pharmaceutical packaging machines firm, we find that the context in which those practices have been enacted enabled and constrained individuals in performing those practices. Organisation-level contextual factors such as structure and strategic objectives as well as culture constrained individuals in performing CKA practices. Employees' skills as well as different tools, in contrast, enabled individuals to perform CKA practices. In other words, whereas the larger organisation did constrain CKA practices, more micro-level aspects such as skills and tools counteracted this tendency. These findings emphasize the critical role of individuals in performing CKA practices.

Our insights contribute to research on open innovation in several ways. First, we address OI scholars that have called for and advanced a contextual perspective on OI (Bianchi et al., 2011; Bogers et al., 2017; Elmquist et al., 2009; Huizingh, 2011; Sisodiya et al., 2013; Van de Vrande et al., 2009; Van de Vrande et al., 2010; Westergren, 2010). Huizingh (2011), for instance, calls for a contextual approach as this might be the next step to further unravel the open innovation paradigm in detail. Similarly, Elmquist et al. (2009) emphasize the relevance of unravelling context factors. In other words, the open innovation paradigm might not only

include the specific sets of OI practices, but also the context in which those practices are enacted. We fill this research gap by taking a contextual perspective on a specific subset of OI practices (i.e., customer knowledge absorption practices). Our study shows which context factors are relevant in performing those practices. This approach might also be applied by scholars that strive to apply a contextual lens to open innovation. Prior studies that elaborated on the context factors influencing OI practices have argued that context might be important (Huizingh, 2011), but this research remains rather general in nature. We add to those insights by introducing two mechanisms of how context and OI practices interact. On the one hand, context might *enable* individuals in performing practices. In our case study, for instance, skills of salespeople enabled them to perform CKA practices. Human resource management tools, for example, also enabled practices. This is in line with the finding that human resource management is related to knowledge sharing and innovation (Gomes et al., 2017; Hurmelinna-Laukkanen et al., 2016). On the other hand, context might also *constrain* actors in performing OI practices. This was, for example, prevalent in organisational structure that created a bottleneck between the sales department and the R&D department, constraining CKA practices. In a nutshell, we propose that future research should differentiate between enabling and constraining mechanisms and specifically look at how individuals interact with the various context factors in order to improve our understanding of OI practices. It is likely that scholars may even identify context factors that enable some OI practices, but constrain others.

A second contribution refers to the idea of considering OI as a set of different practices. Several scholars have referred to the notion of practice within the OI paradigm (Battistella et al., 2017; Chesbrough and Crowther, 2006; Huizingh, 2011; Spithoven et al., 2013; Van de Vrande et al., 2009). The term practice, however, oftentimes remains undefined. An exception is Huizingh (2011) who argues that practices refer to how open innovation is done (Battistella et al., 2017). This conceptual move advances open innovation research in two different ways:

the notion of practice advances the inherently social dimension of open innovation and it enables a more detailed analysis of contexts that enable and constrain open innovation.

Considering the notion of practice foregrounding the inherently social dimension of open innovation (Feldman and Orlikowski, 2011; Whittington, 2006), our data show that salespeople, customers and other employees perform specific practices (i.e., obtaining, analysing and transferring) in order to absorb customer knowledge. These practices, which we regard as solely performative phenomena, embody performative connections between individuals' actions. These individuals, however, apply skills that enable them to perform CKA practices. While these skills are not specific to practices, they shape them and might also be shaped by them. For instance, social skills of salespeople might not only enable obtaining of customer knowledge, but also practices of spending time with their families in private life. Identifying such skills enables a better understanding of the social dimension of open innovation practices. For instance, our data show that the social dimension of OI means to communicate appropriately and build strong, trustful relationships among individuals (Renzl, 2008; Tschannen-Moran and Hoy, 2000), proactively drive open innovation practices even though the larger organisation might constrain them (Mahringer and Renzl, 2018; Spencer and Spencer, 1993) or taking all relevant information into account to make sense of customer knowledge received (McIntyre, 1998). However, the social dimension also interacts with the strategy, structure and culture in which practices are embedded. Hence, analytically distinguishing between practices and context improves our understanding of how actors contribute to open innovation, and hereby addresses research that has emphasized the role of humans in open innovation (Bogers et al., 2018; Bogers et al., 2017; Du Chatenier et al., 2010).

Considering the notion of practice also allows a more detailed analysis of contexts that enable or constrain open innovation. The notion of practices allows us to analytically disassemble the OI paradigm into subsets of practices that might be further explored. Scholars

acknowledge that the OI paradigm is an umbrella for practices that capture a diversity of external knowledge sources that differ substantially from each other (Chesbrough and Crowther, 2006; Huizingh, 2011; Verbano et al., 2015). Particularly when taking a contextual view of those practices, it is important to make a distinction here. In regard to context factors, some studies have taken a broad approach identifying factors that affect OI in general (Durst and Ståhle, 2013; Elmquist et al., 2009; Herskovits et al., 2013; Huizingh, 2011; Schroll and Mild, 2012). While those studies provide valuable overviews they lack accuracy since they do not focus on specific practices. This might also be reflected by the fact that many of those studies are not empirical in nature (Mortara and Minshall, 2011). Other scholars have derived analytical precision by unravelling specific context factors in isolation. Such studies involve the identification of employees' skills (Du Chatenier et al., 2010), corporate strategy (Bader and Enkel, 2014) and culture (Herzog and Leker, 2010). A third way to gain analytical accuracy might be to consider the full spectrum of context factors, but focusing on only a limited subset of practices that share context factors. By specifically focussing on CKA practices, our study shows how this approach might be applied. Our framework might be used to allocate such studies.

Finally, we contribute to research that explores how customer knowledge is absorbed. Customer knowledge is a major theme in OI research (Bogers et al., 2010; Henkel and von Hippel, 2005; Prahalad and Ramaswamy, 2004). Prior research, however, has oftentimes focused on the customers themselves instead of investigating how individuals working in companies are enabled to perform CKA practices (Chesbrough, 2017; Du Chatenier et al., 2010; Foss et al., 2011). Our study provides specific insights into which context factors enable and constrain individuals in performing CKA practices. We find evidence for strategy and structure, culture, employees' skills as well as tools and processes.

Our research also provides managerial implications. If managers are willing to enable their employees to absorb external knowledge from customers, they are well advised to consider the context factors identified in this paper. Managers, for instance, may create an open innovation strategy with specific objectives, they may shape organisational culture towards customer orientation, train employees, and define formal processes and clear responsibilities. Facilitating such a context might enable employees to perform CKA practices and develop new, innovative products and technologies. However, managers should also be aware that the context factors critically depend on the specific OI practices to be enacted.

Our study has some limitations that might be addressed by future research. First, we focus on CKA practices in a pharmaceutical packaging machines firm, limiting transferability to other contexts. In our particular case study, for instance, practices of obtaining, analysing and transferring occurred, typically, in selling projects. Hence, practices of commercializing could not be separated from practices of obtaining, analysing and transferring, since the latter three practices resulted in commercialization of customer knowledge. This might be different in contexts in which products are not directly tailored to specific customers, but where commercialization is partly independent of the other practices. Second, for the sake of simplicity, we conceptualize a unidirectional relationship between practices and context. Practices and context, however, might also be considered as 'dual' where both aspects are deeply entangled (Feldman and Orlikowski, 2011). For instance, salespeople might build new skills by performing OI practices. Future OI research might elaborate on this aspect. Third, we specifically focused on the open innovation literature. An alternative approach might be to link our findings to literature on absorptive capacity (Cohen and Levinthal, 1990), which provides a different perspective on the context for open innovation.[1] Fourth, scholars studying OI are required to choose an appropriate level of granularity for the practices to be observed. The level of granularity does affect which context factors become relevant for a focal subset of practices.

If we, for instance, considered inbound practices as a focus, the contextual factors might be more general and imprecise than for CKA practices. By contrast, looking only at regular sales, visit practices would have blurred the focus on knowledge absorption by salespeople. Even though there is no best way to choose granularity, we believe that defining the practices to be analysed is key. Our empirical analysis reveals that there was sufficient similarity between the incidents that the interviewees described. However, our findings might not be applicable, in general, to all practices covered by the OI paradigm. Nevertheless, this might be a fruitful way for future research. More empirical research unravelling context factors that enable and constrain diverse OI practices in diverse sectors would help to gain a more holistic understanding of the interplay of practices, people, and context within the open innovation paradigm.

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# Footnote

[1] An alternative literature to ground CKA practices is absorptive capacity (Cohen and Levinthal, 1990). Absorptive capacity is "the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends" (Cohen and Levinthal, 1990, p. 128). This definition matches with our definition of CKA practices, since 'recognizing' refers to 'obtaining', 'assimilating' refers to 'analysing' as well as 'transferring', and 'applying it to commercial ends' refers to 'commercializing'. Several scholars have noted that absorptive capacity and open innovation are related constructs (e.g., Hughes and Wareham, 2010; Spithoven et al., 2010; Xia and Roper, 2016), but how those constructs relate oftentimes remains unclear. While elaborating on this link in depth is beyond the scope of this paper we propose that this is a matter of perspective: using an absorptive capacity lens foregrounds the combination of firm-internal resources that build up this capability (e.g., contextual factors) as well as the fit of knowledge obtained. An open innovation lens, by contrast, foregrounds the practices that are performed to include external entities into innovation processes.

# Tables and Figures

Figure 1: A framework of how context enables and constrains individuals in performing open innovation practices
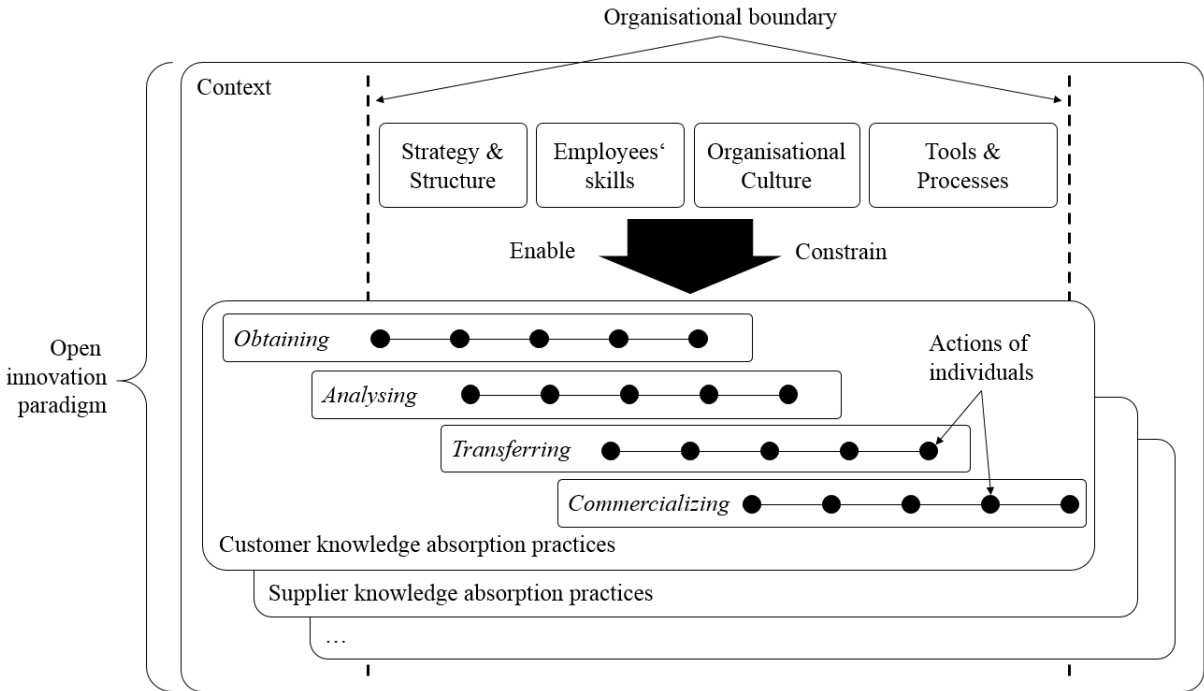
Table 1: Context factors in open innovation research

| Author(s) | Studies' focus | Study type | Context factors |
|---|---|---|---|
| Elmquist et al. (2009) | Major areas in OI | Review | Notion / idea of OI, business models, organisational design and boundaries of the firm, leadership and culture, tools and technologies, intellectual property and patenting and appropriation, industrial dynamics and manufacturing |
| Huizingh (2011) | Context factors of OI | Review | Internal (demographics: number of employees, sales, profits, age, location, market share, ownership type; strategy: strategic orientation, goals of innovation strategy, incumbents versus new entrants, organisational culture), employee characteristics |
| Schroll and Mild (2012) | Factors influencing OI adoption | Review | R&D intensity, firm size, strategic breadth and diversification, geographic proximity, design capabilities, technology aggressiveness, short-term orientation, customer orientation, rising development costs |
| Durst and Ståhle (2013) | Factors enabling OI | Review | Relational issues, people and facilitators, governance, provision of resources, strategy, open innovation process, leadership, culture |
| Herskovits et al. (2013) | Aspects of OI enhancing value drivers | Conceptual | Organisation (objectives, structure, interaction), talent (capabilities, leadership, culture), infrastructure (practices, tools, technologies), instruments (corporate venture capital, licensing, cooperation) |

Table 2: Overview of research methods

| Method | Description | Purpose |
|---|---|---|
| Observation | Five month full time participation in sales department | Understanding the work and tasks of salespeople at PackCo, Understanding how context enables and constrains performance of CKA practices (contextualizing role) |
| Document analysis | Documents (e.g.): Customer satisfaction index, requirement specification form, service reports, modification lists, skill management, job descriptions, job offerings, annual performance reviews, company descriptions, handbooks | Understand strategy, understand formal processes and tools relevant for CKA practices, understand markets |
| Expert survey | Four experts from the R&D department | Reflection on context factors |
| Interviews (12) | Semi-structured and critical incident interviews with salespeople and engineers | Context factors enabling and constraining CKA practices |

Table 3: Context factors that enabled and constrained CKA practices at PackCo

| | Context factors | Obtaining | Analysing | Transferring |
|---|---|---|---|---|
| **Strategy & structure** | Strategic objectives | | | − |
| | Structure | | | − |
| **Culture** | Lack of customer orientation | − | | |
| | Not-invented-here syndrome | | − | − |
| **Employee's skills** | Social skills | + | | + |
| | Technical and methodological skills | | + | |
| | Personal skills | + | | + |
| **Tools & processes** | Meetings | + | | + |
| | Knowledge structuration tools | | + | |
| | Human resource management tools | + | + | |
| | Lack of formal processes and responsibilities | | − | − |

– indicates "constraining"; + indicates "enabling"

# Appendix A

| | Context factors | Mechanism | CKA practice(s) | Explanation | Exemplary quote |
|---|---|---|---|---|---|
| Strategy & structure | Strategic objectives | Constrain | Transferring | Misalignment of objectives of business units constrained transferring of customer knowledge between business units. | "We all have our separate goals. We all have our separate things that we need to get done in order for us to be successful in our jobs. We got our customers and our problems. Everybody is limited in their time." [Interviewee C] |
| | Structure | Constrain | Transferring | Structural separation between the subsidiary and the headquarters resulted in a bottleneck that constrained the transfer of customer knowledge from the subsidiary to the headquarters. | "We are always the middleman between the customer and the designers. I think that is something that slows the [customer knowledge absorption] process and it slows our response time." [Interviewee I] |
| Culture | Lack of customer orientation | Constrain | Obtaining | PackCo lacked a culture in which employees felt the need to get in touch with customers and fulfil customer needs. This constrained obtaining of customer knowledge. | "The other factor is, and I really want you to capture it, is the fact that our associates are too far removed from our customers. Whoever deals with anything with customers […] they really have to remind themselves what the customer needs and why the customer needs it." [Interviewee G] |
| | Not-invented-here syndrome | Constrain | Analysing, transferring | The not-invented-here syndrome resulted in insufficient appreciation of customer knowledge constraining analysing as well as transferring practices. | "Lots of times when we do something with customer feedback we get defensive because it's something that picks on some technology or some part of our machine that we think is great." [Interviewee C] |
| Employee's skills | Social skills | Enable | Obtaining, transferring | Social skills enabled communication and building of strong relationships with customers and internal stakeholders enabling obtaining and transferring practices. | "We're trying to build a relationship that makes the customer say 'I don't really want to look at those guys [competitors], I want to stick with you'. " [Interviewee B] |
| | Technical and methodological skills | Enable | Analysing | Technical and methodological skills enabled analysing customer knowledge, i.e., understanding of customer knowledge and its implications for PackCo and the customers. | "They [a specific customer] just needed a better cycle and we needed to find out a better way to do it. So I wrote back to [engineer] and said we need to work on our cycle time to be approved to compete with the market and to have a better product." [Interviewee L] |

| | | | | | |
|---|---|---|---|---|---|
| | Personal skills | Enable | Obtaining, transferring | Personal skills enabled salespeople to be open toward new customer knowledge and to proactively obtain and transfer it. | "I always ask [my customers] 'What can we do to help you? What's going to make your process better? What are you having problems with?'. " [Interviewee J] |
| | Meetings | Enable | Obtaining, transferring | Meetings with customers enabled salespeople to obtain customer knowledge. Meetings with co-workers enabled transfer of customer knowledge within the organisation. | "When you do site visit that's where you get feedback and that's probably the only way to get feedback. Customer is not going to call me, sending surveys doesn't work, you really have to be in the face of the customer." [Interviewee J] |
| Tools & processes | Knowledge structuration tools | Enable | Analysing | Knowledge structuration tools (i.e., customer satisfaction index, requirement specification form, service reports, modification lists) enabled salespeople to structure customer knowledge and subsequently analyse it. | "So we provided a quotation using the requirement specification [form] and getting feedback from the customer to what we were offering." [Interviewee D] |
| | Human resource management tools | Enable | Obtaining, analysing | Human resource management tools (i.e., skill management, job descriptions, job offerings, annual performance reviews) indirectly enabled obtaining and analysing by managing salespeoples' skill development and performance management. | Not applicable; insights gathered via analysing human resource management tools. |
| | Lack of formal processes and responsibilities | Constrain | Analysing, transferring | PackCo lacked formal responsibilities for analysing customer knowledge and formal processes of how to transfer customer knowledge. | "I think the problem is not [about] getting the feedback. We get a lot of feedback in different areas […]. The difficulty is who is responsible for that and what to do with it. […] There is all good sources of feedback directly from our customer and coming through the service deck. But at that point it stops. It goes out to everybody but there's not a process saying 'customer said that this is really good, so what are we going to do with it?'." [Interviewee A] |