Knowledge exchange between KIBS and their customers in a digitalization context

A case study of interactions between Bouvet and Agder Energi Nett

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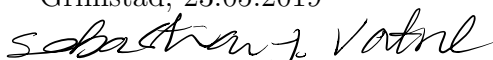This page intentionally left blank.

Preface

This thesis has been conducted as the final part of the master's degree in *Industrial Economics and Technology Management* at the University of Agder.

When faced with the challenge of narrowing down the field of research for the master's thesis, I kept coming back to an event that took place a few years ago. The University's Career Fair in 2017 opened up an opportunity for me to exchange words with several of the largest power companies in Norway. Those conversations left me intrigued. Not just one but all of the power companies weaved a read thread of concern for Norwegian power companies as the exclaimed; "It is a traditional industry", "we have almost not changed for the last 100 years", "we need to modernize and become more efficient", "We need digitalization!". It was therefore of great interest for me to relate the master thesis to one of the largest power net-companies in Norway, namely Agder Energi Nett. Adding my previous experience from the consultancy industry as well, it made for an exciting topic to research the interaction between Bouvet and Agder Energi Nett as they lead the way for digitalization in the industry.

On this occasion, I would like to thank both Bouvet and Agder Energi Nett who set aside time and resources to answer my questions, and for the great help and educational conversations throughout the course of the research.

Finally, I would like to express my gratitude to my two supervisors Arne Isaksen, and Nina Kyllingstad, whose support, comments, and remarks have been of great value.

Grimstad, 23.05.2019

Sebastian Josiah Vatne

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Summary

The rise of digitalization as one of the major trends in the world of business offers great challenges for organizations regarding technological knowledge. This is because technology unwraps so rapid that it is difficult for organizations to sustain a mature relation to technological knowledge, which in turn makes it more difficult to understand, master, and utilize new products and services. To resolve this issue, organizations tend to turn to consultancy firms with expertise in the technological field. It is in such a setting that this thesis aims to examine *how consultancy firms and their customers interact to create new digital solutions.* Based on a case of digitalization in Agder Energi Nett (AEN), where the consultancy firm Bouvet has been of central support, this thesis examines the interaction between the two. The focus area is narrowed down to a knowledge exchange perspective where theory on the topic lays the basis for the following four empirical research questions:

1. *What kind of knowledge did Bouvet contribute with?*

2. *How does the knowledge exchange happen?*

3. *What role has absorptive capacity played throughout the project?*

4. *How did the project embeddedness develop during the project?*

The thesis builds on interview's with central actors in AEN and Bouvet as well as other relevant documentation.

The case is argued to build upon an instance of successful digitalization, which lays the basis to generalize empirically. Other KIBS-customer relations who find themselves in a digitalization context may look to this case, and mimic their interactions for successful results.

Central findings show that Bouvet contributed with both tacit and explicit knowledge. In return, AEN had a great amount of focus on building domain-specific knowledge

with its consultants. Further, both a dynamic and a static knowledge exchange form was apparent as a result of close collaboration and interaction, and the exchange of more standardized knowledge through courses and seminars. The embeddedness developed to have shared representations and a high level of trust, which the parties benefited from greatly.

The theoretical contribution of this case study is addressing knowledge exchange in a digitalization context. Such a setting reveals the importance of both the sender and the receiver having absorptive capacity which contributes to current theory where the focus is merely on the receiver having absorptive capacity. Possible explanations to this increased need of absorptive capacity may be the high presence of dynamic knowledge exchange in combination with the rapid advancements in the field of digitalization. The causation's goes beyond this thesis focus area and hence lay the basis for future research.

Keywords: Digitalization, KIBS, Knowledge, Knowledge exchange

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1 Introduction

It is stated that businesses have to lay the basis for acquiring knowledge in order to develop a unique competitive advantage (Porter, 1990; Aslesen & Isaksen, 2007; Tidd & Bessant, 2013). However, as technology unfolds in an exponential matter, for a company to keep itself on the competitive side, this makes for a great challenge (Chandler, 2013). Already back in 1994, Bohn stated that "managing in high-tech industries requires both rapid learning and the ability to manufacture with immature technological knowledge" (p. 64). Other literature aligns with this and shows that the requirements for knowledge regarding technology is challenging, and especially for new technology as organizations are less likely to have already acquired the knowledge necessary. This makes it difficult to understand, master and utilize new products or process opportunities (Miles & Kastrinos, 1995, p. 27).

Parviainen, Tihinen, Kääriäinen, and Teppola (2017) identifies digitalization as one of the major trends that are changing both society and business in the near and long-term future. Further, technology serves as one of the main drivers in digitalization, and therefore the challenges with technological knowledge are argued to apply in a setting of digitalization too. The Norwegian government has acknowledged such challenges with digitalization when initiating a national strategy through the digital 21 selection (Digital 21, 2018). The strategy aims to:

> *Promote the business community's ability and opportunity to both develop and implement new technology and knowledge in line with the increasing digitalization.* - (Digital 21, 2018)

Here it becomes evident that the government sees the challenges Norwegian businesses are up against, and thereby a strategy to promote, among other things, the development of knowledge. As a result of such a development, where businesses have less mature knowledge, one can observe the needs for consultancy services increasing (Daniels & Bryson, 2002).

Thus, the aim of this research is to research how consultancies within the technological field, in the best manner possible can interact with their customers when creating new digital solutions. Hence, the theoretical research question is:

How can consultancy firms and their customers interact to create new digital solutions?

As a means to address this theoretical research question, the thesis builds upon a case study. The research design which leads to a case study is discussed under the section *Method*. Following the cases is presented in short; however, it is presented in further detail in the section *Case Presentation*.

1.1 The Case

The case for this thesis is Agder Energi Nett's (AEN) work of digitizing their entire power-lines. The digitalization came as a result of a law that enforced all net companies to install smart-power meters throughout their power-lines (Olje-og energidepartementet, 2011). These measures are claimed to be the largest change in the energy industry over the last 100 years. In addition to the regulations given by the government, AEN have on their own initiative, and as the only power company in Norway, taken several measures to digitalize the grid fully.

The work on digitalization has been organized into a temporary department in AEN, referred to as the AMS-program. The AMS-program in whole has had a span of approximately ten years and a total cost in the 1bn NOK class. The results have enabled AEN to gain unique insights and has changed the way they handle customers and their operational responsibility. In AEN's own words, the program is a *milestone* and states *the beginning of a new era* for the AEN (Agder Energi Nett, personal communication, March 21, 2019). These factors listed above, not only give a unique case study but a successful one too. The vast amount of new opportunities, the number of cooperating suppliers as well as several prize nominees all substantiate the

digitalization being successful.

For AEN to achieve these results, they have been accompanied by several suppliers, where the consultant company Bouvet has played one central role. The thesis focus will be on the knowledge-exchange between AEN and Bouvet during the presented digitalization process.

1.2 Focus Area

Figure 1 illustrates the focus area of the thesis.
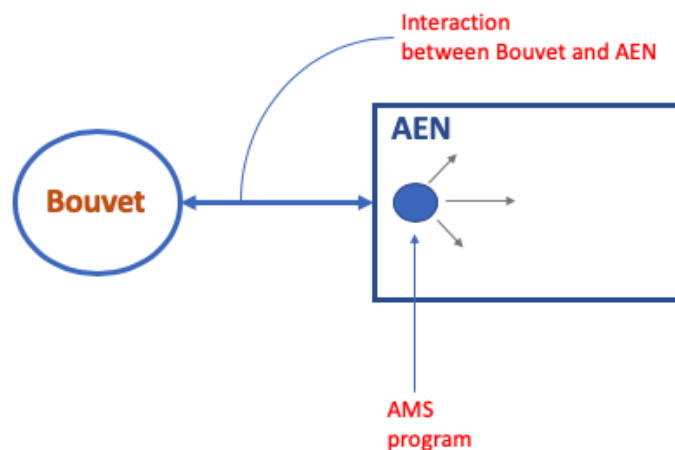
Figure 1: *Illustration of the thesis focus area.*

This thesis is narrowed down to the interaction between Bouvet and the AMS-program in AEN. Further, the focus is based on a knowledge perspective during their interaction. By a knowledge perspective, it is intended to see what role knowledge plays, and how it is exchanged between the parties. How AEN best diffuses knowledge within their organization (represented with arrows going out of the AMS-program in figure 1) is argued to be a field of research for itself, and is not accounted for in this thesis.

The structure of the thesis is divided into the following manner. Section 2, *Theory*, presents relevant theory in relation to the theoretical research question. In this section the various concepts such as *digitalization*, *KIBS*, *knowledge* and *knowledge exchange* are presented. The section further leads up to an analytical framework and four empirical research questions which the thesis builds upon. Further, section 3, *Method*, discusses how the research is designed, what actual methods were used, and how this affected the research quality. Section 4, *Case Presentation*, presents the case for better understanding during the analysis. Section 5, *Analysis*, discusses the empirical findings in light of the presented theory. Lastly, section 6, *Conclusion*, concludes on the findings and discusses the empirical and theoretical generalization of the findings. Further research is incorporated into the discussion of empirical and theoretical generalization.

2 Theory

This section will discuss relevant theory in regards to the previously mentioned research question. Wrapping up the section, a constructed analytical framework provides a reference to the study of the interaction between consultancy firms and their customers. From this section one could expect to gain more insights on the manners regarding *digitalization*, *innovation*, *consultancies*, *knowledge* and *knowledge exchange*.

2.1 Digitalization

Digitalization refers to "the changes associated with the application of digital technology in all aspects of human society" (Stolterman & Fors, 2004, p. 689). As this is quite a broad definition Yoo et al. (2010) goes further and narrows it down to the "transformation of socio-technical structures that were previously mediated by non-digital artifacts or relationships into ones that are mediated by digitized artifacts and relationships" (p. 6).

From a historical perspective one can define three waves of digitalization. The first wave involves "the technical digitization of converting analog contents and services into digital ones without fundamental changes in the industry structure"(Yoo et al., 2010, p. 11-12). Within this *first wave* the industry may experience significant cost reductions. However, the first wave does not bring any fundamental changes in the tightly coupled layer of product architectures. In *the second wave*, traditional boundaries across product categories and industries are constantly shifting. For instance, media services such as music, books, e-mail, and movies can be delivered over multiple different types of networks using multiple devices (Yoo et al., 2010). *The third wave* of digitalization, the emergence of novel products and services enables one to among others collect vast amounts of information that used to be invisible. Such opportunities lay the basis for continuous innovations (Yoo et al., 2010, p. 11-13).

From the three waves of digitalization, the distinction between digitization and digitalization is brought to the surface. Often the terms are interchanged, and the complexity and industry transformation that follows digitalization is undermined. According to Parviainen et al. (2017) digitization regards "the action or process of digitizing; the conversion of analog data (esp. in later use images, video, and text) into digital form". In contrast, digitalization embraces a broader specter and is referred to as "the changes associated with the application of digital technology in all aspects of human society". Parviainen et al. (2017) uses an example of the Finish tax administration to clarify the difference. If the tax administration was to digitize, they could have made the paper tax reporting form digital so that citizens could report their tax information in a digital format. Instead, the tax administration chose to renew the entire process in the sense that they receive the tax information of the Finnish citizens directly from their employers, banks, and other income sources. This example accentuates the distinction between the term digitization and digitalization.

2.1.1 Digitalization and Innovation

Digitalization does not only lead to great changes for organizations, but it can also result in innovation within regional and national economies (Isaksen, Trippl, Kyllingstad, & Rypestøl, 2019). Innovation is further recognized as one of the main attributes to a competitive advantage for firms in high-cost-locations. Yoo et al. (2010) defines innovation as the "creation and adoption of an idea, a product, a technology, or a program that is new to the adopting unit" (p. 6). Tidd and Bessant (2013), further explains innovation practice to deal with the process of turning ideas into reality and then extracting value from them.

In short, there are several approaches to innovation, where knowledge-push can be underlined as one major one (Tidd & Bessant, 2013, s. 234). Here, new opportunities and ideas are created based on scientific research, which often results in radical breakthroughs, followed by incremental innovations. There is, however, little reason

to seek out ideas and solutions if there is no need in society and as a result another approach, need-pull, has been formed. In this approach, innovation forms based on responding to real needs in society. Simply put: "Necessity is the mother of invention and innovation" in the need-pull approach (Tidd & Bessant, 2013, p. 75). Need-pull often results in incremental innovations, as opposed to knowledge-push, which is associated with radical innovations. An example of a type of innovation in the field of need-pull is the term *disruptive innovations* which covers the needs of customer groups that have not met their needs (Christensen, 1997, s. 4). For instance, the introduction of low-cost airlines, trying to meet the needs of leisure travelers and not just the existing business travelers is an example of a *disruptive innovation.* Further development of need-pull is *user-driven innovation*, where users or employees, are systematically involved to understand the user's real needs (Wise & Høgenhaven, 2008, s. 7).

One can draw several links between innovation and digitalization. For instance, innovation is not primarily regarded as a single event, but rather as a process (Dodgson, Gann, & Phillips, 2014). This aligns with the view of digitalization as it is argued that reordering socio-technical structures can be seen upon as a process (Yoo et al., 2010). Literature also recognizes interactive learning as fundamental to both innovation and digitalization, where interactive learning is regarded as a socially embedded process (Lundvall, 2010; Yoo et al., 2010).

Further, one can argue that digitalization actually is innovation in some instances. Schumpeter (2003) and Dodgson et al. (2014) states that innovation actually are "new combinations", as most innovations are not actually novel themselves. He claims that often it is the combination of existing elements which are novel. Often this is the case of digitalization too (Yoo et al., 2010).

Often disruptive innovations are undervalued by existing organizations as they partly, or in whole, replace existing markets and functions (Tidd & Bessant, 2013). This can also be expected to be the case with digitalization as it has a disruptive nature (Yoo

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et al., 2010). Kane, Doug, Phillips, Kiron, and Buckley (2015) addresses this same challenge with digitalization and shows to strategy (digital business strategy) for helping existing organizations identify the source of value creation and capture.

2.2 KIBS

During a digitalization process, frequently organizations have to acquire new knowledge and competency. In such a context, often external resources, such as consultancies, are used to make use of specific knowledge domains (Aslesen & Isaksen, 2007). As consultancies are businesses which make their living from offering services, it is argued that they most often can be characterized as a knowledge-intensive business services (KIBS) (Muller & Zenker, 2001). The OECD further confirms software consultancies as one of the knowledge-intensive industries (Isaksen, 2004).

According to Toivonen (2004), KIBS are "expert companies that provide services to other companies and organizations" (p. 1). Compared to other types of services, such as labor intensive and capital intensive, KIBS stand out, as the knowledge factor they provide is difficult to grasp and more challenging to measure (Strambach, 2001). Miles and Kastrinos (1995) characterize KIBS into the following points. First off, they rely heavily upon professional knowledge. Thus, their employment structures are heavily weighted towards scientists, engineers, and experts of all types. Secondly, they are either themselves primary sources of information and knowledge (e.g., reports, training, consultancy), or they use their knowledge to produce intermediary services for their client's production processes (e.g., communication and computer services) (Miles & Kastrinos, 1995, p.28).

As KIBS may have a great diversity in respect to forms and activities Miles and Kastrinos (1995), also defined two types of KIBS, namely KIBS I and KIBS II. Whereas KIBS I represents the traditional professional services such as marketing, advertising and design, KIBS II is defined to be new technology based service providers. The traditional services (KIBS I) is often associated with helping users navigate and nego-

tiate complex systems. In regard to complex systems they often, however, do not deal with technical systems and some examples such traditional services could be:

- Social systems - legal and accountancy services as well as marketing and issues consultancy services.

- Physical systems - architecture and building services.

- Psychological and biological systems - medical and veterinary services.

(Miles & Kastrinos, 1995, p. 27)

KIBS I are characterized by their relation to technology as they are users and not recognized for developing or diffusing it. It is in such a context that KIBS II is defined as they are characterized by developing and diffusing knowledge in a technological context. These new forms of services are often identified as new professional services. Examples of services KIBS II provide could be: Software development, design involving new technologies, building services (involving technology), and management consultancy involving new technology (Miles & Kastrinos, 1995). In the context of this thesis, KIBS II is referred to as KIBS.

Despite the categorization of KIBS, Strambach (2001) points out several aspects which typify KIBS. The first link is the product they "produce", knowledge, and the fact that they provide "non-material intangible services". The second aspect has to do with the interaction and communication between the supplier and users. As the purchase of knowledge-intensive services differentiates from the purchase of a standardized product or service, there often is a high level of interaction and communication between the KIBS supplier and the KIBS user. The activity of consulting makes for the third main aspect, as it is common the process of problem-solving plays out when KIBS adapt their expertise and expert knowledge to the needs of the client.

KIBS may function as a link to diverse information and knowledge during the process of solving client-specific problems and challenges. Amongst others, KIBS can provide

a "point of fusion between:" 1) general scientific and technical information, 2) internal experience and competence acquired by the KIBS firms in interaction with clients, and 3) the more tacit knowledge located within the daily practice of client firms and sectors (Hertog, 2012, p. 237).

Although the use of KIBS has expanded, the importance of KIBS in regards to a firms innovation activity is disputed. Several innovation studies show to clients, and suppliers having a more significant impact on a firms innovation than what KIBS does (Cooke, Boekholt, & Todtling, 2000; Aslesen & Isaksen, 2007). The Organization for Economic Co-operation and Development (OECD) can also define several barriers to innovation when using services. Firstly, they point out that intellectual property rights and imitation may serve as a challenge. 40 % of the software firms in Germany agree to this being a barrier to innovation, and as KIBS make their living from providing knowledge to their customers, there is no reason that this should be any different for them. Secondly, as a result of the highly dynamic technological nature KIBS find themselves in, regulatory lag is pointed out as a challenge. In reality, this means that regulations are not keeping up with the development, and hence in some situations hinder innovation. Thirdly, the problem with information is defined as a barrier. As KIBS are based on information and knowledge, it can often be a challenge to disclose information to a potential customer, while trying to obtain new contracts without giving away parts to the key services (Organisation for Economic Co-operation and Development., 2001, p. 71-72).

Despite the challenges with KIBS in regards to innovation, there is literature which shows to KIBS playing a strategic role in stimulating innovation processes (Miles, 2005). By confronting organizational and cognitive barriers, KIBS may facilitate to innovation, or even in some cases, "co-produce" innovations with their clients (Hertog, 2012, p. 188).

2.3   The Knowledge Concept

As it is revealed that KIBS supply other organizations with vital information and knowledge, and as it is argued that they are increasingly developing into an informal "knowledge transfer structure" (e.g., Strambach (2001)), it is useful with a reference to relevant theory of knowledge.

In such a context, it is important to emphasize that information is not equivalent to knowledge, as these often are interchanged (Bohn, 1994). Nonaka and Teece (2001, p. 2) stresses this and defines information purely as structured data. Knowledge goes beyond and can be characterized as "a stock of expertise and not a flow of information" (Starbuck, 1992, p. 716). The fact that knowledge contains judgment, interpretations, and expertise, and that it is context dependent further differentiates it from information. It is also important to note that knowledge is not in any simple sense "objective", as it takes on different values in different situations (Strambach, 2001, p. 55). Such distinctions, where knowledge can be defined into different kinds of knowledge, is important. Often, in literature, two types of knowledge are defined, namely tacit and explicit.

2.3.1   Tacit and Explicit Knowledge

To explain the difference between tacit and explicit knowledge, Dhanaraj, Stensma, and Lyles (2004) uses the following example; "explicit knowledge provides the building blocks and tacit knowledge provides the glue and integrating mechanism in learning". According to Becerra, Lunnan, and Huemer (2008) tacit knowledge is defined as "non-verbalized, intuitive and unarticulated knowledge and that it can only be communicated through active involvement of the speaker" (p. 693). This is also confirmed by Smith (2001), who defines tacit knowledge by being "understood without being openly expressed" or as "knowledge for which we do not have words". Further tacit knowledge is seen upon as *know-how* as it represents knowing how to

do something without thinking about it (Smith, 2001). Often the interaction between software consultancies and their clients involves such uncodifiable and complex knowledge (Isaksen, 2004, p. 1171).

In contrast to tacit knowledge, explicit knowledge is defined as "coded and articulated knowledge that is easier to acquire and transfer verbally" (Becerra et al., 2008, p. 693). Explicit knowledge can be seen upon as technical or academic data or information that is described as informal language. Such knowledge is often documented in mediums such as manuals, mathematical expressions, copyright, and patents and can be characterized as *know-what* knowledge. Explicit knowledge is easier to transfer or exchange than tacit knowledge, however, it is important to note that explicit knowledge is technical and requires a level of academic knowledge or understanding that is gained through formal education, or structured studies (Smith, 2001).

2.3.2 Components of Knowledge

Often literature tends to define various types of knowledge as a means to define what degree of knowledge is necessary. Within the technological knowledge aspect Bohn (1994) has defined eight stages for understanding various degrees of knowledge better. Initially, these eight stages concern a companies knowledge about their processes as they range from complete ignorance of how they work to formal and accurate mathematical models. In this context, a process concerns "any repetitive system for producing a product or service, including the people, machines, procedures, and software, in that system" (Bohn, 1994, p. 62). From the process, there are defined inputs, outputs, and variables that characterize what is happening. Bohn (1994) emphasizes that the stages of learning can be applied to diverse tasks and industries. Table 1 gives an overview of these eight stages:

Table 1: *Bohn's eight knowledge stages. Retrieved from: Bohn (1994, p. 63)*

Stage	Name	Comment	Typical form of knowledge
1	Complete ignorance		Nowhere
2	Awareness	Pure art	Tacit
3	Measure	Pretechnological	Written
4	Control of mean	Scientific method feasible	Written and embodied in hardware
5	Process capability	Local recipie	Hardware and operating manual
6	Process characterization	Tradeoffs to reduce cost	Empirical equations (numerical)
7	Know-why	Science	Scientific formulas and algorithms
8	Complete knowledge	Nirvana	

Often literature looks solely upon processes that already are understood to a certain degree. Bohn (1994), however, argues that it is important to recognize the existence of processes that are not perceived as well. From table 1 variables in the first three stages are considered to be exogenous, and as a result, it is impossible to control them. It is not before stage five that one can manufacture products by following a "cookbook". In the transition from stage four to five, the learning process involves learning how to control the various disturbances that affect the input variable. In the final stage, stage eight, one understands the processes so good that one knows all the interactions among all possible variables. In practice, this stage is never reached. However, it is often approached by studying the processes in more and more detail.

The eight stages from table 1 also align with other theory where, for instance, stage six, process characterization (know how), and stage seven, *know-why*, are well-known expressions. Amongst others, Martin, Moodysson, and Zukauskaite (2011) and Garud (1997) discuss the terms, and Garud defines utterly one component of knowledge within the intellectual capital, namely *know-what*. Garud defines the three components the following:

- *Know-why* - represents an understanding of the principles of an underlying phenomena.

- *Know-what* - represents an appreciation of the kinds of phenomena worth pursuing.

- *Know-how* - represents an understanding of the generative process that constitute the phenomena.

(Garud, 1997, p. 81)

Using the example of computers, which have many components and collectively provide a given functionality, Garud clarifies the differences between the three knowledge components. *Know-why* represents an understanding of the principals underlying the construction of each component and the interactions between them. *Know-how* on the other side, represents an understanding of what procedures are required to manufacture each component and how the components should be put together to perform as a system. At last *know-what* understands the different customer groups and what they may want as well as understanding the various uses and expectations they may have for the system. Garud's states that today's environment underbuilds a need to synchronize the creation and deployment of these three knowledge components.

It is important to note that literature shows to various understandings of what the *know-what* component really represents. A different view to Garud's, is presented by Lundvall and Johnson (1994), who states that the *know-what* component refers to the knowledge about facts. E.g., how many people live in a particular area, or what are the ingredients for a certain cake. A possible explanation to these different definitions may be the context the literature is written in, where Lundvall and Johnson (1994) has a background in the economics field, and hence would arguably have a broader picture in mind than Garud which has an engineering background. This because the economic field often views causation's beyond the development of a specific product, for instance, the social aspect. Supporting this argument is the fact that Lundvall and Johnson (1994) introduced utterly one more knowledge component, namely *know-who*, which refers to knowing "specific and selective relations" (p. 29). Independent of the reason this thesis will take base in Garud's definition.

Isaksen et al. (2019) takes digital technology specifically into consideration when they specify three types of knowledge and activities that are vital for developing, employing, and diffusing them.

- Scientific knowledge forms the basis of developing specific technologies

- Knowledge, both scientific and experienced based that is necessary to produce particular digital products and services.

- Knowledge, (mostly experienced based) of how to utilize digital products and services in existing and new products and services/ activities.

(Isaksen et al., 2019, p. 3)

In this setting, one can draw synergies between the three knowledge components and Isaksen et al. (2019) knowledge distinctions. For instance Isaksen et al.'s third distinction can closely relate to the *know-how* component. Further, these knowledge distinctions provided by Isaksen et al. can help describe how knowledge exchange plays out in a digitalization setting.

2.4   Knowledge Exchange

Trippl, Todtling, and Lengauer (2009) defines knowledge exchange into two categories: *static* and *dynamic*. The first one is often regarded as the transfer of "ready" pieces of knowledge, and hence, the characterization static (or knowledge transfer). On the other hand, dynamic (or collective learning) regards interactive learning among actors, through cooperation or other joint activities. The studies from which (Trippl et al., 2009) defines these terms originate from the software industry. However, Aslesen and Isaksen (2007) adapts this thinking and applies it to KIBS theory in general. Table 2 shows an overview of various types of relations in knowledge exchange:

Table 2: *Relations in knowledge exchange. Retrieved from: Aslesen and Isaksen (2007).*

	Types of knowledge exchange	
Types of external knowledge sources	Static (knowledge transfer)	Dynamic (collective learning)
Actors delivering knowledge as their core business, most often through formal, traded relations	(1) Sales relations (purchase of standardized, recipe knowledge from KIBS or RTOs)	(2) Sparring relations (close and lasting interaction between clients and KIBS firms or RTOs in order to customize knowledge-intensive services)
Actors delivering knowledge profitless, most often through informal, untraded relations	(3) Knowledge spill-overs ('ready' pieces of knowledge following persons or goods between players, or through observing and copying other players)	(4) Informal networks (dense and long-lasting cooperation with specific partners in which collective learning often follows as a by-product of more traded relations)

It is argued that only the two first relations, sales relations, and sparring relations apply to this thesis. This is because the relation between KIBS and their customers are formal, traded relations. Aslesen and Isaksen underline that in real life, the knowledge exchange may happen across the types of relations illustrated in table 2.

Although Bakker, Cambré, Korlaar, and Raab (2011) discusses knowledge transfer, it is argued that the terms knowledge transfer and knowledge exchanges in some cases are interchanged (e.g., (Easterby-Smith, Lyles, & Tsang, 2008; Bakker, Cambré, et al., 2011)). Bakker, Cambré, et al. (2011) goes beyond Trippl et al. (2009) in terms of discussing mechanisms facilitating for successful inter-organizational knowledge transfer, and hence, the theory presented by Bakker, Cambré, et al. (2011) may very well be suitable to illuminate the knowledge exchange process between KIBS and their customers.

2.4.1 Inter-organizational Knowledge-transfer

Bakker, Cambré, et al. (2011) claims that the relationship attributes *relational embeddedness*, *cognitive embeddedness* and *temporal embeddedness* as well as the actor attributes *motivation* and *absorptive capacity* are essential for successful knowledge

transfer [1]

Relational embeddedness refers to the strength of the relation between two or more organizations. Strong relationally embedded ties between the project collaboration and the participating parent organizations generally lead to a high degree of knowledge transfer. Factors such as trust and trustworthiness, overlapping identities, and feelings of closeness or interpersonal solidarity all are important to the development of the relational embeddedness (Moran, 2005).

The strength of the relational embeddedness also influences what kind of knowledge is exchanged. Research shows that strong ties are associated with the exchange of tacit knowledge. On the other side, weak ties facilitate for the access novel information (Rowley, Behrens, & Krackhardt, 2000). In other words, one does not necessarily have to strive for strong ties, as this is dependent on the type of knowledge exchange one wishes to accomplish. As theory states that tacit knowledge demands interaction on behalf of both parties, one could also argue that the strength of the relational ties is interrelated to Trippl et al.'s (2009) two knowledge types, and that to achieve a dynamic knowledge exchange one needs a strong relational embeddedness. Anyways, Bakker, Cambré, et al. (2011) states that given an effortful cooperative behavior, it is likely to form the basis for successful knowledge transfer.

Cognitive embeddedness, also cognitive proximity, concerns the relationship between the parent organization and the project venture and to what extent it is characterized by "shared representations, interpretations, and systems of meaning" (Van Wijk, Jansen, & Lyles, 2008, p. 835). In Nooteboom, Van Haverbeke, Duysters, Gilsing, and Van Den Oord's (2007) paper, it is proven that having complementary knowledge bases is fundamental for organizational entities to successfully exchange knowledge. Further Nooteboom et al. (2007) illustrate the connection of cognitive distance in figure 2:

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[1]Nahapiet, Janine and Ghoshal, Sumantra (1998) remark similar factors, such as *structural embeddedness* and *relational embeddedness* in their well known paper *Social Capital, Intellectual Capital, and the Organizational Advantage.*
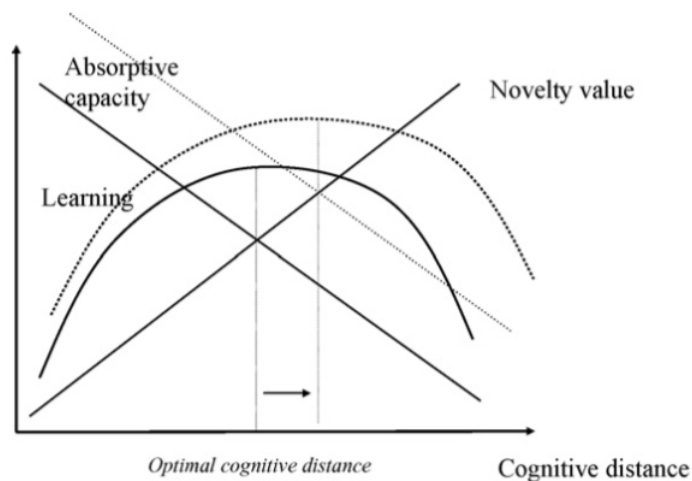
Figure 2: *Optimal cognitive distance. Retrieved from: Nooteboom et al. (2007).*

From figure 2, the cognitive distance is illustrated by showing the connection between absorptive capacity, novelty value, and learning. Nooteboom et al. (2007) proposes that increasing the cognitive distance has a positive effect on learning by interaction. It is argued that through different knowledge bases, people stimulate and help each other to stretch their knowledge for the purpose of bridging and connecting diverse knowledge when interacting. However, this only withstands to a certain degree as too much of a cognitive distance in interfirm knowledge transfer makes it challenging to uphold a mutual understanding and utilize the various opportunities. Hence it is crucial to have a certain degree of cognitive embeddedness to transfer knowledge successfully.

It is argued that the positive effect of the cognitive distance is high with radical innovations, while with incremental innovations the positive effect is understood to be lower (Nooteboom et al., 2007, p. 1018).

Temporal embeddedness relates to whether the parent organizations have worked together in previous project ventures and if they expect to do so again. Reflecting over this is important in regards to the project learning attribute. For instance, if the parts have worked on projects together from the past one can expect that the parts

have created trust, experience, and partner-specific knowledge (Bakker, Knoben, de Vries, & Oerlemans, 2011).

The *Absorptive capacity* refers to an organizations ability to recognize the value of new, external information, assimilate it, and apply it for competitive advantage (Bakker, Cambré, et al., 2011). Cohen and Levinthal (1990) argue that organizations need prior related knowledge to assimilate and use new knowledge. There are two criteria for prior related knowledge to facilitate understanding and value of new external knowledge.

First, the organization must have some prior knowledge which is basic to the new knowledge. Basic knowledge refers to a general understanding of the tradition and techniques upon which a discipline is based. Understanding the relevant basic knowledge permits the receiving firm to understand the assumptions that shapes the senders knowledge and thereby be in a better position to evaluate the importance of the new knowledge for its own operations (Cohen & Levinthal, 1990). Second, some part of the senders knowledge must be somewhat diverse "to permit effective, creative utilization of the new knowledge" by the receiver (Cohen & Levinthal, 1990, p. 136). In short, this means that the receiving organization's have the greatest potential to learn from the sender when they have similar basic knowledge but different specialized knowledge (Cohen & Levinthal, 1990).

Further, it is evident that an organization's absorptive capacity is directly dependent on the individual members absorptive capacity. However, the absorptive capacity of a organization is not merely the sum of the absorptive capacity to its employees, and therefore, it is important to consider what absorptive capacity are distinctly organizational (Cohen & Levinthal, 1990). The absorptive capacity also regards the organizations ability to exploit knowledge, and not only its ability to acquire and assimilate it. This means that the absorptive capacity is not only defined by the connection to the external environment but it also depends on how knowledge is transferred throughout the organization, between departments (Cohen & Levinthal,

1990).

Higher *Motivation* of the sender to transfer knowledge, in most cases, the project
venture, is proposed to result in a more successful knowledge transfer. In other
words, the sender must be motivated and willing to share the created knowledge with
other parties of the project (Bakker, Cambré, et al., 2011).

As a result of Bakker, Cambré, et al.'s research, one main finding shows that there
is no single sufficient condition which is more important than the others among the
relationship attributes and the actor attributes. They conclude that the knowledge
transfer process is a complex one.

Figure 3 shows the relationship between these five factors and how they impact knowl-
edge transfer in the setting of inter-organizational collaboration.
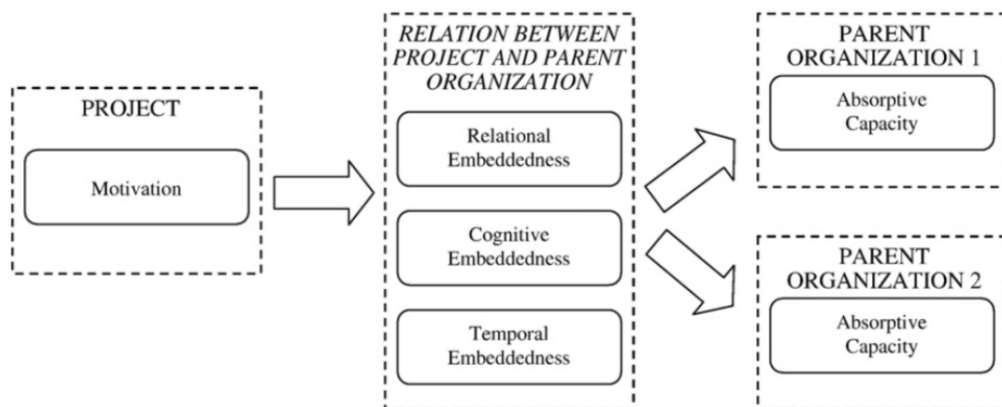
Figure 3: *Overview of the five factors impacting knowledge-transfer. Retrieved from:
Bakker, Cambré, et al. (2011).*

2.5 Analytical Framework

It is argued that for success in a digitalization project, one is dependent on a successful
knowledge-exchange between the parties. This is based on the fact that:

1. It is important for organizations to acquire new knowledge to keep themselves competitive.

2. Digitalization can be characterized as a process of interactive learning, and thus a form for knowledge exchange is apparent.

3. For parties which receive knowledge, there has to be prior related knowledge to assimilate and use the new knowledge.

In such a context, the analytical framework is based upon what extent the parent organization is capable of receiving new knowledge and what types of knowledge exchange was pursued. The development of relational attributes, such as relational embeddedness, cognitive embeddedness, and temporal embeddedness, also play a role in this context as it is argued that they are essential for successful knowledge exchange. Figure 4 shows the analytical framework:
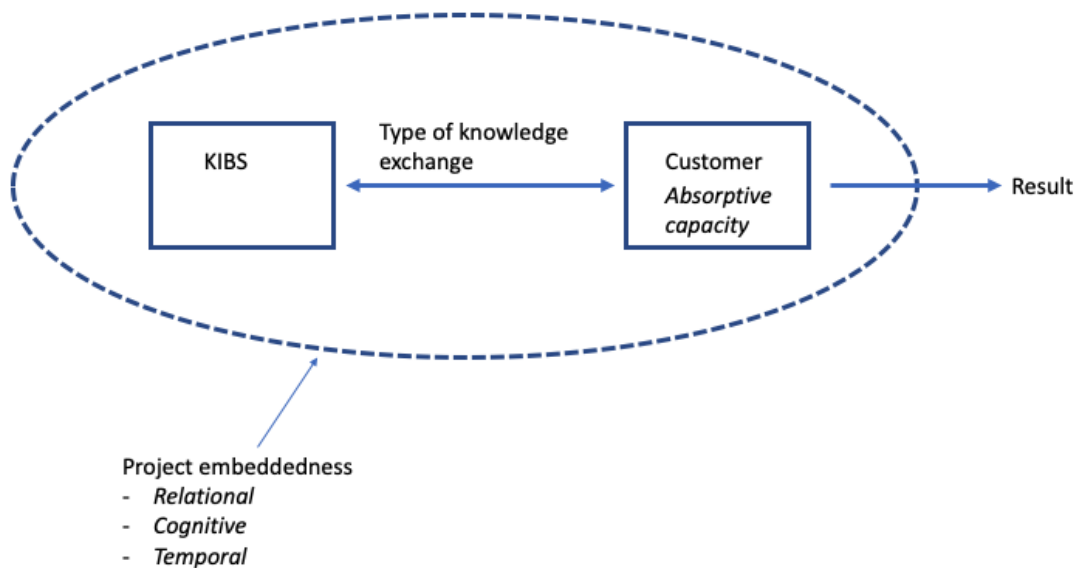
Figure 4: *The analytical framework.*

2.5.1 Empirical Research Questions

As a basis on the theoretical perspectives presented in this section, and the analytical framework presented in figure 4, the following empirical research questions are compiled:

Empirical research question 1: *What kind of knowledge did Bouvet contribute with?*

Empirical research question 2: *How does the knowledge exchange happen?*

Empirical research question 3: *What role has absorptive capacity played throughout the project?*

Empirical research question 4: *How did the project embeddedness develop during the project?*

3 Method

Easterby-Smith, Thorpe, and Jackson (2015) state that to achieve high-quality research, it is essential to have a good research design. It is on this basis that this chapter is conducted. When reading, one can expect to learn more about how this research is designed, what methods are used, and what measures are taken to ensure data validity -and reliability.

3.1 Research Design

Research design is about organizing research activity, including the collection of data, with the intent to best possible achieve the aims of the research (Easterby-Smith et al., 2015). The research design, therefore, means that one describes how the whole research process is set up to achieve the aim of the research itself.

3.1.1 Research purpose

The theoretical research question reflects the aim of this research:

"*How can consultancy firms and their customers interact to create new digital solutions?*"

In short, the research purpose is to examine the interaction between consultancy firms and their customers when creating digital solutions. It is in this context that the research question is narrowed down to a knowledge perspective. It is argued that as technology unfolds and all sectors, both traditional and modern, embrace completely new ways of solving their problems, the importance of the knowledge component evolves. Nevertheless, as a result of the rapid development acquiring the right knowledge is becoming more challenging (Bohn, 1994; Miles & Kastrinos, 1995).

As it is of interest to understand the mechanisms which play a role in a successful knowledge exchange process during the creation of new digital solutions, the purpose of this research is therefore arguably an in-depth one (intensive), rather than a broad one (extensive) (Jacobsen, 2005). Further, one can divide the research purpose into three categories (Gripsrud, Olsson, & Silkoset, 2010):

- Exploratory

- Descriptive

- Causal

In short, with *exploratory design*, the primary goal is to research a topic more in-depth of which one has relatively little knowledge about. Thereby, one does not have any perception of what relationships exist (Gripsrud et al., 2010). Further, by *descriptive design* one wishes to describe the situations within a particular area. The last purpose, *causal design*, has the intent to describe various causation's in a phenomenon.

Although the empirical research questions in the thesis have a descriptive nature as answering them will describe various aspects of the case, it can be argued that the thesis has exploratory characteristics as it aims to explore the knowledge-exchange mechanisms in a digitalization context. Such an angle of theory, to my knowledge, has not previously been researched, and hence the exploratory nature. Given the case builds upon successful digitalization, there is implicitly a causal purpose as well as examining the mechanisms in knowledge exchange may help understand the causations to how the case became so successful.

3.1.2 Reasoning

The research purpose influences how one designs the research and thus, analytical strategies (Holme & Solvang, 1996). Such analytical strategies concerns how one

reason when moving from "experience to knowing" (Thomas, 2017, p. 125). Thomas (2017) states that there are mainly two ways of reasoning: inductive reasoning and deductive reasoning. Inductive reasoning means that one is trying to understand a reality one does not know, and hence one goes from empiricism to theory (Halvorsen, 2003; Jacobsen, 2005).

Deductive reasoning, on the other hand, means that one aims to "stress-test" or better understand already established theories as one goes from theory to empiricism (Halvorsen, 2003; Jacobsen, 2005).

This thesis can be said to have a deductive reasoning approach as it presents the theory, which gave expectations to what mechanism would be of importance. The theory was further used to form the interview guides and laying out the basis for what data to collect. Further, the theory is used to illuminate and clarify the collected empiricism.

However, the thesis also has some inductive characteristics as it is exploring within a slightly new area of theory. Thereby one is trying to approach something one knows relatively little about. Such an approach can be classified as an inductive one (Halvorsen, 2003). One can argue that the purpose of the research is to develop concepts and gain the largest possible comprehensibility, and hence the slightly inductive nature. Such overlap is often the reality in research as it is challenging to define clear separations between the two ways of reasoning (Halvorsen, 2003).

3.1.3   Design Frame

The design frame is another aspect which has to be clarified within research design (Thomas, 2017). Thomas (2017) defines several predefined design frames where one of these is the well known case-study. Based on Yin's (1994) following conditions for decision-making of the design frame, the stance is taken to conduct a case study:

- Form of the research question

- The extent of control a researcher has over the events

- Degree of focus on contemporary as opposed to historical events

(Yin, 1994, p. 4)

First off, the thesis poses a "how" type of research question which suits the case study approach. Secondly, the researcher requires no control over the events, and lastly, the research has a contemporary nature as it is possible to observe directly, and it is possible to conduct systematic interviews (Yin, 1994).

Furthermore, one has to decide upon conducting a single-case study or a multi-case study (Thomas, 2017). Multi-case studies have the advantage where they compare findings, and as a result, the researcher can conclude whether the findings are valuable or not. The conclusion from a multi-case study may provide literature with a significant influence from the contrast and similarities (Gustafsson, 2017). However, multi-case studies do not only provide positive outcomes. Performing a multi-case study demands a vast amount of resources as in high expenses, and they are time-consuming. It is also important to note that the more cases the researcher undertakes, the less observation time there is to study each case (Gustafsson, 2017).

As this study aims to be an in-depth one (intensive), and as there are limited available resources due to this research being a master thesis, the decision is made to conduct a single case study.

Thomas (2017) states that it is important to put the case into an analytical frame, as not doing so would not be a "true, social science case study" (p. 158). By doing this, one can divide a case into two parts: the subject, and the object (Thomas, 2017). The case itself is defined to be the subject, and the object is the analytical frame which the case is intended to shed light on. This thesis it is intended to study a case of digitalization to illuminate what mechanism plays a role in a successful digitalization process. Table 3 shows an overview of the subject (the actual case), and the object:

Table 3: *Overview of the subject and object in the case study.*

Subject	Object
Digitalization in Agder Energi Nett (AEN)	The interaction between AEN and Bouvet with focus on knowledge exchange

Thomas (2017) names three main reasons for choosing the subject in a case study: *local-knowledge case studies*, *key case studies* and *outlier case studies*(p. 159). Having previous knowledge of the AMS-program, through my employment there, one can certainly argue that the subject chosen by the researcher is based upon the *local-knowledge* reason. However, this reason is only part of it. It is also argued that the subject can be defined as a *key case* in the sense that AEN has, as the first net company in Norway, successfully managed to digitalize all levels of their net. Albeit, both the *local-knowledge* and *key case* reasons serve as arguments for choosing "Digitalization in AEN" as the subject.

3.2 Qualitative Approach

Halvorsen (2003) states that method is the teaching about collecting, organizing, processing, analyzing, and accurately interpreting social facts. Often when taking a stand on method, two approaches are discussed: qualitative and quantitative research (Holme & Solvang, 1996; Halvorsen, 2003; Thomas, 2017).

Qualitative research contains data which is difficult to categorize into numbers, and therefore the data is often characterized as "soft-data" (Halvorsen, 2003, p. 11). Further, the method is recognized by a direct relationship between the researcher and the research object. Unlike in a quantitative research design where there is present a me/that perspective, qualitative research design aims to overcome such a view. In doing so, the researcher finds himself trying to understand the research object and

their situation (Holme & Solvang, 1996).

It is in this thesis desirable to understand the mechanisms of the knowledge exchange between the parties AEN and Bouvet. Such understanding is challenging to analyze by the use of numbers and arguably best done by using qualitative data. From Holme and Solvang (1996), the following reasons are stated as appropriate for the choice of a qualitative method:

- The desire to gain an overall perspective

- The desire to develop gradations of existing theory.

- The desire to understand social processes.

(Holme & Solvang, 1996, p. 74)

The above bullet points touch upon this thesis' hotspot, and hence the qualitative method makes for the qualified choice for this research. Also, Yin (1994) presents a variety of data sources when conducting a case study, whereas the majority of these align with the qualitative research method.

It is imperative to keep in mind the challenges that follow a qualitative method. Whereas quantitative data is structured so one can analyze them directly, this is not the case for qualitative data as one has to structure and organize all data post-collection (Holme & Solvang, 1996). Arguably this makes for a more time-consuming process and a more complex workload, and this also serves as one argument for only using one case in this study.

3.3 Data Collection and Research Quality

In the setting of a qualitative case study Yin (1994) shows to a large variety of potential data-sources such as documents, artifacts, interviews, and observations. The main form for data collected in this research is through interviews. However,

documentation and arguably, observations have also been used in one way or another. Observation is in the sense of employment in the program, and hence, one could argue that I have observed the case over a more extended period. Following it will be discussed how the data was collected.

3.3.1 Interviews

Literature exposes three types of interviews, namely: structured, semi-structured, and unstructured interviews (Thomas, 2017; Easterby-Smith et al., 2015). Structured interviews have predefined questions and give little room for follow-up questions. Interviews of this type are thereby criticized, for not utilizing the full potential of interviews as one cannot follow up signals the interviewee sends throughout the interview. It is also argued that one is not able to get the in-depth (intensive) understanding as with the other types of interviews.

In this research, it is mainly applied semi-structured interviews. With such an approach, one pre-defines issues which are to be covered, but one still has the freedom to follow up aspects which are necessary throughout the interview. These predefined issues can be viewed in full in Appendix A and B. Further it is argued that my casual conversations with the employees of AEN and Bouvet can be characterized as a form for unstructured interviews (Thomas, 2017).

The interviews were conducted face-to-face to ensure transparency, as opposed to phone and email where one loses the "bodily presence" and the respondent would potentially answer more reserved (Thomas, 2017, p. 202). Jacobsen (2005) discusses the optimal length of an interview, as to long interviews tend to result in exhausted participants and short interviews may in turn not give enough detail. Jacobsen (2005) concludes that interviews spanning from an hour to one and a half hour as the optimal time-span. Table 4 shows an overview of the respondents, the length of the interview's and when they took place.

Table 4: *Overview of the respondents.*

Respondent	Employer	Interview length	Date
Program-coordinator	Bouvet	1 hour	18.03.2019
Solutions design	Bouvet	55 minutes	19.03.2019
Program-manager	Agder Energi Nett	55 minutes	20.03.2019
Enterprise architect	Bouvet	1 hour, 10 minutes	21.03.2019

Gripsrud et al. list up several ways to select which respondents to use. In this thesis, a review selection method, where the respondents are chosen upon decided criteria (Gripsrud et al., 2010), was used. Holme and Solvang (1996) also underlines the importance of selecting respondents which promote what one wishes to know more about, and thereby not choosing randomly. There where no explicit formulated criteria for the choice of respondents, however, according to Gripsrud et al. (2010) there does not have to be. However, the participants were chosen upon relevant experience, degree of responsibility, and the fact that they had been involved in the program over a longer period.

3.3.2 Documentation

Beyond the conducted interviews, the researcher also had access to various types of documents, such as tenders, architectural solutions documents, and power points. Thomas (2017) states it is difficult to advise how to gather information through documents, due to the "sheer variety" (p. 214). Further, he states that "the knack is to find the right documents, read them, and think about them" (p. 214). In this thesis, documents that complement data recovered from the interview's have been of interest. For instance, the tenders, show what basis Bouvet was hired on, and can supplement to understand what knowledge and competency they were intended to contribute with. Table 5 shows an overview of the documents which were used:

Table 5: *Document overview.*

Name	Description	Size of document
Tender	Describes the various architectural roles, and on what basis Bouvet was hired.	7 Pages
Architecture -and solutions concept	Describes the overall architecture and solution concepts in the AMS-program.	51 Pages
User manual	*User manual for the plan portal software. The software is used as support when planning new power-lines.*	26 Pages
AMS and Grid Benefits at AE Nett	Provides an general overview, possibilities and intentions of the AMS-program.	20 Slides

3.3.3   Quality of the Research

When researching a specific topic, it is vital to ensure good quality. In terms of quality, literature often refers to the terms validity and reliability (Thomas, 2017; Jacobsen, 2005; Holme & Solvang, 1996; Halvorsen, 2003).

Thomas (2017) defines reliability the following: "refers to the extent to which a research instrument such as a test will give the same result on different occations" (p. 114). Validity, on the other hand, shows to what degree the research measures what it is supposed to measure (Thomas, 2017).

Reliability is often criticized in a qualitative setting as the "instrument" measuring is the person who performs the research. Thereby it would be challenging to arrive at the same results when a different person conducts the same research (Thomas, 2017). However, this term is often used, and thereby serves its purpose in this thesis. One measure that can be taken to increase the reliability is to record during the interview process (Jacobsen, 2005). Recording the interviews is a way one can trace back to

the exact words exchanged, and hence, the setting is not lost. Recording also helps during the actual interview as it facilitates to maintain a good dialogue and not being limited by taking to many notes (Jacobsen, 2005).

Other aspects of reliability often refer to researcher bias (Thomas, 2017). One could argue that I, as the researcher, in a position where I have obtained a part-time job in the program through the entire research period, brings bias into the research. However, Thomas (2017) addresses the issue and concludes that the attempt to remove bias may result in diverting attention from the subject. Further, it is argued that there is no fix (as social science deals with people), and in worse case scenarios beliefs that there are fixes can lead to invalid results (Thomas, 2017). On the contrary, my experience from the field leads me to better understand the industry, which may count positively given the short time-span of the thesis research.

Validity often is divided into two aspects: internal and external validity. Internal validity refers to if the results are perceived as right. The question of what degree the research can be generalized is referred to as external validity (Jacobsen, 2005). In such a setting, it is natural that criticism is directed toward the design of the research. This because it only covers one case, which makes it challenging to generalize (Thomas, 2017). Moreover, although Flyvjberg (2006) argues that cases which falsify existing theory are sufficient to generalize from (e.g., the black swan example), it does not apply to this case. Despite not being able to generalize, Flyvjberg (2006) shows to generalization only being one aspect of science, as in reality, science is about the process of "gaining knowledge". Gained knowledge can enter "into the collective process of knowledge accumulation in a given field or a society" (p. 227), and thereby contribute in several ways. Arguably such is the case in this thesis.

Often the applicability of validity (external and internal) is in question in qualitative research as many states it has an interpretative nature and therefore, questions such as generalization are not applicable (Thomas, 2017).

3.4 Ethics

As social sciences almost always regard studying human beings, and when doing so one "commits burglary" into the given individuals privacy, one has to review the ethical aspect of the research (Jacobsen, 2005; Thomas, 2017). Jacobsen (2005) names three such ethical aspects: *informed consent, claim to private life* and *claim to be correctly quoted.*

In this thesis, these aspects have been reflected upon, and as a result, several measures were taken. For instance, all of the representatives interviewed have willingly consented to be interviewed. The interviewees were informed about the purpose of the research, and could at any time withdraw. Further, private life was a high priority, and as a result, the data has been anonymized. E.g., to protect the respondents, there has been given little information in this thesis about the roles and responsibilities each of the informants had. At last, it was strived to reproduce the data as correctly as possible, and therefore, the interviews were recorded. Following the Norwegian research center for research data (NSD) standards, the recordings were only saved on a University of Agder approved OneDrive account.

3.5 Limitations

Research often has several limitations, depending on how they are carried out (Easterby-Smith et al., 2015). One obvious limitation in this thesis is the time frame, and as of such, only one case was used to secure in-depth research. Under section 3.1.3, the implications of what this brings compared to a multi-case study is discussed.

One additional limitation was the number of respondents available. An inequitable distribution between AEN and Bouvet respondents is seen as there only was available one respondent from AEN. However, there are reviewed several relevant documents (listed in table 5) to minimize Bouvet bias being fronted.

4 Case presentation

In order to analyze and understand the findings, it is helpful to have general insights about the case. Further, this section will present a general overview of the parties involved and a detailed description of the case.

4.1 The Parties Involved

From the case, there are two parties which are going to be focused on, namely Agder Energi Nett (AEN) and Bouvet. The digitalization process which the case is based upon, there are more than just the two parties involved, however within the focus area of the case, Bouvet has been a central actor, and therefore in this context, the case would contain just these two actors. It is reckoned that this approach is sufficient to shed light upon and give good answers to the previous defined empirical research questions.

4.1.1 Agder Energi Nett

Agder Energi Nett (AEN) is a part of the Agder Energi group and delivers electricity to over 190 000 customers, which makes the company the fourth largest in Norway. AEN also has the operational responsibility for 21 000 km of power lines. AEN build upon the vision to ensure " business and social responsibility through achieving more for less" (Agder Energi, n.d.-b). The Agder Energi group, which AEN is a part of, has the past two years been elected amongst the 25 most innovative organizations in Norway, and this as the only hydropower organization (Agder Energi, n.d.-a).

As a side note, it is important to acknowledge that the Norwegian power-line operators operate in a monopolistic market. Some would, therefore, argue that for AEN it is not about having a competitive advantage. If that were true then the case would not be of interest for this research. However, this is not the case as there is a government

incentive, where companies that are more efficient than the average will receive a revenue ceiling that is higher than the cost, in contrast to the average company where the revenue ceiling corresponds to the cost (NVE, 2015). It is argued that AEN very much finds themselves in a competitive environment.

4.1.2 Bouvet

Bouvet is a Scandinavian consultancy company which offers design, software development and provides advice on IT solutions and digital communication. Currently, Bouvets workforce consists of more than 1350 employees with a wide range of background and education. They support both the public and private sector. Bouvet builds upon the vision to "be the most trustworthy consultancy with the most satisfied employees and clients" (Bouvet, n.d.).

4.2 Case Background

The case is based on Agder Energi Nett's digitalization of their entire power-lines. This digitalization presents entirely new possibilities, insights and enables the organization to work smarter, and, save money. The background for this case is based on two factors: Firstly, the Norwegian Parliament passed a bill in 2011 that imposed all power line operators in Norway to install smart-power meters within its entire customer base. The purpose of the bill was to prepare the power line operators for future development and environmental challenges. The deployment was scheduled to be finished within 1. January 2019. Secondly, as the only power-line operator in Norway AEN made a strategic choice to further equip all levels of their power lines with smart-power meters, and hence fully utilize the potential from the passed bill (Agder Energi Nett, personal communication, March 21, 2019).

With this additional functionality the program in whole has had a span of approximately ten years and a total cost in the 1bn NOK class (Agder Energi Nett, personal

communication, March 21, 2019). Figure 5 shows what level was enforced by law, and what measures AEN took beyond regulations:
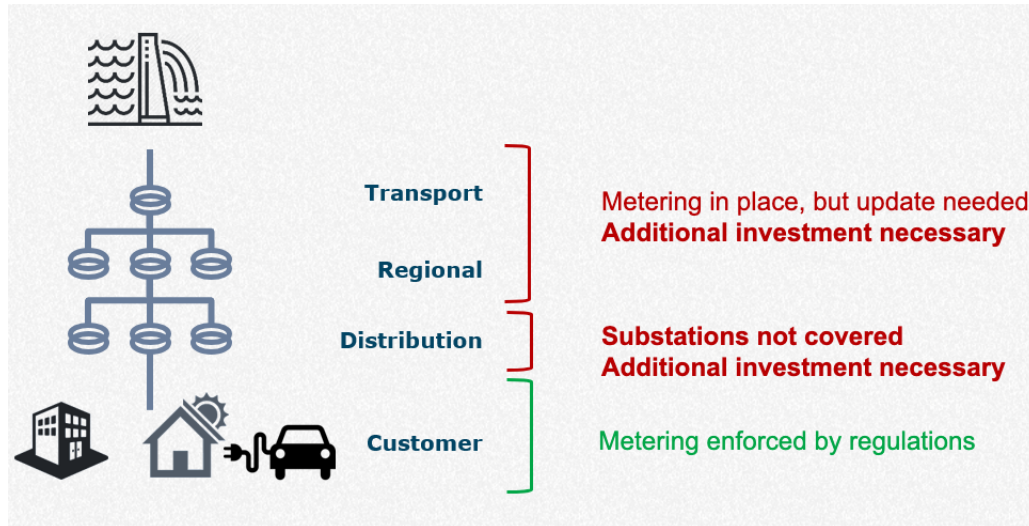
Figure 5: *Illustration of the additional measures AEN took to fully digitalize the power-lines.*

By taking these additional measures, AEN has made it possible to further monitor the grid, at all locations at any given time (The Norwegian Smartgrid Centre, 2018). By the program, it is meant a temporary department created within the organization. This is done to keep focus on rolling out the smart meters, and utilizing the full potential. Throughout the thesis, often a variant of the phrase: "the program", is used to refer to the digitalization work done in AEN. Figure 6 shows an timeline of how the events played out in the program:
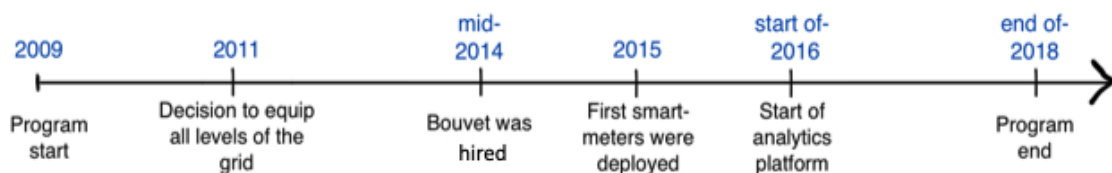
Figure 6: *Timeline showing an overview of central events in the program.*

In 2009, the program was initiated. However, it was not before 2011 that the decision was made to equip all levels of the grid with smart power meters. In 2014 Bouvet was hired on an architectural basis, and the first smart meters were deployed in 2015. As a result, there was a need for a platform to receive data and enable the possibility to analyze and visualize. The work on this analytics platform started early in 2016.

Bouvet has been a central resource in the deployment of the smart meters and the solutions design and development of the analytics platform. The arrow in the figure shows to much of the development in the program still is living on. However, all of the smart meters are rolled out. In short one can say that it is the smart meters which enable the digitalization in AEN, and further, the analytics platform utilizes the potential by making analysis and reports available through the structuring of large amounts of data (Agder Energi Nett, personal communication, March 21, 2019).

4.2.1 A Case of Digitalization

As the subject of the research is "digitalization in AEN", one may ask what makes this particular case one that deals with digitalization. To illustrate what digitalization is Parviainen et al. (2017) shows to an example of the Finish tax administration, where they completely change how citizens tax records are collected through the use of digital technology. Such an approach can also be traced here, where AEN's customers no longer have to register their consumption regularly, as a result of the new smart meters.

Further, Parviainen et al. (2017) states that digitalization changes all aspects of human society through the application of digital technology. In this setting, it is argued that "human society" can be narrowed to AEN as an organization. Following are some focus areas AEN are intending to change given the new possibilities through the digitalization (Agder Energi Nett, personal communication, March 21, 2019):

- **Better insight into voltage and electricity values**. Reveal areas and pe-

riods with capacity challenges, and as a result, enable decision-making which tackles the specific challenges.

- **Energy and effect balance**. Reveal abnormal loss in the low voltage distribution net and thereby plan and target measures to reduce loss.

- **Groundfault and interruptions**. By implementing smart power meters to all of the distribution transformers, it is possible to detect ground faults and find interruptions in a much more efficient manner. This results in less downtime, and better personal safety.

- **Componenetoverview**. Better monitoring of temperature, moisture, switch positions, and doors can increase the components life span, and enable more efficient maintenance.

- **Demand respons**. A growing challenge within the power grid is the changing usage patterns where customers are in a larger degree using a large amount of electricity in a short amount of time. This challenges the capacity of the net, and to meet future demand it is expected that a great number of resources have to be used to improve the capacity. However, with the newly enabled features, it is possible to motivate the customer to distribute their usage pattern, and thus not use large amounts in short amounts of time. For instance, this could be done by using different tariff rates than today.

Changing these focus areas does change the way the organization works in several central areas, and hence, this serves as a second argument for the case dealing with digitalization. Arguments for the case dealing with digitalization also aligns with several of the respondent's comments on how the program has influenced the organization (Agder Energi Nett, personal communication, March 21, 2019):

"*Vi have had the electric grid in Norway for over 100 years, but it is first now we are collecting enough information to understand how the grid actually works*"

and

"*Its a milestone that we have been able to digitalize this much. I believe it's just the beginning of a new era for us.*"

As a result of the focus areas mentioned above, there are several concrete positive outcomes (Agder Energi Nett, personal communication, March 21, 2019):

- **Observation of power leakage** - Before AEN started to make use of the smart power meters, it was almost impossible to detect power leakage. Power leakage can come from bad connections throughout the gird or as a result of someone purposely stealing electricity. With the new installations where both customers and the distribution transformers have smart power meters it is now possible to compare input to output and thereby detect the leakage.

- **Load on distribution transformers** - As a result of the new measurements, one can now monitor the actual load on the distribution transformers and thereby have a better understanding of their lifespan, and make justified decisions regarding new investments.

- **Advanced analytics and prediction of customer usage patterns** - From all of the data which is collected as a result of hourly consumption information, it lays the basis for better understanding the customers and consumption patterns, which has never been possible before.

- **More efficient troubleshooting when the electricity is down** - One primary task to AEN is to ensure stable delivery of electricity to its customers. This can be a challenge during storms when often the power-lines are cut as a result of heavy snow or wind blowing over trees. With over 21 000 km of power-lines, troubleshooting can be quite a challenge. Traditionally troubleshooting has been supported by customers calling in and explaining that they have no electricity. With the new power-meters and an enabled feature by AEN, "last-gasp", it is possible to much faster and more precisely locates the source to the

problem.

- **Owerview of customers who produce and sell electricity back to the grid (prosumers)** - With the current advancement of the renewable energy solutions such as solar power and wind power, it has now enabled customers to produce and sell electricity back to the grid. This makes for challenges in keeping an overview of all current customers, especially as in later time they have expanded massively, and keeping an overview of how much electricity is sold back to the grid by each and every customer is challenging. Figure 7 shows an example of an overview report showing the KPI´s regarding AEN´s prosumers:
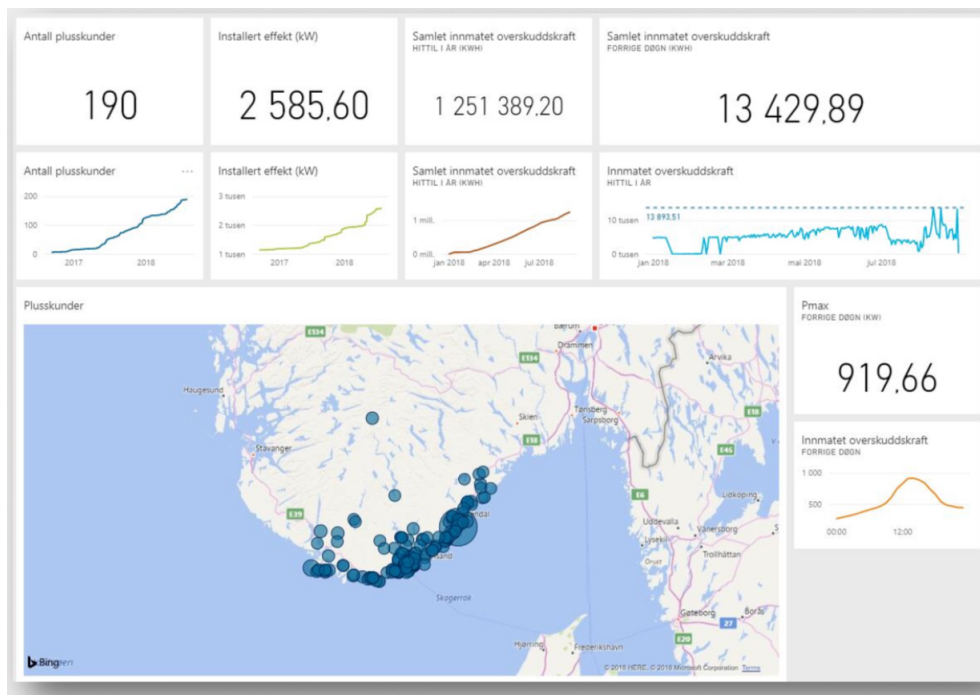
Figure 7: *Example of newly enabled overview over AEN's prosumers.*

The report in figure 7 updates regularly, and thereby shows updated data regarding instances such as the number of prosumers, how much each customer is selling back to the grid, location of the customers, etc. Over time this data also enables the possibility to detect patterns, such as which factors motivate

customers to become procumers.

With such positive outcomes, one can argue that the case is a successful one. As an additional argument AEN has been nominated to, -and collected several prizes. For instance, in September 2018 they won "Smartgridsenterets innovasjonspris", and further, they were nominated to the 2018 BI prize, which crowns the academic communities within business intelligence (BI) in Norway [2]. The "Smartgrid centre innovation prize" is a prize which gives recognition to Norwegian smart-grid projects (The Norwegian Smartgrid Centre, 2018).

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[2]Retrieved from the program for the BI-prize 2018: https://event.dnd.no/bi/

5 Analysis of the interaction between Bouvet and Agder Energi Nett

In this section, the empirical research questions are discussed based on the empirical findings and in light of the presented theory:

1. What kind of knowledge did Bouvet contribute with?

2. How did the knowledge exchange happen?

3. What role has absorptive capacity played throughout the project?

4. How did the project embeddedness develop during the project?

These empirical research questions are further intended to give a deeper and fuller understanding of the theoretical research question, which in turn will be discussed under the conclusion section:

How can consultancy firms and their customers interact to create new digital solutions?

This analysis section is structured based on each of the empirical research questions.

5.1 What kind of knowledge did Bouvet contribute with?

During a process of digitalization, there is required a substantial presence of technological knowledge to envision, grasp, and put into realization solutions which can enable the organization to accommodate future challenges. The first empirical research question, it is to be discussed and defined what knowledge Bouvet contributed with during their involvement in the AMS-program in Agder Energi Nett (AEN). Often a broad distinction of knowledge defines two types, namely explicit and tacit.

In short, explicit knowledge can be codified, and thereby, the knowledge type is relatively easy to transfer. Tacit knowledge is on the other end of the scale as it is *highly personalized* and *hard to formalize.* As a result, tacit knowledge can be more challenging to transfer (Nonaka & Teece, 2001). Further, literature generally defines the three knowledge components *know-why, know-what* and *know-how,* which in short represents different aspects of knowledge (Garud, 1997).

The interviews revealed that Bouvet initially was hired on an architectural basis consisting of a project coordinator and a team of three architects. The three architects were divided into the following specific architectural roles; enterprise architect, solutions design & coordination, and solutions architect. The architecture -and solutions document shows to the architects facilitating for the organization's ability to change, be flexible, and process new IT-systems which are customized to AEN.

One of the Bouvet's respondents said this about their contribution to the program:

"*We have contributed with architectural competence and all that entails from A-Z. We have ensured that the relevant departments and the needs that will change are involved or digitized, that we manage to communicate the needs from the user to what it means for a system to be changed or an integration that has to be created, coding, that is.*"

Here the respondent refers to Bouvet contributing to several architectural aspects from ensuring the enterprise aspect to the technical aspect of revising and developing new digital solutions. The role of an enterprise architect (EA) is to "make order out of chaos" (Strano & Rehmani, 2007, p. 392). It is stated that to enable increased efficiency, and effectiveness across the span of the enterprise, it is important with an EA which can communicate the relations between technology, people, and processes clearly. Another important aspect for the EA is to make the overwhelming amount of information available and to present it in a manner that enables effective decision-making (Strano & Rehmani, 2007, p. 392). From the architectural -and solutions document, it is stated that the EA's purpose is exactly that:

"*The vision for the overall architecture, which is sketched for AEN and which is greatly affected by the AMS-program, is to facilitate for a business-driven, efficient, provident, and adaptable architecture.*"

In order for the EA to fulfill such a purpose, it is argued that one must hold the *know-what* component of knowledge. Garud's definition of the *know-what* component also aligns with the EA's purpose in the program(Garud, 1997, p. 87):

"*representing and understanding of the specific system configurations that different customer groups may want and the different uses they may put these systems to*"

The EA must possess an understanding of the potential system configurations and what the various customer groups want in order to customize new digital solutions with the business. Clarify the term customer in such a setting is important, as it does not refer to only AEN's customers, but could also be defined as the employees in the various departments of AEN. This is because the EA helps align the development of new digital solutions with the business strategy, and it is therefore crucial to understand how the new solutions affect the various end users.

In addition to *know-what*, it is argued that Bouvet also has covered another knowledge-component through the solutions design and solution architect. As opposed to the EA which deals with more of the enterprise level in the organization, the solutions design, and the solution architect are responsible for the architecture regarding the technical aspect of the development of new digital solutions. Architecture in this setting is sketching out solutions in regards to information flow and infrastructure. Sketching such solutions involves a highly technical understanding of software development and data management, and therefore, it is argued, that to plan out such solutions, one must have the *know-why* knowledge component.

The *know-why* knowledge component represents knowing why something works or is put together the way it is. For example, one could assimilate this to a recipe, where one does not necessarily know why the combination of the ingredients forms

the outcome. One can, however, without knowing why it works, construct the outcome based on the recipe (Garud, 1997). One could in this case exclaim that Bouvet contributed to making the recipe for the new solutions through their architectural contribution, and thus they must *know-why* the combinations of various configurations work together. Often the *know-why* component results in documentation in the form of technological notes (Garud, 1997). This also became apparent from the case as the architectural solutions and processes where documented through various visualizations tools, where for instance, Vizio and BPMN-notation were used to describe different processes.

Up to this point, it is argued that Bouvet contributed with both the *know-what* and *know-why* knowledge components. However, as the program moved forward, new Bouvet consultants became involved, and the roles of the previous ones changed. Somewhere down the road, the need for a broader platform for data storage and analysis was found necessary (analysis platform). This means direct development of software and data systems to a more significant extent than previously explained. As *know-how* refers to "the capability to do different kinds of things on a practical level" (for instance software development), it is argued that Bouvet also contributed with the *know-how* knowledge component (Lundvall & Johnson, 1994, p. 28).

Figure 8 shows a time-line, and the associated knowledge components Bouvet contributed with:
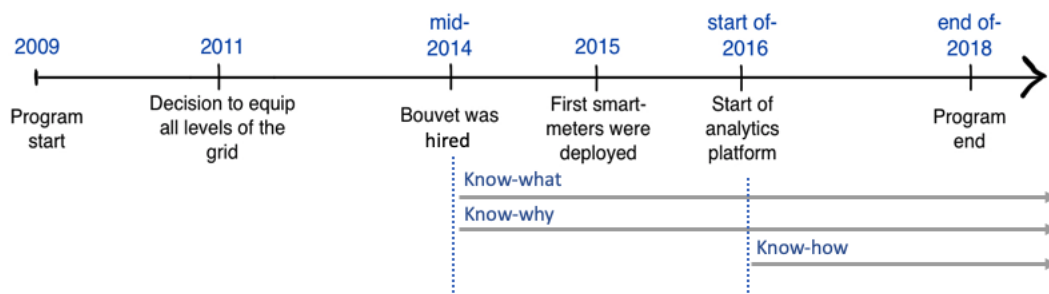
Figure 8: *Bouvets contribution of knowledge throughout the program.*

One could say that Bouvet contributed with the necessary knowledge components to produce new digital services in collaboration with AEN by covering all of the three knowledge components; *know-how, know-why* and *know-what.* In accordance with Isaksen et al. (2019) where technological knowledge is characterized into three distinctions, one can argue that Bouvet contributed with the second knowledge distinction, which is: both scientific and experienced-based knowledge. Contributing with such knowledge, one applies scientific principles in the development of services which include digital technology. In this case, Bouvet has been central in developing the analytics platform, which has the intention to collect and combine data throughout AEN. Previously such data was more difficult to combine -or has never been combined at all. It is argued that the analytics platform and connecting components can be characterized as services from AEN's perspective. Amongst others, the *prosumers report* (fig. 7), can be characterized as a service in the sense that it continually gives updated information related to AEN's prosumers.

In a broader sense, it is apparent that Bouvet contributed with both tacit and explicit knowledge. Tacit knowledge can be viewed as "intuitive" and "unarticulated" and is characterized to be "highly personal" (Nonaka & Teece, 2001; Becerra et al., 2008). This can be connected to the *know-how* knowledge component which Garud (1997) states that may be stored in individuals, and some of it remains tacit. The *know-what* component can also have some tacitness characteristics as it often is not easily transferred to other organizations. This is, however, dependent on the nature of the product as standard products are more transparent. In this case, it is argued that the products are more tangible, and the *know-what* knowledge is thus more embedded in the relationship between the parties (Garud, 1997). Further, as explicit knowledge is easier to codify and transfer, this can be connected to the *know-why* knowledge component, as Garud (1997) states that this component is documented for future references.

A focus area which was repeatedly mentioned during the interviews, and which goes beyond the empirical research question, as well as Bakker, Cambré, et al. (2011)'s

framework, was the knowledge which AEN contributed with. All of the respondents mentioned AEN's willingness to build domain-specific knowledge amongst the Bouvet employees [3]. One of the Bouvet respondents stated this about AEN's knowledge contribution:

" *AEN has been good at building electrical knowledge with its consultants. Ever since we started here, on a regular basis, we have had good academic refill where they have contributed with knowledge of how the electricity grid works, etc. Also, several of us from Bouvet has been at conferences both nationally and internationally. (..) it is an excellent contribution of the customer that they choose to invest in us consultants so that we in return can succeed even better in the job we do for them.*"

Here the respondent shows to AEN intentionally building domain-specific knowledge among their consultants. Based on the response, there is a basis for arguing that explicit knowledge was transferred from AEN to Bouvet. For instance the respondent uses the remark "academic" which often is recognized as "coded" and "articulated" and thereby has an explicit nature (Smith, 2001). Further, one can argue that conferences also bring with them explicit knowledge as they include formal presentations of academic character, and the knowledge is transferred verbally (explicit) (Becerra et al., 2008). As it will be revealed later in the analysis, a lot of the knowledge exchange happens during the interaction of AEN and Bouvet's individuals. Moreover, as tacit knowledge is embedded in individual members, one can argue that there also was transferred some tacit knowledge from AEN to Bouvet (Argote & Ingram, 2000).

Conclusion:

Throughout the span of the case, it is revealed that Bouvet contributed with all three of the knowledge components, by designing solutions (architectural roles), and further executing (programming) them for the customer AEN. When contributing with all

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[3]Domain-specific knowledge here defines the knowledge structure which an organization operates in. In this case, AEN operates in the electric and renewable energy's knowledge structure.

of the knowledge components, both tacit and explicit knowledge is transferred from Bouvet to AEN. Nonaka and Teece (2001) state that it is essential with both tacit and explicit knowledge as they are complementary. In addition to the knowledge that Bouvet contributed with, it was repeatedly revealed that AEN had a strong focus on including their consultants into the domain-specific knowledge area, and hence there was for sure explicit, and probably tacit knowledge transferred from AEN to Bouvet.

5.2   How does the knowledge exchange happen?

Literature shows to knowledge of the tacit kind to be more complex and challenging to transfer. This comes from the unarticulated and difficult to codify nature, and as a result, often the sender of such knowledge must be involved directly (Smith, 2001; Becerra et al., 2008). Explicit knowledge is easier to transfer as it can be codified, and the sender does not need to be actively engaged. Examples of mediums used to transfer explicit knowledge could be documents of various kinds such as manuals and mathematical expressions (Smith, 2001). Further, Trippl et al. (2009) refers to knowledge exchange in two categories, namely knowledge-transfer and collective learning. With knowledge-transfer, "ready pieces" of knowledge is merely transferred from the one part to the other, as opposed to collective learning, which is characterized as interactive learning (Trippl et al., 2009, p. 448).

It is clear that the case does not regard the purchase of standardized services from Bouvet. One of the respondents stated this about the services Bouvet provided:

"*We have contributed with principles, expertise, education, and certifications on methodology of tools and ways of working. However, this must be adapted to the company, and also in this case to a large program.*"

Here the respondent is referring to it not being possible to contribute with a standardized recipe, but rather that it must be intertwined with the specific setting and

organization. To better understand how the knowledge was exchanged, it is illuminating to map out how the parties worked together. Several respondents showed to an iterative approach when developing the analytics platform:

" *We take a problem and divide it into many pieces, and then build one piece from bottom to top. We have many such small, fast iterations, and aim to deliver quickly. There is something about such agility that is important here.*"

An iterative approach is often used in software development and means that one develops a service based on a realization cycle. Such an approach is often used when one does not know entirely what the customer wants or needs and enables the customer to give feedback continuously, based on his needs (Boulanger, 2017). Figure 9 illustrates the iterative approach:
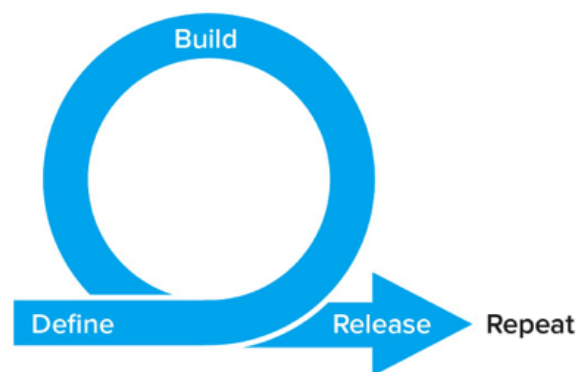
Figure 9: *Simplified illustration of an iterative approach. Adapted from: Ibanez (2017)*

At the release point illustrated in figure 9, the customer gives feedback before repeating the process once again. This process is repeated as many times as necessary before the service is evaluated to be good enough (Boulanger, 2017). Developing this way, one can argue that AEN and Bouvet interact during the whole development process. Isaksen (2004) claims that interaction between clients and companies developing software involves uncodifiable and complex knowledge. One respondent expressed the challenges with such tacit knowledge:

" *Often it is difficult for the electrical engineer to explain or visualize the problem. Therefore we try to understand the need, and then come up with some ideas which we make a small iteration on before getting feedback from the engineer again. (..) Such an approach generates a lot of good discussion and creativity with the customer.*"

Here the respondent shows to the iterative approach helping overcome the challenges with understanding and transferring tacit knowledge, as well as close collaboration and interaction. Isaksen (2004), further, states that the people involved have to meet "face-to-face" when collaborating and discussing new solutions. Such collaboration is facilitated when the parties co-locate (Isaksen, 2004). The respondents highlighted co-location as a central part of their cooperation:

" *We have been placed physically at the customer's offices all the way. I think this is crucial to achieving good cooperation .*"

and

" *The co-location has been dynamic, and we have decided upon where we sit based on what we work with.*"

It was revealed that knowledge was exchanged with some of AEN's employees by strategically placing them with Bouvet employees. With such strategic placement, the AEN employees were able to learn and receive knowledge from Bouvet's experts based on interacting with them.

As a result of the close collaboration and interactive learning between AEN and Bouvet there are grounds for arguing that much of the knowledge exchanged was of the collective learning type. This is however, not unexpected as literature points out interactive learning to be fundamental in digitalization (Yoo et al., 2010).

Knowledge was also exchanged through documentation. One example of this was the user-manual regarding the plan-portal software. This document was handed to AEN in connection with them taking over the responsibility of the plan-portal software.

The plan-portal user-manual is used for reference to how the solution works, and can thereby be characterized as explicit as it is codified and documented (Smith, 2001). One of the respondents referred to documentation being used based on need as when a solution was finished, and AEN were to take on the responsibility:

"*Where there has been a need for it, there has been prepared documentation. For instance, when they are to take over a solution we have developed. Otherwise, it is so that much documentation does not live very long, because things are constantly changing. So it is always challenging to find a correct level of documentation as too much is difficult to adhere as well.*"

As one could characterize the documentation as "ready" pieces of knowledge being transferred from the one part to the other, one could argue that there took place a static knowledge-transfer in addition to the collective type already revealed (Trippl et al., 2009). However, the respondent referred to documentation being a challenge to uphold as a result of constantly changing surroundings.

Beyond the documentation and close collaboration, several other forms for interaction was revealed. Amongst others, Bouvet held several competency courses for AEN's employees based on their request. In short, the courses were held on a tool for presenting and analyzing data. These courses lead to the employees of AEN to better understand the potential and the new opportunities which the AMS-program offers. On the other hand, AEN actively involved Bouvet on seminars for them to better understand the domain AEN operates in. In these settings, one could view the knowledge exchange to be a static type (knowledge transfer) as one could argue the participants attending a course or seminar is receiving a standardized, recipe form of knowledge (Aslesen & Isaksen, 2007).

In the context of defining how the knowledge was exchanged, it is of interest to mention some factors that could have been hindering to knowledge being exchanged as well. One respondent praised AEN for the way the analytics platform development team was set up:

" AEN should have credit for assembling the analytics team of only Bouvet consultants. I do not know if this was intentional, but one could expect that it would be hindering for Bouvet to work closely with competing consultants and potentially giving away key knowledge. "

Bearing in mind that the AMS-program was constituted by several consultancy firms, the potential for competing consultants having central roles in the analytics platform development was apparent. According to OECD, one barrier to innovation when using services is the potential to imitation (Organisation for Economic Co-operation and Development., 2001). It is argued that digitalization can be regarded as innovation as they provide a new combination of existing elements (Schumpeter, 2003; Dodgson et al., 2014). As Bouvet in this situation, are one of the leading consultancies in Southern-Norway when it comes to Big-data and data-analysis, it would be reasonable to argue that other competing consultancies would be interested in imitating them.

Conclusion:

In short, it was revealed that knowledge exchange happened according to both the static and dynamic form. More specifically, knowledge was exchanged through documentation, close interaction between the parties, and through courses -and seminars.

The explanation for both of the knowledge forms being apparent can be reflected upon into several accounts. First off, AEN has seen the value for their consultants to understand some domain-specific aspects, and hence the focus on involving them in seminars and various events in AEN. The second aspect is the flexibility upon Bouvets hire, as AEN stated themselves: *"We do not view it as a specific delivery, but rather as a competency that is hired, and that they work on what is important to AEN"*. Such a view makes it possible for AEN to use Bouvet consultants as they need. For instance, it gives them the flexibility to use Bouvet for giving AEN employees courses without making an explicit agreement or hire.

5.3 What role has absorptive capacity played throughout the project?

One fundamental aspect of knowledge exchange is the customer's ability to acquire and understand new knowledge (Bakker, Cambré, et al., 2011). Litterature states that elements such as prior related knowledge and the absorptive capacity each individual of the organization has both contribute to the organizations overall absorptive capacity (Cohen & Levinthal, 1990).

For AEN, absorptive capacity facilitates the organization to recognize and value new external knowledge (Lane & Lubatkin, 1998). In the context of absorptive capacity, it is important for AEN to have prior related knowledge. From the interviews, it was revealed that some of AEN's employees had prior related digital knowledge:

"*We have several employees in the AMS-program which have both architectural and technical experience, mostly from consultancy companies*"

Theory states that prior related knowledge should enable the receiving organization to have general understanding of the tradition and techniques upon which a discipline is based (Lane & Lubatkin, 1998). Although none of AEN's knowledge was directly correlated to the knowledge Bouvet was contributing with (Enterprise architecture and data management), it is argued that the knowledge still reimbursed AEN's absorptive capacity as it enabled them to understand the traditions and techniques which Bouvet operated with. The fact that several of the employees had previous working experience from consultancies and prior related digital knowledge both substantiate the previous statement. On the other hand, for AEN to effectively utilize the new knowledge from Bouvet, the specialized knowledge Bouvet offers must be diverse from AEN's specialized knowledge (Cohen & Levinthal, 1990).

Further, when absorbing new knowledge, it is important to define what knowledge the receiving organization needs to acquire. For instance, AEN does not have a goal of entering the same market as Bouvet, and hence, they do not need the same level

of knowledge in all areas as Bouvet have. It is however evident that to some extent, an understanding of the solutions implemented, and the technology used is essential. Bohn (1994) defines eight knowledge stages to better discuss and put words to various levels of knowledge. In short, these stages span from complete ignorance to knowing all the interactions among all possible variables. Using Bohn's (1994) terminology, one can easier discuss what level of knowledge AEN needed to acquire, and thereby discuss the role of absorptive capacity. Figure 10 shows a simplified overview of the most important knowledge stages for the AMS-program:
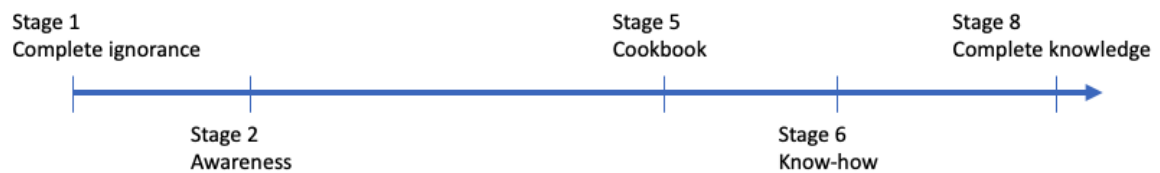
Figure 10: *Simplified overview of the most relevant knowledge stages. Adapted from: Bohn (1994)*

In the context of acquiring knowledge, it is important to bear in mind several aspects:

1. Although the digitalization program is successfully executed, AEN still has much work to do in regards to fully utilizing the potential. Such utilization affects every aspect of the organization, and can in many ways be viewed as a digital transformation.

2. It is important to note that the degree of digital knowledge needed would vary greatly throughout the organization.

It is apparent that AEN would potentially miss out on valuable opportunities if their employees are entirely ignorant of the new digital solutions the AMS-program provides. Through the previously mentioned courses, which Bouvet held for AEN, it

is revealed that AEN actively work to bring awareness of the possibilities the AMS-program offers throughout the organization:

"*We (AEN) have requested Bouvet to give several Power BI courses, which we have had a good amount of AEN people attend.*"

It is reasonable to claim that AEN's employees in whole minimal need a stage-two (awareness) level of knowledge. Stage two means that one knows "the phenomenon exists, and that it might be relevant to your process" (Bohn, 1994, p. 63). By having such a level of knowledge, one could argue that the employees would better value the new external knowledge, and the potential of the AMS-program is better utilized throughout AEN. In the light of absorptive capacity, Cohen and Levinthal (1990) distinguish between distinctly organizational absorptive capacity and the individuals absorptive capacity within an organization. It is argued, as the stage two level of knowledge only gives a basic understanding of a given phenomenon, that the organizations absorptive capacity is not directly dependent on the individuals absorptive capacity, but merely if they are exposed to the knowledge or not (Cohen & Levinthal, 1990). It is reasonable to argue that any organization has to continuously prioritize what new knowledge the employees should be exposed to and not, as such exposure ties up resources which could be used elsewhere. In this instance, one, therefore, can argue that the absorptive capacity is distinctly organizational, and less dependent on the individual members absorptive capacity.

Further, it is argued that AEN must have resources with a higher degree of knowledge than stage two. According to one of the respondents, it is a goal to achieve a higher level of knowledge amongst some of their employees:

"*Our newly employed data scientist will intentionally take the place of the current hired technical experts over time*"

This shows the reflection and measures AEN are taking to gain knowledge and sustain as competitive. This also underbuilds that AEN has a goal to achieve at least stage-

six capabilities. With stage-six capabilities, one holds the *know-how* component of knowledge, and for instance, one knows how the analytics platform works, and how to develop it further. At such a level of knowledge, it is argued that the individuals absorptive capacity plays an important role and thus influences the organizations absorptive capacity (Cohen & Levinthal, 1990). In turn, it is evident that with such a hire, the overall organizational absorptive capacity is increased.

Not only is it for AEN an aim to acquire and assimilate new knowledge, an additional important factor of absorptive capacity is the ability to exploit the knowledge. This means for AEN, a part of the absorptive capacity is to transfer the knowledge to other sub-units which are distant from the point of entry (Cohen & Levinthal, 1990). It was revealed from the interviews that this also was an aim with the newly hired data-scientist as it is intended that he over time would diffuse the knowledge throughout the organization. In addition, it can also be argued that the Power BI courses serve such a purpose as employees across several departments attended the courses.

Bakker, Cambré, et al. (2011) focuses solely on the absorptive capacity on the receiving end (AEN). However, as it already has been revealed, AEN made several efforts, to build domain-specific knowledge on their Bouvet consultants. And thus one could argue, that for Bouvet to fully utilize this knowledge, it is important for them too to have absorptive capacity (Cohen & Levinthal, 1990). One reason for it being important for Bouvet having absorptive capacity is the fact that they are strongly embedded in the technological field. With such strong embeddedness, the Bouvet consultants continuously keep themselves updated on technological development:

" *It is not necessarily the grid company's (AEN's) job to be at the forefront and to know what the latest opportunities are within the technological field. I believe that is something we can contribute with, that we can continuously follow up what the big trends are, and then bring those trends back here and utilize them.*"

The respondent here shows to the challenges with rapid technological development as it may be challenging for organizations to follow. This is something literature also

points out that organizations are likely to have a more immature relation to technological knowledge than traditional knowledge as a result of the rapid development (Chandler, 2013; Miles & Kastrinos, 1995; Bohn, 1994). Further, it is apparent that Bouvet is constantly evaluating possibilities for new technology which may be applicable for AEN. In such a setting, one can argue that the more knowledge Bouvet has of AEN's domain, the better they can understand what technology is applicable and not. Therefore, in order to absorb such knowledge, one could argue that absorptive capacity is necessary also for Bouvet.

The need for absorptive capacity may interrelate to the type of knowledge exchange. Arguably in a static knowledge transfer, there is not the same need for absorptive capacity on the sender's side as more or less "ready pieces" of knowledge is transferred (Trippl et al., 2009). The sender is then not receiving any form of knowledge, and thus, absorptive capacity is irrelevant. However, with dynamic knowledge exchange, the solution is merely created in an atmosphere of collective learning, and therefore absorptive capacity may be more important also for the sender.

Figure 11 shows the findings so far in a revised analytical framework. The findings are visualized through the red text:
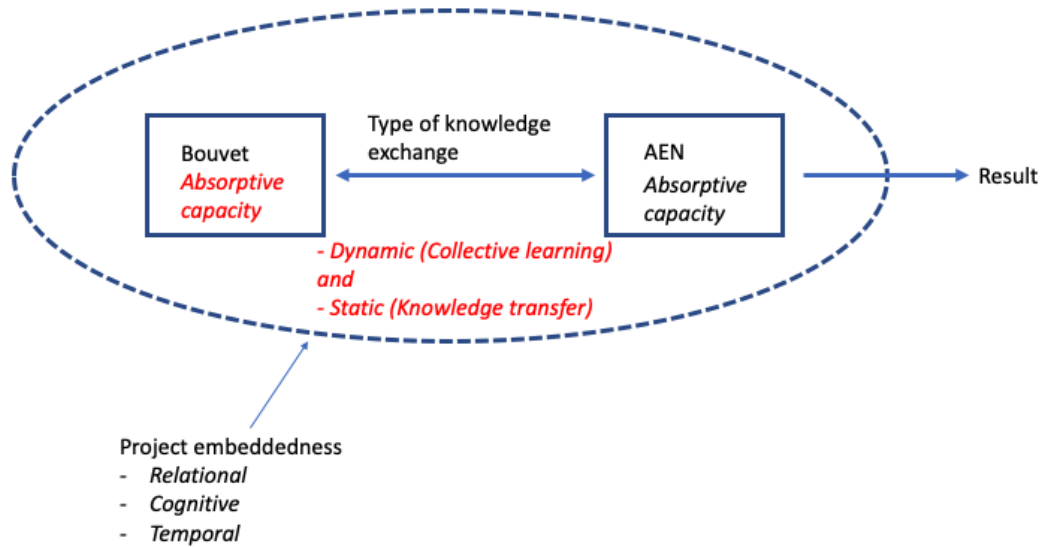
Figure 11: *Revised analytical framework.*

Conclusion:

It became apparent that the absorptive capacity has been of great importance on several levels within AEN. Both the distinctly organizational absorptive capacity as well as the absorptive capacity of individuals appear to be necessary for the knowledge exchange process. To some extent, AEN had basic prior related knowledge, which helped them to understand the assumptions that shapes the sender's knowledge. In addition, Bouvets knowledge can be defined as diverse to the knowledge of AEN, which in turn facilitates effective utilization of the external knowledge for AEN (Cohen & Levinthal, 1990). One interesting finding was the supposed importance of absorptive capacity on the sender's side. Bakker, Cambré, et al.'s (2011) theory does not point this out, however, from the case it is apparent that Bouvet needs absorptive capacity to effectively process domain-specific knowledge from AEN and that way better evaluate how the development of technology may apply to AEN's domain.

5.4 How did the project embeddedness develop during the project?

The project embeddedness can be characterized as underlying mechanisms which are present in the project at all times. However, how they develop may be decisive for the knowledge transfer aspect, and ultimately to what degree the project is a success or not (Bakker, Cambré, et al., 2011). Further, Bakker, Cambré, et al. defines relational embeddedness, temporal embeddedness, and cognitive embeddedness as decisive for the success of a knowledge transfer.

5.4.1 Relational embeddedness

Relational embeddedness refers to the strength of the relation, where strong relational embeddedness, in general, is positive for the knowledge transfer process (Bakker, Cambré, et al., 2011).

It was evident that a high degree of trust was present between AEN and Bouvet. All of the respondents showed to good cooperation and a high level of trust throughout the program:

"*AEN have involved us greatly and been very open with us. They have given us a considerable amount of trust.*"

Further, regarding the technical aspects Bouvet contributed on, it was revealed that Bouvet was given great freedom, and was able to act autonomously:

"*Regarding the technical aspects they (Bouvet) control this themselves. There is no one who double-checks them.*"

This also shows to a great amount of trust in the AMS-program and indicates that AEN trust Bouvet in taking the best decisions regarding the development of the technical aspect. One respondent explained that the great amount of trust was achieved

over time as Bouvet showed what was possible. By this, the representative means that by using an iterative method, one could start with small steps and show to proof of concepts. Such proof of concepts are fast and cheap to develop, and yet they show theories in practice and thereby can be used as examples for possible solutions. Several respondents also mentioned the close interaction between the parties as decisive for the high level of trust.

"*We have been placed physically at the customer's offices all the way. I think that is crucial to achieving good cooperation and not least creating trust between each other.*"

From this statement, one can argue for strong relational embeddedness based on several accounts. Moran (2005) highlights, amongst others, trust, overlapping identities and feelings of closeness as factors which characterizing strong relational embeddedness. One could argue that being placed physically at the customer's offices, leads to a high frequency of interaction, which in turn also leads to a high relational embeddedness (Bakker, Cambré, et al., 2011). Theory states that strong relational embeddedness leads to the exchange of "high-quality" of information and tacit knowledge (Rowley et al., 2000, p. 371). It has already been revealed that the exchange of tacit knowledge has been important throughout the program, and thereby it should come as no surprise the strong relational embeddedness found here.

5.4.2   Cognitive embeddedness

The second relationship attribute, the cognitive embeddedness, refers to if the parties have shared representations, interpretations, and systems of meaning (Van Wijk et al., 2008). Further, it also refers to if the organizations have complementary or related knowledge bases (Bakker, Cambré, et al., 2011).

As for the program in whole, most of the representatives understood the parties to have developed shared interpretations of the end goal. This is not only apparent based

on the representative's answers, but also by the provided architectural -and solutions document, which was prepared by Bouvet as their initial work in the program. From the architectural -and solutions document, one can find the vision for the architectural aspects of the program:

"*The purpose of holistic business architecture is to ensure that IT architecture and solutions support the business goals and strategy that AEN can have at all times*"

This statement underlines the parts aiming to have shared interpretations throughout the program. Regarding the parties having complementary knowledge bases, this has partly been discussed in section 5.3, as an organization's absorptive capacity is dependent on having some previous related knowledge. Beyond having related knowledge bases, Nooteboom et al. (2007) also discusses the cognitive distance.

In short, Nooteboom et al. (2007) uses the cognitive distance to discuss collaboration and the combination of new novel combinations. Cognitive distance is amongst others, affected by to what degree the parties have mutual understanding and the novelty value of the interaction (Nooteboom et al., 2007). Several of the representatives pointed out that sometimes it was a challenge for AEN to understand the potential regarding technical solutions fully, and one respondent pointed out that it has been a maturing process for them:

"*When it comes to the analytical platform, there has been some maturing throughout the organization (AEN) for them to see the potential.*"

This implies that AEN initially did not have the full understanding of the technological opportunities, and thus, their understanding did not align with Bouvet's. These factors lay the basis for arguing that the cognitive distance initially was relatively large in the AMS-program. Such a large distance may in several aspects show to be positive, where for instance a larger cognitive distance lays the basis for learning by interaction and novel combinations (Nooteboom et al., 2007). It is argued here that much of the learning has been pursued through interaction, as previously revealed.

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Further, it is argued that the novelty value is relatively large as the AMS-program introduces a variety of new opportunities which previously have not been possible within the industry. The respondent refers to a maturing process which implies a development towards a smaller cognitive distance as the program moved on.

5.4.3   Temporal embeddedness

By temporal embeddedness, one refers to the project learning attribute, which is dependent on the parties previous history, and future expectations of each other. For instance, if the parties have worked together previously, one probably have developed partner-specific knowledge. This, in turn, is useful when working together in later situations (Bakker, Cambré, et al., 2011). The same author states that the parties also take advantage of a higher level of temporal embeddedness if they expect to work again in future situations as this plays a role in the project learning attribute.

Neither of the respondents referred to previous projects where the parties have had close collaboration, and thereby, it is not found that there has been any partner specific-knowledge, nor former earned trust. Some of the respondents did mention that Bouvet has cooperated with the AE group on previous occasions. However, this was never seen as a deciding factor for the relational ties in this case . This could be rooted in the fact that few of the actual individuals have cooperated on previous occasions.

On the question, if the parties expected to cooperate again in the future, the answers were slightly varied. To begin with, it was revealed that Bouvet and AEN have a framework agreement. This makes it quite probable that AEN and Bouvet at some later point will cooperate again. One respondent said this about a potential later cooperation:

"*It is clear that if a project is created in AEN shortly after this program, then Bouvet will still have some domain knowledge, and one will still have relations to the people,*

etc. On this basis one could expect an even more efficient project execution. "

From this statement, the representative relates to Bakker, Cambré, et al.'s (2011) theory, regarding the benefits of earned partner specific knowledge. Further, AEN underlined the importance of allocating time to new consultant's as it takes time to understand the organization and the scale of the program. The following was stated:

"*When we bring in new people, we are aware that it takes quite a while to get into things.*"

This also aligns with Bakker, Cambré, et al.'s (2011) theory, as one could argue that with a sufficient amount of partner-specific knowledge, the time of setting oneself into things would be shortened. However, one of the representatives also highlighted that the partner specific knowledge only applies for a certain amount of time, as things change so rapidly. By this, the respondent is referring to employees changing jobs, or being assigned to different parts of the organization, as well as technology and organizational structures change rapidly. Such factors may hinder the development of temporal embeddedness as the parties do not expect to gain much advantage from it. Despite this, one could argue that the temporal embeddedness has developed to be stronger during the case as Bouvet and AEN most certainly have gained partner-specific knowledge from cooperating over four years.

Conclusion: How did the project embeddedness develop during the project?

In general, the findings regarding the embeddedness in the project align with the framework which Bakker, Cambré, et al. (2011) concludes on in his theory. The relational embeddedness developed to be strong between AEN and Bouvet as a high level of trust was apparent. A high frequency of interaction between the parties may also have contributed to the high level of relational embeddedness. Finding such a high level of embeddedness is often expected when tacit knowledge is exchanged, and

there was no exception here.

A relative large degree of cognitive distance was revealed initially, as in some instances, AEN did not instantly understand the full potential of the technological aspects. It is also expected to find a relatively large cognitive distance when learning happens through interaction and novel combinations are apparent (Nooteboom et al., 2007). Over the span of the cooperation between Bouvet and AEN, the cognitive distance has decreased, and the cognitive embeddedness has grown to be stronger through a "maturing" process.

From the case there was no mentionable trace to temporal embeddedness. There were findings which propose AEN and Bouvet would benefit from temporal embeddedness. Amongst others, AEN had the understanding that it would take time for new consultants to understand the organization and their domain. It is argued that stronger temporal embeddedness between Bouvet and AEN would make for a more seamless process when taking in consultants. However, due to the fast-paced nature of digitalization, and employees shifting jobs and moving on, some of the representatives questioned how long such temporal embeddedness would be applicable.

6 Conclusion

The purpose of this thesis has been to research *how consultancy firms and customers interact when creating new digital solutions.*

The thesis has been conducted by discussing and linking theory related to the topic and collecting empirical data through an in-depth-case-study. The case study is the interaction between Bouvet and AEN throughout AEN's work of digitalization. AEN is the only company in Norway, as of now, who have fully digitalized all levels of their grid. Based on the presented theory, the research was structured into four empirical research questions:

1. What kind of knowledge did Bouvet contribute with?

2. How did the knowledge exchange happen?

3. What role has absorptive capacity played throughout the project?

4. How did the project embeddedness develop during the project?

These four research questions were answered by using theory to discuss the data in the analysis chapter. In the following, findings concerning the empirical research questions are summed up.

Bouvet contributed with both explicit and tacit knowledge, and by this covered all three of the knowledge components, *know-why*, *know-what* and *know-how*. A somewhat unexpected finding was AEN's focus to exchange domain knowledge with their consultants. Such a focus goes beyond Bakker, Cambré, et al.'s (2011) framework whose research is solely on the transfer of knowledge to the receiving party.

The knowledge exchange was found to occur in both a dynamic and static manner. The explanation for this was that much of the knowledge was exchanged through close collaboration and interaction between Bouvet and AEN, and hence the dynamic knowledge exchange type. The static type was merely a result of AEN re-

questing Bouvet to give general courses on technological matters to its employees, or AEN bringing Bouvet consultants to domain-specific seminars. Such static knowledge exchange involves less interaction and can be viewed as a more standardized recipe of knowledge.

It was revealed that AEN, to some extent, had prior related knowledge to the one which Bouvet contributed with. This laid the basis for AEN being able to utilize the knowledge exchanged between the parties. Going beyond Bakker, Cambré, et al.'s (2011) theory, the findings suggest that the sending party (Bouvet) also needs absorptive capacity. In Bouvet's case, absorptive capacity is important to effectively process domain-specific knowledge and thereby evaluate what new technological development is applicable to AEN.

Regarding the embeddedness in the case, the general findings align with the framework of which Bakker, Cambré, et al. (2011) has developed. The relational embeddedness appeared to be strong, and a high level of trust had developed between AEN and Bouvet. Further, a relatively large cognitive distance was initially found between Bouvet and AEN. However, over the course of the program, the shared interpretations of the end goal and overall mutual understanding increased. Regarding the temporal embeddedness, this deviated some from Bakker, Cambré, et al.'s (2011) theory as it was not found that it played an important role.

In regards to the theoretical research question, it is of interest to see how the findings can be generalized. First off, it is discussed if the findings can be generalized empirically. That is, if the findings apply to other KIBS-customer interactions or if they apply only to the Bouvet-AEN case. Secondly, the theoretical implications are discussed, where the findings are viewed in light of the analytical framework. During the discussion of generalization, relevant future research is also presented.

Empirical generalization:

There are several aspects which imply that the findings could pertain to other KIBS-

customer interactions. One of the respondents stated that he shared experiences from the case with another energy company, which was about to do the same process of digitalization as AEN. The respondent underlined that much of the knowledge was applicable to the project of the other energy company, and hence, there was no reason to "*invent the wheel all over*". Another aspect is the fact that the case is based on successful digitalization, and therefore, others looking to digitalize in the same manner can look to AEN and the AMS-program.

There are several other aspects which imply that one could expect to find much of the same ways of interacting in other KIBS-customer relations as well. The task of digitalization cannot be characterized as a standardized product or service, and it would thus be necessary with the exchange of both scientific and experienced-based knowledge, and hence exchange of both tacit and explicit knowledge. Also, the lack of a standardized nature in digitalization would demand close collaboration and interaction between the parties which in turn would lay the basis for collaborative learning. During this process, it is reasonable to expect that the embeddedness would grow to be stronger, as one develops shared representations and greater trust to one another.

Although it is argued that the case can be generalized empirically, the configurations of the interaction may affect what mechanisms play an important role. For instance, one respondent questioned whether some of the architects should have been employed in AEN and not hired as a consultant. The argument was that with a temporary hire, such as a consultant, valuable knowledge of the link between technology and domain-specific knowledge in correlation to the overall business structure is lost when the contract expires. As the process of digitalization is temporary, it would be natural to use the traditional view, to hire consultants instead of hiring a full-time employee. However, with digitalization, as it changes how the organization works, perhaps it would be beneficial to keep the resource which could contribute to the transformation of the company in the years to come.

A possible result of having some of -or all of the architects employed in AEN may, for instance, have played a role on to what extent Bouvet needed absorptive capacity or not, as a large portion of the responsibility to evaluate technology in regards to AEN's domain lays on the architects. These implications go beyond the scope of this thesis. However, they may prove to be an interesting field of research.

Theoretical generalization:

In regards to theoretical generalization, and given the analytical framework, it has to be discussed if the findings are substantial enough to make theoretical contribution.

The thesis is constructed around a single-case study which in many cases is not enough in itself to provide literature with significant influence (Gustafsson, 2017). There are offcourse exceptions, such as the famous black swan example (Gustafsson, 2017). However, one can not argue that this case provides such falsification of existing theory. In other words, the case in itself does not give grounds to contribute to new theory but may lay basis for new knowledge through a collective process within the field of knowledge and digitalization (Gustafsson, 2017).

There are, however, some reflections which can be made on the analytical framework. From the original analytical framework, there is not placed any absorptive capacity on the KIBS side. Based on central findings, the framework should be revised to include absorptive capacity on both the KIBS and customer side.

Although absorptive capacity on the sender side is not apparent in Bakker, Cambré, et al.'s (2011) research, they acknowledge that further research on knowledge exchange to the benefit of knowledge transfer is due. In Bakker, Cambré, et al.'s research, more traditional interactions are examined, and one first assumption to make is that absorptive capacity is not necessarily of the same importance with such interactions. Moreover, the absorptive capacity may be dependent on what degree the knowledge exchange can be characterized as collective learning. Another possibil-

ity is that the need for absorptive capacity is a result of the fast-paced environment (digitalization) and that with rapid change, it is more difficult for the customer to keep up. Hence, this makes it more necessary for the KIBS to absorb knowledge from its client. Nevertheless, the revised analytical framework lays the basis for further research.

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Attachment A

Intervjuguide- Eksterne

Innleder med å fortelle om oppgavens tema.

Kan du fortelle generelt om prosjektet og din posisjon i dette prosjektet (dine ansvarsområder, hvor lenge du har vært i prosjektet osv.)

1. **Vet du hvordan prosjektet kom i stand?**

2. **Hva har vært den sentrale kunnskapen som Bouvet har brukt i prosjektet?**

3. **På hvilken måte har dere bidratt inn i dette prosjektet?**
   - Vil du si at det er en ferdig løsning dere har levert?
   - Til hvilken grad vil du si løsningen er et resultat av samarbeid?

4. **Hvordan har dere samarbeidet underveis i prosjektet?**
   - Hvilken form for samarbeid har dere hatt? (Tett samarbeid, samlokalisering, dialog, Skype osv.)
   - Overleverer dere i stor grad dokumentasjon til AEN? (Taus vs. Eksplisitt)
   - Evt. vil du si at kunnskapen utveksles gjennom tett interaksjon mellom dere og AEN?
   - Har dere tilbudt/ har AEN etterspurt noen form for kompetansebygging (Workshops, kurs og lignende.)?
   - Kommunikasjon

5. **I hvilken grad har AEN vært i stand til å bruke/ bearbeide kunnskapen fra dere?**
   - Har det vært stort sprik mellom deres og AEN sin kunnskap i forbindelse med prosjektet?
   - Etter din oppfatning har AEN vært åpne for endringer som påvirker prosesser i bedriften stort?
   - Til hvilken grad oppfatter du at AEN har tilstrekkelig digital kunnskap for å kunne utnytte det fulle potensialet til de nye løsningene?
     - Har dette endret seg over tid?
   - Har det vært situasjoner hvor du føler at AEN har hatt manglende forståelse og dermed ikke oppfattet det fulle potensialet?
     - I slike tilfeller hvordan har dere håndtert det?
     - Har kunden vært interessert i å heve sitt kunnskapsnivå?
       - Hvordan har det skjedd/ foregått?

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Attachment A

6. **Hvordan har relasjonen dere imellom utviklet seg underveis?**
   - Vil du si at det har vært høy grad av tillit gjennom prosjektet?
     - Har denne tilliten økt gjennom prosjektets utvikling?
   - Vil du si dere har hatt tett samhandling gjennom hele prosjektet?
     - Har graden av samhandling økt gjennom prosjektets utvikling?
     - Er dette noe dere evt. Har hatt fokus på?

7. **Til hvilken grad har dere hatt felles forståelse for prosjektets utvikling?**
   - Har dere hatt samme visjon for prosjektet?
   - Ved prosjektets oppstart, vil du si at dere hadde overlappende teknologisk forståelse?

8. **Har prosjekt teamet til Bouvet og AEN samarbeidet tidligere på lignende prosjekter?**
   - I tilfelle ja, til hvilken grad har dette bidratt til et godt samarbeid på dette prosjektet?

9. **Forventer dere å samarbeide på lignende prosjekter i fremtiden?**
   a. Hva ville dere gjort annerledes til neste gang

"Bare for å konkludere":
10. Til hvilken grad vil du si at dette prosjektet endrer AEN?

Er det noe annet viktig som bør nevnes (Spesielle typer av utfordringer)?

Attachment B

Intervjuguide- Interne

Innleder med å fortelle om oppgavens tema.

Kan du fortelle generelt om prosjektet og din posisjon i dette prosjektet (dine ansvarsområder, hvor lenge du har vært i prosjektet osv.)

1. **Hvordan kom prosjektet i stand?**

2. **Hva gjorde at Bouvet ble en av samarbeidspartner?**

3. **På hvilken måte har Bouvet bidratt inn i dette prosjektet?**
   o Vil du si at det er en ferdig løsning dere har fått levert?
   o Til hvilken grad vil du si løsningen er et resultat av samarbeid?

4. **Hvordan har dere samarbeidet underveis i prosjektet?**
   o Hvilken form for samarbeid har dere hatt? (Tett samarbeid, samlokalisering, dialog, Skype osv.)
   o Får dere i stor grad overlevert dokumentasjon fra Bouvet? (Taus vs. Eksplisitt)
   o Evt. vil du si at kunnskapen plukkes opp gjennom tett interaksjon mellom dere og Bouvet?
   o Har dere mottatt/ etterspurt noen form for kompetansebygging (Workshops, kurs og lignende.)?
   o Kommunikasjon
5. **Har dere og Bouvet vært på bølgelengde kunnskapsmessig?**
   o Har forslagene til Bouvet vært enkle å bruke/ bearbeide?
   o Har dere vært åpne for endringer som påvirker prosesser i bedriften stort?
   o Til hvilken grad må dere ha tilstrekkelig digital kompetanse for å kunne utnytte det fulle potensialet til de nye løsningene?
   o Har det vært situasjoner hvor du føler at dere har hatt manglende forståelse og dermed ikke oppfattet det fulle potensialet?
     ▪ I slike tilfeller hvordan har dere håndtert det?
     ▪ Har dere vært interessert i å heve sitt kunnskapsnivå?
       • Hvordan har det skjedd/ foregått?

6. **Hvordan har relasjonen dere imellom utviklet seg underveis?**
   o Vil du si at det har vært høy grad av tillit gjennom prosjektet?
     ▪ Har denne tilliten økt gjennom prosjektets utvikling?

Attachment B

- o Vil du si dere har hatt tett samhandling gjennom hele prosjektet?
  - Har graden av samhandling økt gjennom prosjektets utvikling?
  - Er dette noe dere evt. Har hatt fokus på?

7. **Til hvilken grad har dere hatt felles forståelse for prosjektets utvikling?**
   - o Har dere hatt samme visjon for prosjektet?
   - o Ved prosjektets oppstart, vil du si at dere hadde overlappende teknologisk forståelse?
   - o Føler du at dere har utnyttet kunnskapen Bouvet har kommet med til det fulle?

8. **Har prosjekt teamet til Bouvet og AEN samarbeidet tidligere på lignende prosjekter?**
   - o I tilfelle ja, til hvilken grad har dette bidratt til et godt samarbeid på dette prosjektet?

9. **Forventer dere å samarbeide på lignende prosjekter i fremtiden?**
   a. **Hva ville dere gjort annerledes til neste gang**

"Bare for å konkludere":

10. Til hvilken grad vil du si at dette prosjektet endrer selskapet?
   a. Kan du fortelle noe om den utvidede funksjonaliteten dere har valgt å implementere i dette prosjektet (Nettanalyse)?
   b. Gir det ny og verdifull innsikt til hvordan selskapet bør styres?
   c. Vil du si at det endrer fundamentale prosesser i selskapet?
   d. Sammenlignet med andre prosjekter i selskapet, har dette utpekt seg som spesielt utfordrende?

Vil prosjektet og resultatet påvirke andre deler av AEN i framtidig utvikling av AEN?

Er det noe annet viktig som bør nevnes (Spesielle typer av utfordringer)?