Creating customer value through knowledge integration

- How internal stakeholders can be involved in the product development process

Caroline Alenvret

Johannes Evaldsson

Master Thesis LIU-IEI-TEK-A—15/02282—SE

Department: Department of Management and Engineering
Division: Projects, Innovation and Entrepreneurship
Date: 15-06-12
ABSTRACT

The increasing globalisation of the market is followed by increased competition between organisations. Therefore it becomes more important to create products with high customer value. To be able to create customer value, deep understanding of the customers’ needs must be obtained by employees, shared between them and transformed into products. Further consequences of globalisation are increasing differences between customers’ needs, which results in demand for customisable and flexible products.

The purpose of this study was to analyse how organisations can create more customer value through increased knowledge integration. The focus was on how knowledge that already resides within a globally dispersed organisation can be integrated during the product development process.

This study showed that customer value is created throughout the product development process by integrating the knowledge held by R&D and internal stakeholders. Different types of value are created at different phases in the product development process. One important finding is that different parts of the augmented value are created throughout the entire product development process. Since employees obtain different knowledge depending on which customer they interact with, it is important to utilise knowledge from a large number of employees with different roles and in different countries. Hence, the significance of knowledge integration must be disseminated and understood across the organisation. After completing the product development process additional customer value is created by the internal stakeholders’ who sell and implement the product, but it is during the product development process that the basis for their value creation is established.

Knowledge needs to be integrated in a formalised, repeatable way, so that the R&D department can ensure that the right product is developed at the right time. Integration means that the tacit knowledge that resides within one employee is codified into an explicit form that can be exploited by more employees. Therefore, four steps must be performed and repeated iteratively to create and spread knowledge throughout the organisation. The first step includes communication by exchanging tacit knowledge. The second step entails documenting the knowledge, and the third step involves combining the knowledge residing in the organisations into one common knowledge system. The final step includes distributing the knowledge so that it receives wide attention within the organisation. Several factors that have a negative impact on these four steps, and knowledge integration, need to be countered somehow. However, it was found that there are several mechanisms that facilitate knowledge integration, and most often the presence of several mechanisms at the same time had a better effect.
ACKNOWLEDGEMENTS

After completing five years of education at Linköping Technical University the final challenge was to conduct this study. Throughout the writing process we have had strong support from a lot of people.

First, we would like to thank IFS and specifically our supervisor Jonas Högberg who gave us the opportunity to conduct this study in the first place and who supported us with balanced advice and direction for the study. Further, we would like to send a great thank you to all respondents who took their time to share their story. In general, the great interest for our work that been shown by many employees with no connection to this study has helped us maintain our focus and work harder.

Second, we would like to thank our supervisor from the university, Charlotte Norrman. With her energy and enthusiasm she helped us raise the bar and pushed us beyond our limits. Without her advice this study would not have reached the same academic level. Third, thank you to our examiner from the university, Dzamila Bienkowska. By giving us clear instructions and directions we could keep on track throughout the study. Finally, a great thank you to our opponents Nina Petrén and Hanna Söderquist who read our study thoroughly and with critical eyes. You gave us valuable input that contributed to make the study better.

________________________________________
Caroline Alenvret

Johannes Evaldsson
### Table of content

1 **INTRODUCTION** ............................................................................................................................................. 1

1.1 Background ....................................................................................................................................................... 1

1.2 Purpose ............................................................................................................................................................... 2

1.3 Empirical problematisation ............................................................................................................................... 2

1.4 Explorative pre-study ......................................................................................................................................... 3

1.5 Research questions ............................................................................................................................................. 5

1.6 Report outline ...................................................................................................................................................... 5

2 **LITERATURE REVIEW** ................................................................................................................................... 6

2.1 Creation of customer value ................................................................................................................................ 6

2.2 Knowledge integration in organisations........................................................................................................... 8

2.3 Factors influencing knowledge integration ....................................................................................................... 12

2.4 Mechanisms facilitating knowledge integration ................................................................................................. 17

2.5 Summary of literature findings .......................................................................................................................... 19

3 **METHODOLOGY** ................................................................................................................................................. 21

3.1 Methodological framework ............................................................................................................................... 21

3.2 Explorative Pre-study ....................................................................................................................................... 22

3.3 Literature review .................................................................................................................................................. 23

3.4 Data collection ..................................................................................................................................................... 24

3.5 Analysis ................................................................................................................................................................. 27

4 **COMPANY DESCRIPTION** ............................................................................................................................... 30

4.1 Introducing IFS .................................................................................................................................................... 30

4.2 Organisation at R&D ......................................................................................................................................... 31

4.3 Product Development Process .......................................................................................................................... 31
5  EMPIRICAL FINDINGS ............................................................................................................. 33
5.1  Product Roadmap - Product reference groups ................................................................. 33
5.2  Pre-study - Account managers ...................................................................................... 35
5.3  Project Planning - Open Idea ......................................................................................... 37
5.4  Development - Account managers and product groups ................................................. 38
5.5  Stabilisation - Early Adopter program ............................................................................ 42
5.6  Release to Market - Webinars ......................................................................................... 44

6  ANALYSIS  46
6.1  Product Roadmap - Product reference groups ................................................................. 46
6.2  Pre-study - Account managers ...................................................................................... 50
6.3  Project Planning - Open Idea ......................................................................................... 52
6.4  Development - Account managers and product groups ................................................. 54
6.5  Stabilisation - Early Adopter Program ............................................................................ 58
6.6  Release to Market - Webinars ......................................................................................... 60
6.7  Summary of findings and answers to the research questions ......................................... 62

7  CONCLUSIONS AND DISCUSSION .................................................................................. 68
7.1  Theoretical contribution ............................................................................................... 68
7.2  Managerial implications ............................................................................................... 69
7.3  Limitations and further research ................................................................................... 70

8  APPENDIX ......................................................................................................................... I
List of figures

Figure 1. The relationship between goods, service and product ................................................. 6
Figure 2. Levels of the product, inspired by Kotler (2014) pp. 251 ................................................. 7
Figure 3. Knowledge conversion- based on Nonaka et al. 1996 pp. 842 ......................................... 11
Figure 4. Factors influencing knowledge integration ....................................................................... 12
Figure 5. Knowledge is used to create customer value in different stages of the product development process ........................................................................................................... 19
Figure 6. Knowledge spiral- based on Nonaka et al, (1996) pp. 842 .............................................. 20
Figure 8. Mechanisms influencing knowledge integration ............................................................... 20
Figure 7. Factors influencing knowledge integration ....................................................................... 20
Figure 9. The U-model, based on Lekvall et al., (2001) pp.214 ..................................................... 21
Figure 10. Organisation tree ........................................................................................................... 30
Figure 11. Organisation tree research and development ................................................................. 31
Figure 12. IFS’s product development process .................................................................................. 32
Figure 13. IFS’s Product Roadmap phase ......................................................................................... 33
Figure 14. IFS’s Pre-study phase .................................................................................................... 35
Figure 15. IFS’s project planning phase ............................................................................................ 37
Figure 16. IFS’s development phase ................................................................................................. 38
Figure 17. IFS’s stabilisation phase ................................................................................................. 42
Figure 18. IFS’s release to market phase .......................................................................................... 44

List of tables

Table 1. Explicit and tacit knowledge-based on Jonsson (2012), pp. 103 ........................................ 9
Table 2. Research question – interview questions matrix ................................................................. 26
Table 3. Initial analysis matrix ....................................................................................................... 28
Table 4. Research question matrix ................................................................................................. 28
1 INTRODUCTION

This chapter introduces the reader to the study and its background to provide an insight into the identified problem areas from a literature perspective and an empirical perspective. Together they form the basis for the purpose and research questions related to the study.

1.1 BACKGROUND

Why do customers buy a product? Usually they have a need that they expect the product to fulfil and chooses the product that offers the highest perceived customer value. That perceived customer value is based on the customer’s subjective evaluation of differences between the product’s benefits and the cost of the product, which is then compared with competitors’ products. (Armstrong and Kotler, 2014) When the product meets the customer’s needs and expectations, it creates customer value (Armstrong and Kotler, 2014; Mont, 2001). But the customers can also have unknown needs that can be fulfilled with an augmented product (Armstrong and Kotler, 2014). It means that additional customer value can be created if the product meets the customers’ unknown needs through additional consumer services or benefits (Kindström et al., 2012; Armstrong and Kotler, 2014). Therefore it is important to continuously create customer value to remain competitive as an organisation (Heide et al., 2011).

Since it is crucial to know customers and their needs, information and knowledge about the customer must be obtained. It has been emphasised that knowledge makes major contributions to an organisation’s competitive advantage and should be seen as an important resource (Nonaka et al. 1996; Jonsson, 2012; Schiuma and Carlucci, 2012). Witell et al. (2014) agree by stating that knowledge about customer needs increase an organisation’s ability to deliver customer value and that the amount of customer value created differs depending on where in the product development process the knowledge is integrated. Different stakeholders within an organisation also have different knowledge and different abilities to integrate knowledge from different sources (Berggren et al. 2011; Grant, 1996). It is an employee’s knowledge about the customer, converted into products or services that create customer value (Lin and Chen, 2006; Schiuma and Carlucci, 2012). If employees across departments have an unclear understanding of the customers’ needs they are also unaware of the importance of their knowledge, and potential customer value might be lost, within the organisation (Conduit et al., 2014; Jimenes-Castillo and Sanches-Peres, 2013).

Today, the environment is changing and globalisation is increasing faster and faster. The result of a globalised market is increased competition among organisations. (Daft, 2013) Therefore, it is even more important to create customer value that restores competitiveness (Heide et al. 2011). Customer needs are also increasing due to globalisation (Parry et al., 2012), and organisations must be able to adapt and respond more quickly than before to the changing needs of customers. Organisations are therefore dependent on their ability to make good use of their knowledge. (Daft, 2013)

The globalisation of the market and the internationalisation of research, development and production create new arenas for knowledge transfer. This spread also increases the importance of making use of knowledge and knowledge integration (Tell, 2011). Industries with advanced technologies are currently facing major trends, due to globalisation that are changing the conditions for knowledge integration (Berggren et al., 2011). Knowledge created locally must be integrated with the international organisation before it can reach its full potential. Knowledge obtained from different regions varies a lot and
organisations can gain and sustain an advantage if it is integrated properly. (Colakoglu et al., 2013) The transformation from national to international markets is also breaking up established ways of developing products and collaborations with customers. Research and development departments need broader and deeper knowledge to better balance the interests of different downstream units, which implies that knowledge integration is needed to a larger extent than before. Factors that influence an organisation’s ability to use knowledge need to be investigated to efficiently integrate knowledge and create customer value (Baxter et al., 2013).

The rapidly evolving software industry, with rapidly aging products, makes it a specifically vulnerable market (Parry et al., 2012; Tonnquist, 2012) and an interesting area to investigate. Also, the increasing use of software in business to business puts even higher pressure on the usability and user experience of software systems. (Lárusdóttir et al., 2014) To find out how knowledge integration affects the creation of customer value, this study analyses the enterprise software company Industrial and Financial Systems (hereafter IFS).

1.2 PURPOSE
Knowledge integration is most important during the product development process (Berggren et al., 2011). It is important to consider not only customers but also stakeholders, who are a part of the value creation, when developing products (Armstrong and Kotler, 2014; Edvardsson and Olsson, 1996). Globalisation affects organisations and increases the importance of knowledge integration according to Tell (2011).

Hence, the purpose of this study is to analyse how organisations can create customer value through knowledge integration. The focus is on how knowledge that already resides within a globally dispersed organisation can be integrated during the product development process.

Based on the problems that IFS experiences today (section 1.3), and a pre-study (section 1.4), four research questions (section 1.5) further break down and define the purpose.

1.3 EMPIRICAL PROBLEMATISATION
One company that experiences that more knowledge within the company can be utilised, and thereby create more customer value, is IFS. IFS operates on a global arena within the software industry, with its enterprise resource planning system IFS Applications (hereafter the application). IFS’s corporate functions and central development department is mainly located in Sweden and in Sri Lanka. The core product development is done by five product groups that are specialised in different areas of the application. The application consists of several modules, which can be further modified by regional research and development departments to better fit the customer. Sale and implementation of the application are taken care of by Pre-sale and Consultants at regional offices dispersed around the world. A more thorough description of the company and the application can be found in Chapter 4 - Company description.

During recent years, communication between the central research and development department (hereafter R&D) and Pre-sale and Consultants (hereafter Consultants) has become much better according to both R&D respondents and Pre-sale and Consultants. However, at the same time they emphasised that it could be even better. IFS in general has a tradition of keeping its employees for a long time, building up useful networks, which were said to enhance communication within the organisation. But, R&D still experiences that they develop functionality that is not used in the intended way, if at all, by the customers. Some functionality does not even reach the Pre-sale and Consultants who in turn cannot sell or implement that
functionality, according to R&D. R&D does not know what they need to do to improve the integration during the product development process.

1.4 EXPLORATIVE PRE-STUDY
An explorative pre-study with semi-structured interviews was conducted at IFS to identify problems and to specify the purpose further. The respondents were chosen from different departments and subsidiaries within IFS; the R&D department and employees from Pre-sale departments (hereafter Pre-Sale), Sale departments (hereafter Sale), and Consulting departments (hereafter Consulting) from Scandinavia and North America. The result is described in the following section below. A thorough description about the pre-study and how it was performed can be found in Chapter 3 - Method.

The pre-study start with a description of what customer value is to different internal stakeholders and how different stakeholders contribute to the creation of customer value. Then a discussion about the empirical findings follows, which lead down to the research questions.

R&D’s contribution to customer value is new functionality that meets the known and unknown needs of the customer. But, R&D have no defined working methods that can verify that value has been created for the customer and they get little information about what functions are being sold or how customers use IFS Applications.

Pre-sale respondents explained that they create customer value by explaining the benefits for the customer compared to competing solutions in the selling stage, and what specific functionality that can be useful in the customers’ business processes. Pre-sale is first to demonstrate IFS Applications and the user interface for the customer. One Pre-sale respondent also mentioned that customers lose interest if IFS Applications is not simple and user-friendly, so the application must also have an appealing user interface. In addition, if the Pre-sale employees can show the customer that IFS Applications will be developed continuously, in areas that will be beneficial for that specific customer; more customer value can be created. Therefore, to sell the application, the salesperson need to get proper information about what the application can achieve in terms of reducing the customers costs and risks so that the benefits with IFS Applications can be transferred to the customer.

Consulting contribute to the customer value creation through implementation and education of how to use the application to help the customer achieve higher revenue. Hence, value created by Consulting is how this can be illustrated and presented in business processes for the customer during implementation of the system. At the moment Consulting get a lot of information about new functionality, from which they have to sort and pick out the important parts for different customers. Some regions already have a platform of information that explains how the existing functionality relate to each other and how they can be combined into business processes to ease their value creation process. Every time new functionality is added Consulting has to update the existing platform, which they perceive as time consuming and not value adding activities.

The transfer of the application from R&D to the other Pre-sale and Consultants is an important step to secure Roll Out and successful creation of customer value. R&D uses a lot of channels to communicate product information to the rest of the organisation but several respondents mentioned that problems appear when the application is transferred to the Pre-sale and Consultants, aggravating their creation of customer value.
“We are an IT company and we cannot even share information in a good and effective way”

-Consultant

R&D prepares and launches the application in a way that not all Pre-sale and Consultant the dispersed organisation seems to understand and can make use of. Many respondents also emphasised that it is hard to find information and sort out which information that is useful and updated for different situations. Thereby their contribution to the creation of customer value is obstructed. Unfortunately, R&D employees perceive that they do not get enough feedback regarding this issue, leading to the next issue; gathering of customer needs. Feedback regarding needs is not transferred between internal stakeholders and R&D and therefore unknown needs are hard to meet.

The pre-study showed that there is a difference between R&D’s contribution to customer value and Sale, Pre-sale and Consultant’s contribution to customer value. Different output from R&D are therefore needed in order for mentioned parties to create their part of the customer value, which was emphasised when interviewing employees from Sale, Pre-sale and Consulting. From the interviews it can be stated that there are some activities during the product development process, where problems seem to occur; during product roll out and gathering of customer needs.

It seems that R&D and internal stakeholders have limited common understanding of each other and each other’s knowledge. The different opinions on product related issues are not communicated between them. R&D seems to develop the application with too little involvement of internal stakeholders, and there might be a lot of knowledge about the customer and the application that is not utilised within the organisation.

Little feedback is communicated back to R&D, according to the R&D respondents, which indicates that other internal stakeholders’ ability or motivation to exchange knowledge is lacking. It could also be a question of lack of opportunity to integrate knowledge. Another important aspect related to knowledge integration is the possibility to interact with internal stakeholders in a company with globally dispersed divisions with great physical distances. The organisational structure may influence the integration of knowledge since employees are distributed across many countries.

These findings are supported by an earlier research conducted at IFS by Lundquist and Läckström (2014). But despite Lundquist and Läckström’s (2014) suggestions for improvement these issues still exist today, which raises the question of where in the organisation or in the product development process the problems with communication and creation of customer value originate from. The problem might have additional sources, possibly earlier in the product development process.

The result from the pre-study implies that the problem at hand might be more complex than it first appears. It could be multiple and perhaps underlying root causes to the issue at hand. Instead of only transferring knowledge, which is a one-way communication, integration between R&D and Sale, Pre-sale and Consultants earlier in the product development process might be a solution. A better understanding of the customer can thereby be obtained, and increased customer value can be delivered. Therefore a study on integration during the product development process is needed.
1.5 **RESEARCH QUESTIONS**

Knowledge integration is important to master but it might be more or less important to do at different phases during the product development process. How knowledge integration should be performed to efficiently create customer value is something that organisations must learn and work with continuously. There are several factors hindering knowledge integration and mechanisms facilitating knowledge integration that is important to be aware of.

To fulfil the purpose the following research questions were developed based on findings in the pre-study. Research question one to three aims to answer where knowledge should be integrated, how it should be done and what factors that influence knowledge integration. Research question four aims to encompass and tie the previous research questions together in an attempt to find counteracting measures that facilitate knowledge integration.

1. When in the product development process should knowledge be integrated between R&D and internal stakeholders to create customer value?
2. How can knowledge be integrated between R&D and internal stakeholders?
3. What factors influence knowledge integration between R&D and internal stakeholders?
4. What mechanisms facilitate knowledge integration between R&D and internal stakeholders?

1.6 **REPORT OUTLINE**

After *Chapter 1 - Introduction*, a selection of theories is presented in *Chapter 2 - Literature review*, which provides support to the analysis conducted later in this study. The chapter ends with a brief conclusion with the most important findings. After that comes the *Chapter 3 - Methodology* with a review of the approach and methodology used in this study.

Then, a presentation of the studied company’s organisation, application and product development process in *Chapter 4 - Company description* follows. In *Chapter 5 - Empirical findings*, a description regarding the knowledge integration between R&D, Pre-sale and Consultants within the studied company can be found. The empirical findings are divided into the different phases in accordance with IFS’s product development process and further in terms of the three first research questions, while research question four extends across the first three research questions and is therefore integrated in them. The aim is to provide the reader with a structure that is easy to follow and so that each phase can be read separately. Chapter 2 and Chapter 4-5 is then combined and integrated in *Chapter 6 - Analysis* where similarities and differences between the empirical and theoretical findings are extracted and interpreted.

The analysis follows the same structure as the previous chapter (the empirical findings in section 5.1.1. is analysed in section 6.1.1.) with one exception. A deeper analysis, a combination of the conclusions from analysing research questions one to three together with further analysis regarding research question four was also performed. The analysis ends with a summary of the findings relative to the research questions. The results from the analysis are then presented in *Chapter 7 - Conclusions* together with implications and recommendations for further research.
2 LITERATURE REVIEW

This chapter consists of selected parts of literature that aims to support the analysis conducted later in the study. Each section ends with a brief conclusion with the most important findings that are used in the model of analysis. The review starts with a description of what value is and how it is connected to knowledge. Then knowledge, different types of knowledge and conversion of knowledge is explained. Further, the importance of making use of knowledge through knowledge integration, between the organisation, its external environment and internal stakeholders’ is emphasised. Finally several factors and mechanisms influencing knowledge integration are described. The chapter ends with a summary of the most important findings form the literature.

2.1 CREATION OF CUSTOMER VALUE

Armstrong and Kotler (2014) define customer value as the subjective value that customers perceive when they compare competing offers. The perceived customer value consists of the customer’s evaluation of the difference between benefits and costs of a product offering (Armstrong and Kotler, 2014; Kindström et al., 2012; Frankelius et al., 2015). What constitutes value, and how it is perceived, differs between customers. Therefore it is hard to anticipate customer needs, especially on a global market with many different industries (Parry et al., 2012; Mont, 2001).

2.1.1 CUSTOMER VALUE IN THE PRODUCT DEVELOPMENT PROCESS

To create customer value, an organisation needs to understand the customers’ needs, wants and demands and fulfill them with a combination of goods and services (figure 1), in other words a product (Armstrong and Kotler, 2014; Mont, 2001). Witell et al. (2014) argue that having information about customer needs facilitates an organisation’s possibility to increase profits, by delivering more customer value. Their study showed that the amount of customer value created differs depending on in which phase, in the product development process, the information is integrated, and if it is goods or services. The product development phase contain five phases; strategy, idea generation, concept development, design, and ‘test and launch’. Regarding goods, information needs to be integrated in the early phases of the product development process. Information obtained in the test and launch phase, when the design parameters already have been decided, only have minor impact on customer value. For services the highest customer value is created when information is integrated in the strategy phase or in later phases such as concept development and design phases. The reason is that it is hard for customers to provide valuable feedback to designers before the product has reached a certain degree of maturity. (Witell et al., 2014)

Figure 1. The relationship between goods, service and product
Armstrong and Kotler (2014) claim that a product can deliver value on three levels, which corresponds to three product levels; core-, actual- and augmented product (figure 2). The core product aims to deliver the solution for the core problem, hence delivering core value, which is defined early in the product development process. This level of the product only deliver solutions to the problem the customer wants to be solved. The actual product includes the overall design, functionality and quality that intend to persuade the customer to buy a specific product over competitors’ offer. By that, additional customer value is created through, for example, easier usage or more functionality (Armstrong and Kotler, 2014). This is partly supported by Edvardsson and Olsson (1996), who make the same observation concerning services. To create even more customer value, the product should be extended and include intangible attributes and benefits that the customer finds valuable, which create the augmented part of the product (Kindström et al., 2012; Armstrong and Kotler, 2014).

![Diagram of product levels]

Figure 2. Levels of the product, inspired by Kotler (2014) pp. 251

2.1.2 Stakeholders Contribute to Customer Value

The pressure of globalisation, increased product complexity and technology progress has forced organisations to create more customer value to differentiate themselves. Customer value is delivered to customers through conversion of (employee’s) knowledge into products or services. (Schiuma and Carlucci, 2012) Therefore the importance of having a good understanding of the customer to meet their needs, and create customer value, increases (Heide et al., 2011).

Armstrong and Kotler (2014) and Edvardsson and Olsson (1996) also emphasise the importance of considering both customers and stakeholders, and how they cooperate when developing products. They are often a part in the creation of the product and are thereby a part of the customer value creation process (Armstrong and Kotler, 2014; Edvardsson and Olsson, 1996). It is the ones who deliver the product who mainly creates the service part of the product and they are therefore crucial in the development of the product (Edvardsson and Olsson, 1996). The fact that there are many stakeholders involved in the creation of value implies that there are several sources of knowledge regarding customer needs. By making good use of the sources that possess knowledge about the customer, and through integration of the knowledge, the primary resource for creating customer value is secured (Grant, 1996). The increased attention to effective knowledge processes during recent decades further proves this statement (Schiuma and Carlucci, 2012).
2.1.3 Exploiting or exploiting knowledge to create customer value

Organisations increasingly focus on development of structures and systems to be more adaptable and responsible to change (Dodgson, 1993). Effective learning makes organisations more able to cope with problems (Hedberg, 1984). Two ways of integrating knowledge have been described in the literature.

Exploitation is defined as the refinement of existing knowledge (March, 1991). Exploitation is more efficient from a short-term perspective since existing activities become more efficient, but in the long run individuals, and thereby organisations, use suboptimal processes since knowledge about new techniques is not gathered (March, 1991).

Exploration means that the individual actively explores its environment to obtain new knowledge, integrate it and develop more new knowledge. Exploring, learning new things and incorporate new technology, decreases speed at first but increase benefits in the long run (March, 1991). Organisations can only learn, according to Grant (1996), through the learning of its members or by ingesting new members who hold knowledge that the organisation does not. This shows the connection and importance of exploring to keep up with the changing environment and customer needs.

A balance between exploitation and exploration is crucial in order for an organisation to survive and stay competitive (March, 1991). Berggren et al. (2011) argue that organisations mainly integrate knowledge during the development process. Hence, it is important to master knowledge integration, especially at the research and development department, to both gain and keep competitive advantage. The transformation from knowledge to products, to fulfil customer’s needs and demands, is dependent of the extent of knowledge integration. (Berggren et al, 2011) To strengthen and spread knowledge it is vital to create an environment within the organisation where interaction between individuals is possible (Bhatt, 2000).

To adapt to new situations, organisations need to process information from the environment (Grant, 1996). That is why it is important to gather and collect information from the market about the customer’s needs (Berggren et al., 2011). Lin and Chen (2006) have shown that knowledge integration is strongly connected to user satisfaction and increased value creation. By being aware of what the customer demands, knowledge integration facilitates new product development and the creation of customer value. (Lin and Chen, 2006)

Organisations must also use exploitation to refine existing activities and to keep up the speed (Zetterquist et al., 2012). To determine when enough exploitation has been done and more exploration activity is needed, feedback must be provided. If feedback is too slow, or absent, the likelihood of receiving incorrect information and making wrong interpretations increase. (Durnell Cramton, 2001) If a person is unaware of the fact that his or her actions is suboptimal, the person has little to none incentive to change behaviour and learn new things. Hence, one potential reason that prevents organisations from exploring, and challenging its existing knowledge frame, is limited feedback. (Zetterquist et. al., 2012)

2.2 Knowledge integration in organisations

Knowledge is an organised combination of ideas, rules, procedures and information (Bhatt, 2000). Knowledge, like technological know-how and deep understanding of customers, is increasingly considered as an important aspect of organisations’ competitiveness (Nonaka et al., 1996; Schiuma and Carlucci, 2012). Grant (1996) agrees by stating that knowledge is the primary input to production, and the primary source of customer value. Knowledge exists in a changing reality that through multiple
interactions and information exchanges is realised (Bhatt, 2000). To secure that the customers’ needs are met and creation of value is possible, information about the customers and their needs must be gathered continuously. (Grant, 1996)

2.2.1 **Knowledge Dimensions**

Nonaka et al. (1996) and Lam (2000) divide knowledge into two parts; explicit and tacit knowledge (table 1). *Explicit* knowledge can be expressed in terms of words and symbols and thereby be codified and published. Explicit knowledge is impersonal and independent of the context. (Nonaka et al., 1996, Grant, 1996; Jonsson, 2012) Hence, explicit knowledge can be acquired by formal studying, it can be obtained without participation from the knowledge owner and it can be stored in one location. (Lam, 2000) *Tacit* knowledge exists in the form of intuition, hunches and builds on experience from the owner. Tacit knowledge can only be acquired by practical experience. (Ruppel and Harrington, 2000; Nonaka, et al., 1996) Tacit knowledge is harder to transfer to other people (Ruppel and Harrington, 2000; Nonaka, et al., 1996, Grant, 1996) and builds on a shared understanding (Lam, 2000). Tacit knowledge is personal and contextual dependent, which makes close involvement and cooperation during knowledge transfer important. Otherwise tacit knowledge will not be utilised to its full potential. (Lam, 2000) A concrete example of tacit knowledge is to know how to ride a bike- hard to explain before trying.

<table>
<thead>
<tr>
<th>Explicit</th>
<th>Tacit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Possible to codify</td>
<td>Hard to codify</td>
</tr>
<tr>
<td>Objective</td>
<td>Subjective</td>
</tr>
<tr>
<td>Impersonal</td>
<td>Personal</td>
</tr>
<tr>
<td>Independent of context- time and place</td>
<td>Context dependent- here and now</td>
</tr>
<tr>
<td>“Know what”</td>
<td>“Know-how”</td>
</tr>
</tbody>
</table>

Knowledge can also be divided into individual and collective knowledge within an organisation. (Jonsson, 2012; Lam, 2000; Nonaka et al. 1996) *Individual* knowledge is knowledge that resides within an individual’s brain and skills. Given the cognitive limits in storing and processing information that an individual has, individual knowledge becomes domain-specific. Since individual knowledge is bound to the individual, it is important to gather and utilise this knowledge before the individual retire or quit, otherwise important knowledge might disappear. (Lam, 2000) *Collective* knowledge refers to knowledge that is shared and distributed among employees (Lam, 2000). The intersection of individuals’ knowledge represents the platform on which individuals can share and integrate their individual knowledge (Grant, 1996; Nonaka et al., 1996). The collective knowledge is stored within the organisation’s rules, procedures and routines (Grant, 1996; Lam, 2000). Collective knowledge can be said to be the organisation’s “memory”. It can take the form of hard data or represent the flow of interaction between individuals (Lam, 2000).

2.2.2 **Knowledge Spiral**

Knowledge creation, the source to innovation, and knowledge integration are closely related and often interdependent processes during development projects. When individuals with different knowledge integrate their knowledge in an effort to innovate they create new knowledge. When the new knowledge is
integrated with the existing knowledge more new knowledge is created. Therefore, in a product development perspective, where diverse knowledge bases are integrated to satisfy a common need, knowledge creation and knowledge integration can be considered as, “two sides of the same coin”. (Berggren et al., 2011) This is partly supported by Baxter et al. (2013), Grant (1996), Nonaka et al. (1996) and Lin and Chen (2006), who state that innovation is closely related to integration of knowledge within an organisation.

Nonaka et al. (1996) take the concept of knowledge creation one step further by stating that knowledge is created when tacit and explicit knowledge interacts and integrates with each other in an innovative process. Lam (2000) argues that tacit and explicit knowledge are mutually complementary entities. This means that an organisation cannot be innovative with only one form of knowledge and that the organisation’s performance is dependent on its ability to integrate these two types of knowledge. Nonaka et al. (1996) and Grant (1996) argue that a balance between tacit and explicit knowledge is essential to gain competitive advantage.

Newly created knowledge is strongly tacit since it origins from the individual (Blackler, 1995; Grant, 1996, Lam, 2000). The tacit and individual knowledge can, in an organisational context, gradually be transformed into codified and explicit knowledge, through interaction between individuals. The explicit knowledge can then be spread to many people within the organisation and become common knowledge. Each individual may then interpret the knowledge, make it their own tacit knowledge, and in that process create new knowledge. (Blackler, 1995; Lam, 2000) With the assumption that knowledge is created through these creative processes, four different modes of knowledge conversion (figure 3) can be assumed to exist (Nonaka et al., 1996):

1. From tacit to tacit knowledge: Socialisation
2. From tacit to explicit knowledge: Externalisation
3. From explicit to explicit knowledge: Combination
4. From explicit to tacit knowledge: Internalisation
**Socialisation** is when individuals acquire tacit knowledge from each other, and the knowledge can become collective. It can be done without speaking but with observation, imitation and practice instead. This kind of learning is commonly referred to as experience and is linked to the specific emotions and context where the knowledge exchange occurs. (Nonaka et al., 1996) One important factor in socialisation is the proximity of the individuals engaged in the knowledge creating activity. Imitation, practice and individual participation is localised and geographically defined since transmission of tacit knowledge builds on language and observation. The transmission is also influenced by the networks formed for exchanging knowledge. (Cohendet et al., 1999)

**Externalisation** is when tacit knowledge is transferred into explicit concepts. This kind of transfer is often portrayed in the form of metaphors, analogies, concepts, or models, and constitutes a simplification of the tacit knowledge. When the tacit image is conceptualised, and transferred parts of the experience is lost in the process. But, the discrepancies and gaps that appear when interpreting the message help promote reflection and interaction between individuals. When people feel an imbalance, inconsistency, or contradiction in their association, their reflection often leads to the discovery of new meaning. This kind of deduction and induction is a very common method during collective reflection, and concept creation, in creative processes. Therefore, externalisation can be seen as the key to knowledge creation since it creates new, explicit concepts from tacit knowledge. (Nonaka et al., 1996)

**Combination** is a process of gathering and implementing concepts into one knowledge system. This kind of knowledge conversion therefore involves combination of different concepts through media like documents, meetings, telephone conversations, or computerised communication networks. The knowledge

---

*Figure 3. Knowledge conversion* based on Nonaka et al. 1996 pp. 842
transfer mode can also be performed in the other way meaning that larger corporate visions, business concepts or product concepts are broken down and operationalised. (Nonaka et al., 1996)

*Internalisation* is a process when explicit knowledge is converted into tacit knowledge and is closely related to learning by doing. This process can be assisted with verbalised or diagrammed documents, manuals or oral stories. Documents or manuals also facilitate the transfer of knowledge to other individuals helping them to share experiences indirectly. (Nonaka et al., 1996)

The starting point of knowledge creation or a knowledge spiral often begins with *socialisation* creating a common ground for interaction. This common ground, or interest, facilitates the sharing of individuals’ experiences and mental models. To articulate tacit knowledge, *externalisation* transfer occurs, and metaphors or analogies are created. When existing knowledge is merged with the newly created knowledge *combination* conversion happens and a new product, service, or managerial system can be the result. *Internalisation* occurs when the result is shared with other individuals in the organisation which also ‘closes’ the spiral, which then can continue to spin. (Nonaka et al., 1996)

By spinning the spiral, the original *individual tacit* knowledge is amplified through the organisation, and becomes *explicit collective* knowledge through these four organisational learning steps. Moreover, all steps are needed to link peoples’ experiences and take advantage of all knowledge incorporated in the organisation. (Nonaka et al., 1996) Many researchers (Baxter et al., 2010, Inkpen and Dinur, 1998; Kang et al., 2010) agree, and argue that tacit knowledge has little competitive advantage until it is converted into explicit knowledge and is distributed to all individuals in the organisation.

2.3 FACTORS INFLUENCING KNOWLEDGE INTEGRATION

Previous research has focused on knowledge integration at three levels; Project, Organisation and Industry level (Tell, 2011). Since this study focus on organisational level only, knowledge integration factors influencing organisational level will be considered. Tell (2011) has divided these factors into three groups: task characteristics, knowledge characteristics and relational characteristics (figure 4).

![Figure 4. Factors influencing knowledge integration](image-url)
Knowledge integration has been found to be influenced by *task characteristics* such as complexity and objects. The more complex task, the more need for integration (Tell 2011; Durnell Cramton, 2001; Grant, 1996; Kang et al., 2010). The degree of uncertainty and novelty is another factor that has been found in the innovation literature. Complexity and uncertainty may also relate to frequency and heterogeneity. With less frequency and heterogeneity among complex and uncertain tasks, more processes for integration is needed. (Tell, 2001)

Regarding *knowledge characteristics* the effect of whether the knowledge is internal, or external, as well as the difference between organisations boundaries to transfer knowledge, is important to consider (Tell, 2011). Another factor is the degree of “tacitness”. Knowledge that is tacit is harder to integrate (Ruppel and Harrington, 2000; Nonaka, et al., 1996; Grant, 1996). The degree of knowledge differentiation (the degree of which the knowledge is shared or differentiated) is another influencing variable (Tell, 2011). It is easier to integrate knowledge if a common ground is set by common knowledge (Grant, 1996). Finally knowledge relatedness and complementarity is two different factors that have been found to positively influence knowledge integration (Tell, 2011).

*Relational characteristics* concern activities structured in interactions between individuals, groups or organisations, which affect knowledge processes and thus integration of knowledge (Tell, 2011). One of the most discussed and important characteristic is social capital (Baxter et al., 2013; Bhandar et al., 2007; Lin & Chen 2006), which can be seen as a resource that is based on social relationships. Social capital can reside within various forms, like trust, norms, cooperation, information, benefits and power. (Bhandar et al., 2007) Another important factor is how organisations handle knowledge integration through organisational design (Ravasi and Verona, 2001; Tell, 2011). There are many ways to structure an organisation; it can vary from functional structure to project-based structure and combinations of them both (Hobday, 2000). A third interesting area is the organisations history (Tell, 2011) and projects, which have to be understood in relation to standard operating procedures, traditions, norms, current, and future plans (Engwall, 2002).

Hence, general theories about knowledge integration propose the following characteristics; common knowledge, social capital and organisational structure, as particularly interesting to investigate further.

### 2.3.1 *COMMON KNOWLEDGE*

*Common knowledge* has been argued by researchers (Baxter et al., 2013; Grant, 1996; Durnell Cramton, 2001) to be one of the main reasons to problems with knowledge integration. Common knowledge is the knowledge that employees, within an organisation, have in common (Grant, 1996). With an established common knowledge, the likelihood that communication works properly increases since a common awareness of the recipients and what he or she knows or does not know is established (Daft, 2013; Durnell Cramton, 2001). Although, common knowledge, according to Grant (1996), resembles the ways that collective knowledge can be created, through for example the socialisation step in the knowledge spiral (section 2.2.2.).

Grant (1996) has made a general differentiation between five types of common knowledge that allow individuals to invade each other’s functional boundaries and integrate knowledge:

- Language
- Other forms of symbolic communication
• Commonality of specialised knowledge
• Shared meaning
• Recognition of individual knowledge domains

A common *language* is important in knowledge integration forms that require verbal communication between individuals; like group problem solving and decision making. (Grant, 1996; Baxter et al. 2013; Colakoglu et al., 2013)

*Other forms of symbolic communication* include literacy, numeracy, statistical use, and familiarity with computer software programs (Grant, 1996.)

*Commonality of specialised knowledge* refers to the common ground of knowledge that individuals can build their integration of knowledge on. If they have the exact same knowledge to begin with there is no need for integration. But, if no common ground exists, integration cannot be made beyond the most primitive level, since they do not understand each other. (Grant, 1996)

*Shared meaning* means that there is a common understanding of, for example, expressions used. This was also emphasised by Colakoglu et al. (2013) and Baxter et al. (2011) to be particularly important in collaborations where cultural differences were present, which is common in globally dispersed organisations. When converting tacit knowledge into explicit knowledge, the source’s perception might not be communicated, and substantial knowledge might be lost (Grant, 1996).

*Recognition of individual knowledge domains* refers to the awareness, understanding, and recognition of others’ knowledge and competencies (Grant, 1996). Since not all knowledge is of value to all employees within an organisation, it might seem unnecessary to integrate knowledge (Kang et al., 2010). Lack of understanding of others, their needs, and competences may lead to less integration and further that some knowledge disappears (Kang et al., 2010; Jacobsen and Thorsvik, 2008).

According to Durnell Cramton (2001), common knowledge or common ground is a central problem especially for geographically dispersed organisations (using the terminology of Grant, 1996). With a larger and more differentiated organisation, the need for coordination regarding integration increases (Daft, 2013).

Colakoglu et al. (2013) investigated the subsidiaries’ capability to absorb information from the head quarter in multinational corporations. Their result shows that a dispersed organisation has limited conditions, regarding the creation of common understanding, and that it is easier for subsidiaries to absorb information from stakeholders (such as customers or other subsidiaries within multinational corporations) in their local environment. (Colakoglu et al., 2013)

One explanation is said to be that the information is more in line with the context and existing knowledge of the subsidiaries, which strengthen the earlier statement of Durnell Cramton (2001). The reasons for inadequate information was found to be restricted interaction, increased use of one way communication, through technology products, and assumptions about other’s knowledge, due to social categorisation (for example job title). This indicates that knowledge that is customised has more potential to be absorbed and understood. (Colakoglu et al., 2013)
Another explanation found is that local knowledge is easier to utilise and explore due to the geographical and cultural differences that arise when information comes from a distant source. (Colakoglu et al., 2013) This problem has been emphasised by several other researchers as well (Baxter et al., 2013; Grant, 1996).

Consequences of having too little common knowledge in geographically dispersed collaborations is illustrated in communication problems (Colakoglu et al., 2013; Durnell Cramton, 2001; Grant, 1996), unevenly distributed information, failure to convey information, and different interpretation of silence (Durnell Cramton, 2001). Over all it can be stated that lack of common knowledge lead to loss of knowledge and missed opportunities to create customer value.

2.3.2 SOCIAL CAPITAL

Social capital is another important characteristic that has a large impact on knowledge integration (Adler and Kwon, 2002; Bhandar et al., 2007; Tell, 2011). Social capital can be seen as a resource based on social relationships, which exist within projects, networks, organisations, and emerges through interaction between individuals. Social capital can reside within various forms like, trust, norms, cooperation, information benefits and power. It can aid knowledge integration by reducing the time to reach consensus, and unite all stakeholders around a common goal. (Bhandar et al., 2007) Adler and Kwon (2002) identified three sources that are essential for social capitals existence:

- Opportunity
- Motivation
- Ability

*Opportunity* for social capital transactions is created by an individual’s social network (Adler and Kwon, 2002) and is a precondition for individuals to contribute with their knowledge (Bhandar et al., 2007). The opportunity lies in the possibility to utilise resources that the contacts hold. There is also a possibility to leverage the indirect network ties, which means that an individual might gain access to the contact’s contacts, and their resources. (Adler and Kwon, 2002)

*Motivation* relates to what the source and recipient have to gain from engaging in an exchange of social capital. (Adler and Kwon, 2002; Bhandar et al., 2007). Ryan and Deci (2000) differ between intrinsic and extrinsic motivation. *Intrinsic motivation* origins from activities that include; appeal of novelty, challenge or aesthetic value for the individual concerned. *Extrinsic motivation* comes from the individual’s expectation of a separable outcome apart from performing the activity (Ryan and Deci, 2000). Lin (2007) further divides intrinsic motivation into *enhancement of individual knowledge self-efficacy* and *enjoyment in helping others*, and extrinsic motivation into *expected organisational rewards* and *reciprocal benefits*. The following three motivational factors have been found to positively influence knowledge sharing: knowledge self-efficacy, enjoyment in helping others and reciprocal benefits (Lin, 2007). By informing the knowledge sharer that input have helped other people, and by creating something for the knowledge sharer in return, managers can positively influence the motivational factors enjoyment of helping others, and reciprocal benefit (Lin, 2007). Lin (2007) mentions that knowledge self-efficacy can be enhanced by managers by providing useful feedback that improves employees knowledge self-efficacy. Parker (1998) complements this by stating that knowledge self-efficacy can be developed by creating an environment where individuals feel that they are informed, listened to, and encouraged to speak. Parker (1998) also mentions the importance of choosing individuals with “high self-esteem, with a proactive personality style, cognitive ability, and intrinsic motivation” from the beginning, when assembling teams.
The competences and resources needed for a transaction determine if an individual have the Ability to contribute with knowledge (Adler and Kwon, 2002; Bhandar et al., 2007). Social capital also include resources made accessible through the individual’s social relations and its magnitude depends on the resources that is made available to the individual. The share of the resources made available depends on the source’s motivation to share resources with the recipient. (Adler and Kwon, 2002)

Bhandar et al. (2007) found that the importance of social capital varied depending on in what phase in the product development process a project is in. They found that during the initial stages of a project, where the idea is introduced and “sold” to the stakeholders, the stakeholders need motivation to commit to a project. If motivation is strong, opportunity can be created and ability can consequently be acquired. Therefore, it is important to identify motivators for each individual participating in the exchange of social capital.

During the design and implementation phase, where the designers get requirements for the product and refines them, the most important factor is ability. It is important that the right resources and competences are acquired or developed. Opportunity and motivation should be used to enhance the abilities through a common understanding of the problem, and a clear vision of the goal. The implication is that individuals are motivated to commit to the project, and that they will take the opportunity to contribute by using their individual networks. (Bhandar et al., 2007)

In the post-implementation phase, meaning when the product is launched, opportunity should be leveraged as a facilitator for collective actions towards the project. The opportunity to gain ability through the project together with a common identity and a sense of belonging can facilitate motivation in a project. (Bhandar et al., 2007)

2.3.3 ORGANISATIONAL STRUCTURE

When entering the international arena, an organisation meets new challenges not experienced on the domestic market regarding knowledge integration. For organisations that choose to use a dispersed structure to meet the challenges, the physical distance between employees’ increases, and the sources of knowledge are separated further. (Daft, 2013) Organisational structure in general has effects on knowledge integration regarding:

- Vertical distance
- Horizontal distance

Grant (1996) argues that decisions regarding product performance should be based on knowledge. Since specialised knowledge is required for competitiveness, and the fact that one manager cannot inhibit all knowledge residing in his or her department, a gap between decision power and knowledge emerges. (Grant, 1996) Since decision making processes is partly dependent on the knowledge source being available (Grant, 1996), a globally dispersed organisation can have problems taking decisions based on the most relevant knowledge, and at the right hierarchical level, which he names as vertical distance.

When a product requires integration between, for example, marketing and technology, and specialised knowledge resides within the subordinates at each department, the only choice left is to allocate decision power to the source of knowledge. (Grant, 1996) Björkholm and Brattberg (2010) also emphasise the importance of involving people who possess knowledge about customers in development and decision
making processes. They further state that information about the market is important to incorporate in the product development, to develop what the market demands, at the right time. But they also add that this knowledge is not usually held by the developers, and that they therefore need close cooperation with those who are more market-oriented during the entire product development. (Björkholm and Brattberg, 2010) Jacobsen and Thorsvik (2008) state that ability, and amount of knowledge, that can be handled, decreases higher up in the hierarchy. The reason is that there are fewer employees that can make use of the knowledge (Jacobsen and Thorsvik, 2008).

The variety that an international market represents, offers opportunities for learning, development of diverse capabilities and startling innovations in products. But, to capitalise on these opportunities, an organisation must transfer knowledge, and innovation from the domestic market, to the global organisation, where horizontal distance influence the outcome. This starts by sharing, and integrating knowledge, and this is particularly important, and challenging in globally dispersed organisations. Due to the long distances, time differences, and individuals’ different knowledge about local needs, coordination problems arise, which is further increased by the regions autonomy. It also becomes difficult to transfer domestic knowledge to international markets since each region is responsible for their market, and develops what their market needs. Likewise, it becomes more difficult to plan on a global scale, since each region acts only to meet the needs of their geographic area. (Daft, 2013)

2.4 MECHANISMS FACILITATING KNOWLEDGE INTEGRATION

As Schiuma and Carlucci (2012) stated earlier, it is through conversion of knowledge that customer value can be delivered. Grant (1996) has the same opinion and argues that the primary role of organisations is to facilitate the application of existing knowledge, to produce goods and services. This can be achieved by management of knowledge, and with mechanisms through which individuals integrate their productive activities and create value (Grant, 1996).

2.4.1 GENERAL KNOWLEDGE INTEGRATION MECHANISMS

Cummings and Teng (2003) found that various and numerous mechanisms for knowledge integration enhance research and development teams’ ability to transfer and understand knowledge. To facilitate knowledge integration in general, Grant (1996) found four mechanisms that can be used by organisations. The knowledge mechanisms are:

- Rules and directive
- Sequencing
- Routines
- Group problem solving and decision making

The first mechanism is rules and directives. Rules, policies and operating procedure facilitate human interaction, and help minimising the need for communication, and transfer of tacit to explicit knowledge. (Grant, 1996) It is important for organisations to send clear and consistent messages about the type of knowledge exchange activities that should be practiced, to enhance knowledge integration (Burgess, 2005). It is the organisation’s responsibility to ensure that the individuals have the appropriate social networks to access the required expertise for his or her job. It is particularly important that novices, with weaker social networks, are provided with opportunities to build social relationships with specialists in their field. (Kang and Kim, 2013)
By using a variety of tools when integrating, or transferring knowledge, such as presentations, documents and discussion sessions, managers can make the information more accessible, internalised and easier to receive. The transfer from tacit to explicit knowledge can also be enhanced by using role-playing or case-related activities. (Cummings and Teng, 2003) To solve problems with knowledge loss, due to unshared meaning, reconciling of different experiences and understandings with common cognitive frameworks, metaphors, analogies, and stories can be done. (Grant, 1996) Managers should support individuals who actively participate in exchange activities between employees, both within and across divisions, by reducing their workload, and recognise it at performance evaluations. Another solution is to increase an employee’s identification with the organisation. (Burgess, 2005)

Second, by planning and sequencing the steps, in all activities, where specialist’s knowledge is needed, each specialist has his, or her own time for input to the projects, and thus, integration between less people is needed, which can enhance the planning for integration. Third, routines can help guide the individual through patterns, in absence of rules and directives, or in absence of verbal communication. (Grant, 1996)

The first three mechanisms seek to avoid costs for communication, and learning, and are therefore associated with efficiency in organisations. But, sometimes a more personal and communication-intensive form of work is needed to solve unusual, more complex, and uncertain tasks. Complex and uncertain tasks call for more integration among employees in a form of meetings called Group problem solving and decision making. (Grant, 1996) Inkpen and Dinur (1998) argue strongly for this type of mechanism to successfully transfer, especially, tacit knowledge. Grant (1996) adds that the group problem solving and decision making mechanism for knowledge integration comes with high costs, due to consensus decision making, connected to the difficulties of communicating tacit knowledge.

2.4.2 Global Knowledge Integration Mechanisms

According to Daft (2013), there are some mechanisms specialised to enhance knowledge integration for organisations operating on a global level. These two mechanisms is said to help facilitate integration, coordination, and transfer of knowledge. Daft (2013) mentions two mechanisms:

- Global teams
- Coordination role

To facilitate integration, and achieve greater access to international expertise, an organisation can establish global teams, consisting of multi-skilled members from different countries, who either met face to face or through virtual media (Daft, 2013). This is connected to the mechanism group problem solving and decision making by Grant (1996), but on a global level. The key to coordination is to achieve effective integration through cross-learning by organisational individuals (Grant, 1996), task force teams or communities of practice (Kang and Kim, 2013). Taking into account what Durnell Cramton (2001) discussed earlier, face-to-face contact is preferable, since limited interaction, and increased use of technology products has a negative effect on common knowledge. Grant (1996) agrees and adds that the membership should be fluid and follow the knowledge requirements at hand, which is connected to his suggestion about sequencing.

In order for managers to take well-grounded decisions, filtering of the information they get, must be made, resulting in loss of important information and knowledge (Jacobsen and Thorsvik, 2008). Decisions should, as mentioned earlier, be taken by those who possess the knowledge, and not necessarily by people
with formal authority. Global teams should have the right to take decisions relevant to their possessed knowledge (Daft, 2013). Therefore, managers should delegate the decision making when possible. Grant (1996) state that decisions that require tacit and specialised knowledge should be decentralised, and decisions that can be based on common organisational knowledge should be centralised.

The drawback with global teams is the risk for teams developing an “us against them” mentality, which leads to competition among the members to fight for their country’s interests, instead of the organisations. (Daft, 2013) Another challenge is if specialist knowledge is required at the same time in multiple teams, but this is where sequencing comes in handy (Grant, 1996).

Arrangements can also be done on a structural level. Introducing a new or expanding an existing role, and include responsibility for coordination of knowledge, can enhance integration among divisions. The role can be established for any hierarchal level, for example top functional managers. Top managers should be responsible for coordination of informal and formal networks across boundaries enabling employees to exchange and integrate knowledge. The functional manager cannot both coordinate across countries and across functions so an additional role, a country manager, must be added. The country manager should be located within the country to be able to meet and absorb opportunities, trends, problems and needs, and be able to take an action more rapidly when changes appear. (Daft, 2013)

2.5 SUMMARY OF LITERATURE FINDINGS
The most important findings from the literature have been compiled into a short description presented, and illustrated in figures, below.

Customer value is created at different stages in the product development process and the creation differs between goods and services. Internal stakeholders’ different knowledge is also connected to customer value creation and organisations should use their specific knowledge to create customer value (figure 5). Both exploration and exploitation are important knowledge integration activities to use, and a balance is crucial. Exploration has the potential to create more customer value since new and unknown knowledge can be integrated in the product development process. Feedback has been identified as important in order for organisations to understand and accept that exploration is needed. The absence of knowledge integration prevents feedback from happening on a regular basis.

Figure 5. Knowledge is used to create customer value in different stages of the product development process
Knowledge can be tacit, explicit, individual and collective, and organisations must possess, and make use of all forms of knowledge, to create value. It is harder for organisations to utilise tacit and individual knowledge. Nevertheless, it is this knowledge that needs to be integrated, to become explicit and collective, in order for organisations to create new knowledge, to be innovative, and to deliver more customer value. The knowledge types are transformed through a spiral (figure 6) that needs to spin continuously in order for knowledge to be integrated and reach its full potential. If the spiral is interrupted, problems for knowledge integration, and thereby customer value creation, might appear.

Three factors influencing knowledge integration was found suitable to investigate for this study; level of common knowledge, social capital and organisational structure (figure 7). By understanding how these factors influence knowledge integration, precautions can be taken to increase knowledge integration. Several mechanisms (figure 8) can be used to enhance knowledge integration among individuals.

Depending on which factor influencing knowledge integration, what type of knowledge, and where in the product development process knowledge integration is affected, different methods are more or less suitable.
3 METHODOLOGY

This chapter aims to describe the process of the study performed. It also aims to explain and motivate the choices of methods used and decisions in general regarding the study. Furthermore the authors’ own reflections and evaluations of the process are, in terms of reliability and validity, integrated in the methodology descriptions below.

3.1 METHODOLOGICAL FRAMEWORK

This study was conducted during the spring of 2015, for 20 weeks, according to the University’s prescriptions regarding how to write a master study. The study was conducted at the R&D department, at IFS office in Linköping. The main part of the R&D department is located in Linköping, in the same building as other parts of IFS. Additional research was conducted at places in connection to the Technical University in Linköping. The study has been monitored by supervisors from IFS, and the university, and by opponents from the university. Their roles have been to support and guide the authors throughout the process.

This study aims to analyse how customer value can be created by involving internal stakeholders and integrate their knowledge in the product development process. The study is conducted from a R&D perspective. To achieve the purpose, factors, and mechanisms influencing knowledge integration were analysed. The overall structure of the method was based on a model (figure 9) for conducting a marketing research, by Lekvall et al. (2001).

The study started with a brief investigation of the company and the problem area through an explorative pre-study. This step enabled a better understanding of the problem, and a more precise problem description, early in the process. The second step was to get a deep understanding of the problem by gathering a theoretical basis through a literature review. The third step was the data collection, which connected the problem area to the specific company, and its conditions. The analysis was done in the fourth step by integrating the insights from the literature, and the specific company so that conclusions regarding the studied company could be provided in the fifth step.

Figure 9. The U-model, based on Lekvall et al., (2001) pp.214
3.2 EXPLORATIVE PRE-STUDY

To get an understanding of the studied company and the problem area, the project began with an explorative pre-study to investigate and decide the orientation before the main study. An explorative orientation is suitable when there is insufficient information to determine how the problem should be analysed (Lekvall et al., 2001). The knowledge of the authors was also taken into consideration when the orientation was chosen, which is supported by Björklund and Paulsson (2012). An explorative study enables a more specified purpose and better research questions early in the main study (Lekvall et al., 2001). Since the initial assignment “ensure value transfer from R&D to the rest of the organisation” were too wide, and undefined, a pre-study was considered necessary to set the scope properly.

The conducted pre-study was an iterative process including interviews, performing literature research, and analysing and comparing literature with empirical findings. Each part is explained separately but in reality the three parts were conducted in an iterative way.

The data for the pre-study was gathered through 13 interviews (appendix A), and from the company's webpage. For the initial interviews the respondents were allowed to describe the situation through unstructured interviews. The reason for using unstructured interviews was that the authors wanted to get an understanding of the problem without influencing the respondents. While the study progressed, and the problem became clearer for the authors, the interview methodology changed towards semi-structured interviews, with open-end questions and prepared follow-up questions. This enabled discussion between the authors and the respondent. A risk with this explorative approach is that it is hard for the authors to keep an objective view on the problem when different stakeholders strongly arguments for their own core issues. The authors tried to prevent this with frequent meetings with the supervisor from the university, and by repeatedly take a comprehensive view and think back on what the initial purpose of the study really was.

Employees from different regional subsidiaries (Scandinavia and America) and departments (R&D, Pre-sale, Sale and Consulting) were chosen for the interviews to get a broad picture of the problem. By engaging a lot of people with different experience, the validity of the gathered information increased, and some information could also be verified. This method is called assessment selection, and is supported by Lekvall et al. (2001). The choice of respondents was also partly based on an instruction selection, meaning that respondents recommended further potential respondents for the authors to interview. The advantage with this method was that thoughtful respondents with a lot of experience and opinions got chosen. A risk with instruction selection is that employees are chosen from the respondents’ personal networks, and that there are employees without equally extensive networks who might have another perspective on matters. Therefore, the authors asked for more alternatives than there were interview- slots, and also asked different employees to recommend respondents.

Notes were taken during each interview, and after the interview a description was completed. Since the aim of these interviews was to narrow down and determine a proper scope, a full transcription was not considered necessary.

During the explorative pre-study literature was gathered in parallel with the interviews, to increase the understanding of why things happened as they did within IFS. The initial collection of literature had a wider scope than the main study, which was narrowed down continuously while a better understanding of the problem was obtained. The wide scope led to a lot of theory being discarded before the main study.
Key words such as agile development and innovation were excluded as time passed. The fundamental understanding, that the authors gained, was valuable and supported the selection of problem areas and analysis later in the study.

The following is a list of used key words that also was used for the main study:

- Customer value
- Customer perceived value
- Knowledge creation
- Knowledge integration
- Knowledge transfer
- Learning organisation
- Organisational learning

When combining empirical with theoretical findings, patterns can be identified, according to Lekvall et al. (2001) and Yin (2006). This method was used to create the right boundaries for this study.

The findings of the explorative pre-study were presented to the supervisor from IFS and his department, Product Coordination. Based on the preliminary findings, and through a discussion session, the scope for further research could be set in accordance to both IFS’s and the authors’ wishes. The selection of scope was also partly based on an earlier research made within the R&D department. Lundquist and Läckström (2014) performed a study in 2014 at IFS, and the R&D department. Their study has a connection to the focus area of this study. Their study concerned knowledge transfer from R&D to the regional subsidiaries. Lundquist and Läckström (2014) identified the same problems as described in this pre-study (section 1.3.1); that different internal stakeholders need different type of output from R&D and that there is inconsistency in the transfer of product information. Since their focus was on communication during Roll Out, they proposed several suggestions regarding re-design of an existing communication channel used by R&D. Important to mention is that the data only was used to support this study’s findings, and to motivate and support the choice of focus area.

With this knowledge as a basis, it was decided to focus on integration of knowledge instead of transfer of knowledge. Since methods and processes varies a lot between product groups it was decided to conduct a wide company study that included individuals from different projects, departments, and regional subsidiaries. The authors wanted the conclusions, and implications to be general, and applicable to the entire R&D department.

The importance and benefits of conducting the pre-study showed in for example a well-defined purpose that early enabled a more focused main study. The interviews performed during the pre-study prepared the authors for the main interviews, in terms of interview training and development of questionnaires.

3.3 LITERATURE REVIEW
After having decided the scope, an extensive literature research was performed. When gathering a theory base, it is of great importance to have a critical approach. Some articles and books may not be as valid as others.
The used articles were therefore gathered from the database *Scopus*, which only provides peer-reviewed journals. The choices of articles were based on the number of citations and perceived relevance connected to the pre-study. However, it took some time for the authors to figure out how to find the most relevant theory with the most significant references, which was time consuming. Searching for and finding the original source of a theoretical field, and use that as a starting point had been a more efficient way of searching for theory, which was not realised until the end of the literature collection.

The used books were gathered from earlier university courses, recommendations from the examiner, the supervisor at the company, and through references in the used articles. Therefore, the books chosen were considered to have high validity. However, there might be a risk that the data is biased when the company provides the data. Therefore, the authors only used that information to get a general understanding of the company and methods used.

During the literature collection for the main study, key words that had been found to be suitable from the pre-study were used, and searched for in a more extensive way. The authors wanted a broad understanding of the research field as a base for decision making and deeper theoretical analysis. Therefore, from the initial key words, additional key words were found to be interesting to investigate:

- Communication
- Perceived value
- Tacit/explicit knowledge
- Exploration/Exploitation
- Dispersed organisations
- Knowledge coordination

Towards the end of the literature research, by combining the results of the pre-study with general theory about knowledge integration, an additional set of key words was selected. With support from statements from several researchers the following characteristics could be singled out as particularly interesting to investigate further:

- Common knowledge
- Organisational structure
- Social capital

### 3.4 DATA COLLECTION

The choice of research orientation and approach affect the way the empirical data should be collected. The decision is explained and discussed in the following sections.

#### 3.4.1 RESEARCH ORIENTATION AND APPROACH

The choice of orientation and research approach for the main study was based on the findings in the explorative pre-study. An explanatory research orientation is suitable when investigating the relationship between cause and effect within a specific research area (Lekvall et al., 2001). The focus in this study was to identify factors that had an influence on knowledge integration, which motivates choosing an explanatory orientation. Lekvall et al. (2001) further argue that few, rather than many, variables should be included in the study and that some variables could be selected in advance if they are predicted to be the cause of the problem. The pre-study, as well as the theory research, worked as a basis for selecting
potential factors to investigate in this study, and the boundary was set to include the product development process, the knowledge spiral, factors and mechanisms.

Since a deep understanding was needed to find the relation between cause and effect, and how it was affected by conditions in the surrounding, a case study approach was chosen. According to Lekvall et al. (2001), this type of approach is suitable when a deeper analysis is needed. Finally, the choice between a qualitative or quantitative study was made. The choice affects how the data should be expressed and analysed. Lekvall et al. (2001) suggests a qualitative dimension if it is hard to measure the collected data in numbers. In this study the data was collected from interviews, leaving the qualitative study as the best choice. The authors also discussed other methods to gather data, such as a survey questionnaire and also if combinations of methods could be suitable. However, the authors wanted to conduct one method to do it thoroughly. In addition, a survey was considered not appropriate since it would be too hard to formulate a short and concise survey that could cover the purpose and chosen research questions.

3.4.2 COLLECTION METHOD
The empirical data for the main study was collected through a question method together with employees at IFS. A careful selection of internal stakeholders was performed, since not all internal stakeholders could be investigated, to keep a high validity. Since the internal stakeholders’ contribution to value creation differed, the selection of internal stakeholders was important to get the whole picture. Consulting and Pre-sale employees were chosen since their combined knowledge best sums up the organisations knowledge about the customers. In addition, the authors wanted the conclusions to be applicable to whole IFS, several regions; Scandinavia, Americas and Europe West, were chosen to be included in the investigation.

The performed interviews were semi-structured with open-end questions and prepared follow-up questions. A semi-structured interview provides the interviewer with a description and understanding of the respondent (Brinkmann and Kvale, 2015), where the respondent gets the opportunity to express and emphasise areas that he or she sees as relevant and important (Bryman and Bell, 2011). A semi-structured interview makes it more of a discussion than question-and-answer session according to Brinkmann and Kvale (2015), and the authors wanted the respondents to focus on the broader picture rather than on specific questions. The interviews were conducted face-to-face during approximately 60 minutes, or over Lync (an instant messaging software client) during approximately 40 minutes, which is a time frame recommended by Lekvall et al. (2001). To further validate the gathered data the transcribed interview scripts were sent out to the respondents after the interview so that the notes could be approved by the respondents as well.

3.4.3 CREATION OF QUESTIONNAIRES
The questionnaires were adapted after the suggested time frame. Since the interviews with R&D employees had to include answers regarding how knowledge integration were conducted with both Pre-sale and Consultants, these questionnaires contained twice as many questions, and thereby took twice the time, in comparison to the interviews with Pre-sale and Consultants. The same types of questions were asked to both Pre-sale and Consultants and R&D. Since Lync meetings were primarily used to reach Consulting and Pre-sale employees in the regions, and longer interviews could be conducted with R&D employees face-to-face, the interviews could be performed as planned. The drawbacks with not meeting with the respondents face-to-face were an increased risk for misunderstandings, and that the body language, which is well known to contribute to what a person actually says, could not be read. However,
excluding respondents from outside the Linköping office would not have given a nuanced view of the organisations situation. Choosing to perform interviews with respondents from other regions were considered motivated since IFS is a global company, and the fact (mentioned earlier) that the authors wanted the conclusions to be applicable to the entire company and other organisations in general.

The interview guide (the questionnaire) was formed with input from the literature review as a base. But, a transformation of theoretical definitions had to be made. The reason was because the authors could not count on the respondents knowing the meaning of the theoretical definitions, and the fact that the questions would not be comprehensive enough if asking questions connected only to theoretical concepts.

To secure that answers to the three research questions was gathered, a matrix was created (table 2). The matrix consisted of mapping research questions on one axe, and the interview questions on the other axe, mapping holes that could be filled. In this way all research questions got answered by all respondents with the compromise that the time for each question was reduced, compared with going deep in specific problem areas with specific respondents. This method was preferable since the amount of respondents was limited, and the authors wanted the risk for a biased case description to be reduced. The complete matrix can be found in Appendix B.

<table>
<thead>
<tr>
<th>Research question 1</th>
<th>Research question 2</th>
<th>Research question 3</th>
<th>…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product development process</td>
<td>Knowledge spiral</td>
<td>Common knowledge</td>
<td>Social capital</td>
</tr>
<tr>
<td>Interview question 1</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interview question 2</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Interview question 3</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>…</td>
<td>…</td>
<td>…</td>
<td>…</td>
</tr>
</tbody>
</table>

Since the quality of interviews is decisive for further analysis (Brinkmann and Kvale, 2015), the authors performed a test interview to ensure the quality of the questionnaire. It was also a good way for the authors to practise their interview technique. The test interview was conducted with a respondent from R&D. This enabled adjustments and redrafting to a number of questions. The final questionnaire can be found in Appendix C.

Additional data was collected through IFS internal intranets and databases. By using these sources general information about the company was obtained. The literature review was also a source for secondary data. But, since that process accounted for a significant part of the method the authors decided to describe it in a separate section (section 3.3).

An issue that the authors had to handle was the fact that there were some changes being made in the studied organisations product development process during the data collection, which the authors could not
take into account. Instead, the authors tried to avoid those areas, and sorted off irrelevant data that were currently being replaced by new methods or processes.

3.4.4 *THE CHOICE OF RESPONDENTS*

During the data collection 20 employees were interviewed; ten from R&D, five from Pre-sale, and five from Consulting (appendix D). The selection of R&D roles, to interview, was based on the different roles existing in the projects, and hierarchical roles in the functional organisation. The chosen roles were: Product Director, Project Manager, Business Requirement Owner, Business Solution Architect and Software Engineer. Both Pre-sale and Consultants across several regions as well as hierarchical levels were chosen to get an overall understanding of the organisation.

The selection of respondents for the main study was partly based on recommendations, as previous described (section 3.3.1), from key individuals within IFS, and respondents from the pre-study. This method of selecting people is supported by Lekvall et al. (2001), who argue that the selection method is suitable when conducting a deeper case analysis. Also, more senior employees with a deep knowledge and experience in the field were chosen since they were perceived to best represent the way IFS work today. In addition, some chosen respondents also had a background from multiple roles within, and across, both departments and regional subsidiaries, resulting in broader answers, and better understanding of the similarities, and differences between roles. An important factor that influenced the choice of respondents of Pre-sale and Consultants was the lack of monetary resources for the interviews. Many Pre-sale and Consultants are under pressure to bill all of their hours, even internally, and therefore the respondents to choose from were limited. This might have influenced the results since those who are the busiest might be the ones who are most affected by the potential solution. But, the authors believed that the respondents could assume their earlier positions through experience, and describe the case from a general view as well as from their current personal view. A description of the different roles chosen can be found in Appendix E.

3.5 *ANALYSIS*

This section includes a description of how the collected data was first processed, with support from several matrixes, and then how it was analysed.

3.5.1 *PROCESSING OF COLLECTED DATA*

Processing and compiling of data should be done in a way that makes sense for the investigators further analysis (Lekvall et al., 2001). The first step after collecting the data was to document and describe all information aiming to sort and categorise the collected data. When the collection of data was done, a transcription of all the interviews was made. The notes worked as a base, complemented with audio recordings only when considered necessary. An excel matrix (table 3) was then made, based on the interview questions, and the different respondents participating in the study, which also is supported by Miles et al. (2014). The intention with using this method was to make an initial analysis half way through the data collection to evaluate the interview questions, and to see if the anticipated results could be found. Making an analysis half way through the interviews is supported by Lekvall et al. (2001). They state that since it is far from all projects that go according to plan the data collection should be adjusted continuously to ensure that a complete and correct description is gathered. This is especially important when conducting a case study. (Lekvall et al., 2001)
The aim was also to test if individuals with the same role saw the same issues or if it differed between roles, departments and regional subsidiaries. Thanks to the initial analysis some interview questions could be modified, and some completely removed. Updated questionnaires, and the research questions-interiew question matrix, can be found in Appendix F-G. When all data was gathered the authors made another evaluation of the data where they compiled the immediate and most obvious results. These results were presented in form of a PowerPoint for the supervisor at IFS together with two other employees, not connected to the chosen problem areas, in a group interview where the authors guided the discussion areas. This group interview was held in accordance with instructions by Lekvall et al. (2001). The main purpose of this group interview was to validate the initial empirical findings by triangulation, as Bryman et al. (2011) describe the combination of methods.

After the group interview the data was reorganised in a new excel matrix (table 4), called “research question matrix”, where the questions were organised under each research question. The reason was to ease the creation of the case description where all information was compiled into a whole picture, with the research questions as a base. Unwanted and non-contributing information was also singled out with the help from the research question matrix. This way of sorting data in a database is also supported by Yin (2006). Going straight to a narrative description from written field-notes include risks like only describing parts, biased, or incorrect findings according to Miles et al. (2014). They further state that by structuring events and their connection to each other the chronological order is preserved.

### Table 3. Initial analysis matrix

<table>
<thead>
<tr>
<th>Respondent 1</th>
<th>Question 1</th>
<th>Question 2</th>
<th>Question 3</th>
<th>…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondent 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respondent 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>…</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 4. Research question matrix

<table>
<thead>
<tr>
<th>Respondent 1</th>
<th>Research question 1</th>
<th>Research question 2</th>
<th>Research question 3</th>
<th>…</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondent 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Respondent 3</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>…</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
From the new matrix (table 4) the data was sorted into each phase in IFS product development process. In each phase the data was gathered and presented in different problem areas and each problem area was then structured after research question one to three. Since research question four extends over research question one to three, it was considered included in their respective column. When completing the empirical chapter some shortcomings in the data were identified. To fill these gaps complementary data were gathered from the respondents by mail, or quick phone calls. By using the matrix and complementary interviews, a case description could then be constructed. When the authors wanted to highlight something that the respondents said, citations were used. Since the interviews were performed with both Swedish and English respondents the citations were translated, but not corrected if the authors believed that the correction would change the interpretation of the citation. When original citations were used it is clearly shown with brackets including the word “sic”.

3.5.2 Analysis of collected data

When the data had been structured in an empirical description (chapter 5), critical events, key persons and key factors were identified and compared with the theoretical findings (chapter 2). A comprehensive picture was built, and patterns in each phase were identified by studying each phase separately. This method of analysing is also supported by Lekvall et al. (2001) and Yin (2006).

By comparing the case findings with theory, conclusions could be made. This method is called pattern-making; when empirical based patterns is compared with findings in theory to find similarities and differences (Yin, 2006). Since each chapter in the literature review corresponds to a research question, and the same goes with the analysis chapter, the comparison was performed in a structured and methodical way. When the empirical findings had been analysed based on research question one to three, research question four was applied on their conclusions. By comparing the result, from research question one to three with theory corresponding to research question four, additional conclusions could be made across the research questions to link them together. A summary was conducted for each research question, after the analysis, containing conclusions across all phases in the product development process. These conclusions were then used as a basis for theoretical and practical contributions (chapter 7).
4 COMPANY DESCRIPTION

This chapter includes an introduction of IFS; what they do, how they are organised, the application (IFS Applications) and their processes for product development from a R&D perspective. The main sources used for this part is the company’s webpage and internal documents.

4.1 INTRODUCING IFS

IFS is a global enterprise software vendor providing an Enterprise Resource Planning (ERP) solution called IFS Applications. IFS develop, sell and implement the component based ERP software with over 2200 customers in over 60 countries. As a global company IFS support multiple languages, currencies and units of measure. The company was founded 1983 by five engineering students from Linköping University. The first application was launched during 1985 and two years later they released the first complete suite. Today IFS has grown to 2700 employees’ worldwide and has total revenue of three billion SEK in 2014.

IFS operates in several countries and has a decentralised management. The main organisation has four corporate functions as support; Finance and Administration, Corporate Marketing, Business Development and R&D. The organisation is then divided into eight regions; Americas, Asia Pacific, Europe Central, Europe East, Europe West; Finland and Balticum; Middle East, Africa and South Asia; and Scandinavia (figure 10). Every region has its own budget and strategy enabling them to meet local customer requirements, like geographical and cultural differences. This also means that the regions are almost self-governed.

IFS Applications, the main product, is a comprehensive system specialised in a number of business processes. The aim is to enable mid-size to large organisations to obtain greater profits. IFS Applications focuses on agile businesses and supports four core processes; service and asset management, manufacturing, supply chain and projects. This focus gives the customers a competitive advantage within their own markets. In addition to the four core processes IFS deliver solutions for human resources, financials and customer relationship management.

Figure 10. Organisation tree
These processes are built up by five different product groups. Architecturally the system is built up by a base (Technology) and the four additional product groups (Human Resources and Financials; Service and Asset and Projects; Manufacturing; Supply Chain). These groups form the core part of the application. Every region is then allowed to develop their own customisations (hereafter localisations) and add them to the core application, with the help from their regional R&D department. The added localisations are only available in the region where they are developed and they are often connected to one or a few customer. IFS Applications is easy to customise and the customer only pay for what they use. Depending on the customer’s needs, selected parts of the application can be implemented, and the same applies to the localisations.

4.2 ORGANISATION AT R&D
In the R&D department, there are five product groups, as mentioned earlier. The product groups have their own Product Director who is responsible for the product group and its requirements (figure 11).

The product groups is supported by three supporting functions; Research and Strategy, Methods and Processes and Product Coordination. The supporting functions together with the manager at the human resource department forms the management team. Research and Strategy follow market trends by investigating the market either by themselves or with hired consulting firms. Method and processes develop and evaluate new and existing methods and processes for the product development. Product Coordination is responsible for coordinating the application, translating it to different languages and packing it to a shippable application.

4.3 PRODUCT DEVELOPMENT PROCESS
IFS delivers a new core release of their module based application every third year. The core part of the application is the part that R&D develops and supports. The modules in the core part are the modules that are the same for every customer. To ensure that the updated application meets customers’ and markets’ demands a Strategic Roadmap is formulated for each core release. The Strategic Roadmap covers major updates and budget for the complete application and is decided upon at a strategy conference before every start of the new core project.

The product development process (figure 12) of IFS Applications is initiated after the strategic conference, which can be seen as the starting point of the customer value creation that R&D have sole responsible for.

Figure 11. Organisation tree research and development
Since R&D share the responsibility of the Strategic Roadmap with other corporate functions, this phase has been excluded from this study.

After the strategy conference R&D break down the goals and form detailed plans for each product group on how they meet the strategic goals. The development of the application then follows the structure of a pre-study, project planning and development phase. In the stabilisation phase R&D ensure that the application meet the requirements through several tests with Pre-sale and Consultants as well as real customers.

The application is then rolled out to the Pre-sale and Consultants that in turn sell and implement the application to the end customer. Since every customer is unique, localisations might then be needed. These localisations are developed by the R&D department in each region, as explained earlier (4.1). All these phases contain knowledge integration between R&D and Pre-sale and Consultants, forming the ground for customer value creation.

A more thorough description of each phase can be found in the beginning of each section (5.1, 5.2, 5.3, etcetera) in chapter 5.
5 EMPIRICAL FINDINGS

This chapter includes a selection of the empirical findings representing the knowledge integration between R&D, Pre-sale, and Consultants within IFS. The information was gathered primarily from the interviews but also from spontaneous conversations with employees, and is presented in a case description below. The findings are structured in accordance with the phases in the product development process (section 4.3), and further in accordance with research question one to three. Research question four extends over research question one to three and are therefore integrated in them.

5.1 PRODUCT ROADMAP - PRODUCT REFERENCE GROUPS

When the Strategic Roadmap has been decided, the first phase of the product development starts, which is called Product Roadmap phase (figure 13). Each Product Director is responsible for the transformation of the Strategic Roadmap into an execution plan for each product group, the so-called Product Roadmap, and further operationalises it into several development projects. Each Product Director has their own product reference group consisting of representatives (Pre-sale and Consultants) from several regions. The aim with the product reference groups is to gather and combine information from a wide range of customers and industries, prioritise their demands, and create a Product Roadmap with prioritised areas for strategic investment and improvement.

![Figure 13. IFS's Product Roadmap phase](image)

In the end it is the Product Director who has the formal power and can decide whether the input from the reference group should be considered or not. It was mentioned that, how the Product Directors use the reference groups differs. Some Product Directors seem to consider the input and others seem to use the reference group more as a channel for distributing information.

When all the Product Roadmaps are set, the cost and required resources for each project need to be defined and checked against other product groups, since cross-functional resources may be needed for cross-functional projects. This step is the start of the coming development and aims to allocate the resources between the product groups, in the most appropriate way.

5.1.1 WHEN KNOWLEDGE IS INTEGRATED

The reference group is decided to meet four times per year, according to methodology prescriptions, which should be seen as guidelines. The product reference groups are mentioned by Pre-sale and Consultants to be the formal way for Pre-sale and Consultants to communicate their input, and in that way influence the prioritisation of the product roadmaps. The composition of the groups varies since there are unclear rules for how the regional representatives are selected, or which roles that should be included. The purposes with the product reference group include providing guidance on the overall roadmap for the product area, represent prospects and customers, and represent their respective region. It is the Regional Managers who select the regional representatives on behalf of the Product Director, but not all stakeholders or regions are represented in all reference groups.
5.1.2 *HOW KNOWLEDGE IS INTEGRATED*

Before the meetings the chosen regional representatives gather information through their personal networks, through both formalised e-mail distribution and from their personal experience. How this information is compiled and then presented at the reference groups meetings varies. In one product group the representatives gather information, prioritise it and present the region’s top five investment areas in a template document which is submitted to all group members in advance so that everybody can get an overview and prepare their opinions before they meet. This document was mentioned to be remnants of an earlier attempt to structure how the product groups gather knowledge, but that the initiative faded out. The details are then presented and discussed during their group meeting. Reference group meetings can also contain brainstorming, briefing or demonstrations of new concepts. In some product reference groups the participants get to vote about the ideas in a democratic way and in others they have little influence. One Product Director who uses little formalised methods during in his product reference group expressed his view quiet clearly by stating that the product reference groups are not a democracy where each vote carries equal weight.

“Other groups have a democracy in which all participants can vote, and that is a hair brained idea, if you ask me. This is no damn democracy!”

– Product Director

The Product Director then completes the Product Roadmap and delivers it to the product group through a PowerPoint. A compiled document of all five Product Roadmaps, representing the common application roadmap for all product groups, is then sent out to the regions which. The product reference groups are seen as an important channel to communicate IFS long-term strategy through out to the regions.

5.1.3 *FACTORS INFLUENCING KNOWLEDGE INTEGRATION*

Some reference groups lack representatives from one or more regional department. On the question of whether any Pre-sale and Consultant is more suitable, the answer was that R&D makes no difference between Consulting or Pre-sale employees, it is rather a matter of “getting the right people”. Although, one Product Director mentioned that they have no Pre-sale representative at all in their reference group, and that they might miss out on understanding customer sales requirements, and on how Pre-sale generates sales, due to that fact. The input from Pre-sale employees was also mentioned to be more creative and visionary.

“With regard to no Pre-sale person involved, the input might therefore be less creative and visionary.”

– Product Director

Although, several respondents, R&D employees, Pre-sale and Consultants, feel that the chosen regional representatives only care about their own customers and interests. Further, the same respondents also perceive that the regional representative loses sight of IFS long-term goals that are needed at this level of strategic planning. Another problem mentioned with the product reference groups is their composition of people and that they are organised in silos, and therefore it is harder to come up with solutions that corresponds to the customers’ business processes according to a Product Director.

It was also mentioned by a Project Manager that R&D in general seems to believe that Pre-sale employees can give better input about the customers compared to Consultants and therefore prioritises Pre-sale
employees. Also, it was mentioned that since not all regions have their own Pre-sale employees (in some regions the Consultants are responsible for the sale process as well), R&D might not reach these regions when transferring information that only targets Pre-sale employees.

In turn, the regional employees’ opportunity to influence R&D depends on whether they are included in the regional representatives’ network. Several Pre-sale and Consultants feel that they cannot influence the application since they have no contact with the regional representative.

“We are represented by a representative but we do not have much contact, occasions when we meet or time with them [sic].”

– Pre-sale employee

Several Pre-sale and Consultants mentioned that there is a lot of knowledge in the regions that could be useful for R&D, but it is not captured with current methods (section 5.3.).

Even if Pre-sale and Consultants do not feel that they can influence R&D, it was found that they are motivated to collaborate with R&D to get a better application, and with that make IFS’s business grow. One respondent also mentioned that the possibility to be creative and share ideas is one source for motivation.

“I enjoy being creative, and change is a positive thing. I wish I had more time to share my ideas, and write them down.”

– Pre-Sale respondent

Some of the employees in the regions have their own personal contacts within R&D that they have built up over the years, and they try to use them to influence the development, in absence of contact with the regional representative. Vice versa, most R&D respondents are motivated to collaborate with the regions, and the main reason is that better understanding for the customer will lead to a better application.

Out of the gathered input, it was mentioned by respondents, R&D employees, Pre-sale and Consultants, that R&D tend to listen more to larger regions compared to smaller. Some R&D respondents also feel that the closer the collaboration with a region is in general, the more R&D listens to them. Also, the closer the region is to R&D in terms of physical distance, the more input and collaboration. The Scandinavian region was mentioned to have a lot of influence due to being the biggest region and its closeness in terms of distance to R&D (some Consultants work in the same building as R&D in Linköping).

5.2 PRE-STUDY - ACCOUNT MANAGERS

When the product roadmaps are set, and checked against each other so that all resources have been distributed, the Pre-study phase is initiated (figure 14). First a Project Manager and a Business Requirement Owner are appointed, they are then briefed with the Product Roadmap by the Project
Director. Their task is then to further operationalise the Product Roadmap and decide what the purpose and usefulness for the customer should be. If there is a short timeframe for some projects it can be decided to allow some projects to skip the pre-study and move straight to the project planning. If functionality already exists in a localisation, it is common to skip the Pre-study since R&D can acquire enough information from the localisation instead.

The thoughts behind the operationalised application are then benchmarked with competitors and pitched towards potential customers, to verify that the application will be competitive, which is done, for example, by conducting analysis of competitors’ offers. Verification against other projects is conducted to ensure that other projects are unaffected and that conflicts of interest are taken care of. The results from the pre-study is gathered in different documents, and is later compiled in a new document, which then can be communicated to the development team, in the project planning phase.

5.2.1 WHEN KNOWLEDGE IS INTEGRATED

To help the Business Requirement Owner and the Project Manager to decide the purpose and usefulness of the project, a target group analysis can be conducted, and an account manager should be appointed. The account manager is involved to a varying degree in different projects. The account manager shall represent any general customer that IFS has. The account managers’ task is to provide R&D with input through continuous interaction throughout the development, with mostly the Business Requirement Owner, or Business System Analyst, according to R&D respondents.

In cases when the pre-study is not performed, an account manager is not appointed (of normal causes) before the next phase, Project Planning. Although, it happens that the account managers are first appointed after a while, in the Project Planning when the project has some initial results to present, and use that as a basis for discussion at the start of the development.

“Not until after two months, we have now begun to involve them. Obviously, we are probably a little late."

– Business Requirement Owner

5.2.2 HOW KNOWLEDGE IS INTEGRATED

During meetings with an account manager the input is written down before the Business Requirement Owner compiles it into the project backlog. The project backlog is a list of prioritised requirements that shall be met in the specific project, which in turn is stored in the virtual project-planning tool, called JIRA, and by that the input is made available for all team members to take a part of.

5.2.3 FACTORS INFLUENCING KNOWLEDGE INTEGRATION

The account manager can be either a Pre-sale or Consulting person, the importance is that the person has good knowledge about the customers and is interested in the project. If the idea for new core functionality originates from a localisation it is easier to find a suitable account manager, compared with development of completely new functionality. It is easy to handpick someone from the region who was a part of the project that developed the localisation. One Business Requirement Owner mentioned that they can use the regional representative from the product reference group or someone in his or her network with relevant experience. However, there is no formalised process for how these account managers should be selected. It often depends on each Business Requirement Owners personal network. Some Business Requirement
Owners find it hard to find appropriate account managers who is motivated, interested and who can give customer input from a general perspective and not just one specific customer. As mentioned earlier (section 5.1.3) the Scandinavia region is easier for R&D to reach and in addition, according to a Business Requirement Owner the Scandinavia region is more used to cooperate with R&D, which leads to that Scandinavian representatives are chosen to a larger extent. Another Business Requirement Owner also mentioned that Pre-sale employees are more commonly involved as account manager but that it would be appreciated, and that it probably would add some other valuable perspectives to involve Consultants.

“The account managers that I have been in contact with have foremost been Pre-sale employees...it would be valuable with more Consultants as account managers, since Pre-sale and Consultants have different focus; sales and usefulness.”

– Business Requirement Owner

Another factor mentioned influencing account manager involvement was the lack of time, both from a project perspective but also from an account manager perspective. Projects are often performed within a tight timeframe and therefore, according to a Business Requirement Owner, they do not have enough time to search for, and appoint account managers in the early stages of the product planning.

5.3 PROJECT PLANNING - OPEN IDEA

In the Project Planning phase (figure 15) the Product Roadmap is refined, and broken down into several project backlogs. The basic functionality that should be included (what the customer should be able to do and how it should be visualised) as well as the technical requirements (needed hardware to work properly) is decided and validated. Input for improvement from Pre-sale and Consultants is gathered.

This phase ends with a meeting where all interested parties such as Project Manager, development team, Business Requirement Owner, account manager, and others is present, and the solution is presented and changed if necessary. This is done together with a PowerPoint that is uploaded to IFS internal website afterwards.

5.3.1 WHEN KNOWLEDGE IS INTEGRATED

Requests for improvements of the application can be logged in a tool called Open Idea, which is available on IFS intranet. Open Idea is, as the name indicates, an open internal forum that can be used by any Pre-sale or Consult, to log their ideas. This is a way for Pre-sale and Consultants to share their knowledge about the customers’ needs, and a way for R&D to gather knowledge from many different sources.

5.3.2 HOW KNOWLEDGE IS INTEGRATED

The logged requests in Open Idea are supposed to be read by R&D continuously throughout the development process. The appointed person responsible for reading the requests (from R&D) varies between projects and product groups. The ideas are categorised, and gathered in a list by the appointed
For every new project the list is reviewed, and if some ideas can be applied to a specific project the Project Manager takes care of the idea, and enters it into the project backlog. Depending on their perceived importance, the requests are resolved at different speed. Sometimes feedback is provided by email to the owner of the request, otherwise it is up to the Pre-sales or Consultants to check the status of their request by themselves, according to an R&D respondent.

5.3.3 **FACTORS INFLUENCING KNOWLEDGE INTEGRATION**

The respondents from the regions were found to feel unmotivated to log requests in Open Idea since they experienced that no one reads them. Several of the Pre-sale and Consultants have stopped using or have never used Open Idea since it is perceived as a waste of time, and too much administration.

“I do not get feedback on my suggestions, especially regarding Open Idea. It is a great idea, but since I do not get any feedback I stopped using it.”

– Pre-sale employee

Instead Pre-sale and Consultants use other informal channels and personal networks, which have been formed over years of employment, to get their requests fulfilled. A Business Solution Architect confirms this by saying that beside Open Idea, the development team get customer information from their personal networks. The input from personal networks, as well as ideas from Open Idea, is usually discussed during development team meetings. The result is incorporated in the project backlog, if time is available.

The requests logged in Open Idea are usually written in terms of a solution rather than in problems or demands, leaving the development team wondering what is actually asked for, according to R&D respondents. Therefore R&D sometimes needs to contact the ones who logged the requests, and feedback on how R&D handles the requests are then automatically provided. Several Pre-sale and Consultants emphasised that it might take years before they hear anything from R&D about the requests they have logged. This is due to that when the requests are read some product groups marks them as solved the same minute as they have been read and categorised, and by other product groups not until the request has been solved and developed; which can take several years.

5.4 **DEVELOPMENT - ACCOUNT MANAGERS AND PRODUCT GROUPS**

During the *Development* phase (figure 16), all activities needed to build the application (and business processes) are broken down, planned and executed. This includes coding, documentation, and details in functionality and technical design.

The development is executed in accordance to agile methods where the complete application is divided into small iterative work-packages. Every work package and its project backlog are tested and refined every fourth week. R&D uses account managers and customers to get input on the work performed, at
different stages during this phase. The deliverables, from this phase is functions that are small parts of one or more business processes.

5.4.1 *When Knowledge is Integrated*

As mentioned earlier, account managers shall be used throughout the product development process. The cooperation is supposed to be withheld throughout the development phase but R&D respondents testify that the attendance ratio of the account manager (especially Pre-sale employees) tends to decrease while the project progresses.

“Our intention is to use them all the way, but we have experienced a decreasing attendance ratio to our demonstrations.”

– *Business System Analyst*

The account manager is supposed to work as the voice of the customer, but especially Business System Analysts and Software Engineers mentioned that they feel too isolated from the customer resulting in insecurity of whether they develop the right things or not. Some R&D respondents have jokingly said that R&D are a “code factory” who work in their own little bubble, disconnected from the real world. Not only R&D employees feel that they have too little exposure to customers. Pre-sale and Consulting respondents emphasised that, even if R&D have become better at it, they should become more customer focused. One Pre-sale respondent mentioned that he have little interaction with R&D, and that if they communicate it is informal, and through personal networks.

“There is not a channel for ‘this is what we do in the real world guys’. I need to go the informal way to share my ideas and knowledge.”

– *Pre-sale employee*

During the interviews it was also mentioned by several R&D respondents that knowledge integration within R&D itself might be lacking, meaning that information about what is happening in other product groups is somewhat unclear.

“Between the product groups we do not know what everyone else is doing. If you sit in your ‘room’ and develop on your own and do not ask those who are affected by the developed functionality – problems arise. It is foremost between one special product group and the others.”

– *System Engineer*

It was mentioned that historically R&D employees perceive cross functional projects as harder to execute than functional projects. Due to lack of transparency between product groups several R&D respondents emphasised that synergy effects are missed out on. One example is when one product group initiated an initiative to cooperate with another product group to develop functionality. This functionality was later discovered by chance by another product group who also felt that it could have been useful in their area of the application as well.

“At the end of the last project (Applications 8) we heard that another product group had developed a functionality that we could have used as well but that was not communicated to us in time.”
Another respondent mentioned that to get information about what is happening in other product groups presentations of have been held for her and her product group. It does not occur on a regular basis, it is rather a matter own initiatives and curiosity from employees.

5.4.2 HOW KNOWLEDGE IS INTEGRATED

Account managers are supposed to attend to the monthly development demonstrations where the development team show what they have done according to methodology prescriptions. When they do attend, the account manager gives feedback, and the development team incorporates the input into the product backlog where it is prioritised against the other things already decided to do. The result is an updated backlog available for all team members. However, as mentioned, Business System Analysts and Software Engineers feel that they do not have enough integration with account managers, or enough direct interaction with the customer. Instead, information about the customer comes from R&D employees higher up in the hierarchy, or from informal meetings through personal networks. Therefore, Business System Analysts and Software Engineers feel that they get a lot of ”second-hand” information.

Regarding the be informed about what functionality that is sold, implemented and used basically no integration between R&D and Pre-sale and Consultants was found. R&D can get hold of some statistical information though, but the information is not easily gathered and not incorporated with existing knowledge.

"I have seen slides of what kind of version the customers are on, but not which modules they use. In CRM-we can find this kind of information, but it is hard to access.”

–Pre-sale employee

However, the wish for more integration was not supported by one of the Product Directors who mentioned that employees on a more operational level, such as Business System Analysts and Software Engineers, probably do not have the need for more insight into Pre-sale and Consultants work.

“I think we are quite aware of what they are doing, as a whole, at least those in leading positions. The common man is probably more uncertain and they are probably not in the need of it either.”

– Product Director

Regarding the integration between product groups, the meetings that have been held were informal and described to be performed in a way adapted to each situation, but some similarities were found. The conducted presentations have been held orally, as a part of the interested product groups regular product group meetings. The invited presenter has gone through the new functionality that they have made in their product group; what has been done, why it has been done and how it works, live in the application. Sometimes in combination with a PowerPoint that has been distributed afterwards. The intention was said foremost to be to inform employees about what is happening, not educating the listeners in the functionality.
5.4.3 **FACTORS INFLUENCING KNOWLEDGE INTEGRATION**

R&D respondents mentioned that the information that Pre-sale and Consultants obtain from the customers is known by R&D to be valuable. Pre-sale respondents expressed high motivation for helping R&D. One Consulting respondent also mentioned that Consultants from his region would appreciate the opportunity to work directly with R&D.

“I was under the impression that most of the consultants from my region would welcome an opportunity to work directly with R&D.”

– Consultant

Though, one Consulting respondent mentioned that the biggest challenge with attending the demonstrations is the fact that Consultants are based on customer sight during normal working hours. For the Consultants’ personal situation meetings need to be planned well in advance, or be kept early in the day before normal working hours. Most R&D respondents in turn have expressed that they are motivated to use account managers since they feel that their input is too important to miss out on. One Business Requirement Owner claims that in an upcoming project higher consideration will be taken to the account manager’s schedule, to keep the attendance ratio high.

Another Business Requirement Owner stated that the account manager in general gives more input when the development demonstrations are held in smaller groups compared to when a lot of people are present. The reason to why was believed to be that the account manager feels bothersome and inconvenient in bigger groups. That is why the product group that this Business Requirement Owner belongs to have held additional meetings exclusively for the account managers.

Beside knowledge about the customers, and their needs, one Product Director mentioned that R&D probably lack some knowledge about customers business processes in general, since the development teams sometimes over-engineer the solutions.

“At R&D we probably partly lack understanding of what it is in IFS Applications that the customer buys, and also the understanding that the customers do not buy a specific function, they buy a solution. I have a feeling that some persons over-engineer, that is, they put too much effort into details that is irrelevant in the larger picture.”

– Product Director

In addition, several R&D respondents said that they do not have enough knowledge about what Pre-sale and Consultants do. Being more aware of what they do, sell and implement are believed to be helpful in the development team’s daily work. For example, a Business System Analyst would like to know the reason for why Pre-sale loses a sale opportunity so that the affected areas can be prioritised and improved.

“I would like to be on both Pre-sale and Consulting projects so that we can develop the right things instead of guessing. We would then get a better understanding of what the application lacks today. From Pre-sale we could learn when they disappear as a candidate – what basic functionality that we lack.”

– Business Requirement Owner
On the other hand a Product Director disagrees by saying that it is mainly the ones in leading positions that need to interact and fully understand what Pre-sale and Consultants do.

“I think we are pretty well aware of what they do, as a whole - at least those who are Product Directors or in a product leading position.”

However, R&D employees from both leading and more operational level agreed on that too little knowledge integration happen between product groups within R&D itself. They further state that no one stands in the way for more integration but that it is not encouraged or planned for it either. A Project Manager even mentioned that they have been thinking about conducting more cross-project meetings after the initial project information meeting, at the project start-up, but that has not happened yet.

“We have been talking about having meetings between the Project Managers but it has not happened so far.”

– Project Manager

The Project Manager also mentioned that it could be useful to have such meetings, especially when the original plans or scope have changed a lot since the initial information meeting. A Business System Analyst adds that inspiration for new functionality can be gathered from other product groups, which have been the case for some earlier functionality as described earlier.

5.5 STABILISATION - EARLY ADOPTER PROGRAM

IFS has created a program that they call “Early Adopter Program” that involves customers that are willing to try the unfinished application before it is launched to the global market (unlike the theoretical definition of an early adopter who embrace the product after launch). It consists of five of IFS’s existing customers. The purpose is to gather input from real users of the system in parallel with the development. This phase of the product development is called Stabilisation (figure 17).

![Figure 17. IFS’s stabilisation phase](image)

When the product development process comes close to its end, the complete application (first complete useable version of the new core release) is previewed for the Early Adopters. The aim is to prepare them for what is coming, before they actually implement the unfinished application during this phase. R&D directly supports and corrects problems influencing the Early Adopters’ businesses, since the application is unfinished and still contains several bugs. Each Early Adopter customer have their own R&D person, that is responsible for their implementation project and, the communication with R&D.

R&D also monitors various quality indicators to assess the quality of the application throughout this phase. It is tested by Early Adopters and internal stakeholders, such as Pre-sale and Consultants. It is validated for real life usage including key processes, consulting delivery, future support, and customer usage.
Based on the feedback about improvements of existing and/or new contents, features can be re-made. This provides the basis for deciding when the application is stable enough to progress to the release stage. This stage is also used to refine the positioning of the application, and prepare it for market roll out.

5.5.1 **When Knowledge is Integrated**

When the application has been updated and considered stable enough, the Early Adopters implement the application in their business activities. Early Adopters together with Pre-sale and Consultants (not involved in the product development) are also invited to test sessions during two weeks in Linköping, where feedback is gathered by representatives from R&D. The purpose with the test sessions is to make a final test to find and correct smaller bugs, or problems, before release to market, but also to pass on lessons learned to the next project.

The selection of Pre-sale and Consultants, that should perform the tests, is based on Pre-sale and Consultants’ experiences. Special made environments (online) have been set up for the testers to use throughout the session. Depending on if there is a bug or if the feedback regards improvement, the feedback is handled differently. Minor and low risk changes in the code can be made at this phase of the development process. The testers are informed about how their feedback is taken care of, and if possible, a date is provided, for when the suggestion or bug will be fixed. More extensive changes or ideas cannot be incorporated in the release this late in the process. However, that information is still taken care of, and stored, for coming updates or releases in the Product Roadmap.

In the Early Adopter Program for an earlier version, the product groups also performed customer evaluations with the Early Adopters through focused group discussions, surveys, and observations. The purpose with the evaluations was to use the customer knowledge for marketing activities, and future development of updates at the next version of the application.

5.5.2 **How Knowledge is Integrated**

When conducting the tests, as for the case in the development phase, the Early Adopters and Pre-sale and Consultants provide R&D with feedback on the application, through description of cases. The input is taken care of by the affected product group, who incorporates it into their project backlog. Participants have emphasised that the benefit for them lies in that they get a preview of what is coming in the next release, and that they can, and do pass this information on, to their fellow colleagues.

Regarding the customer evaluations the results were gathered first by each product group, and then compiled into one document, which was distributed to all product groups. However, this survey has not yet been performed for the last core development project. A Business System Analyst even mentioned that the Early Adopters have asked for R&D to come visit them, but it has not yet happened. Factors influencing knowledge integration

Since the initiation of this program, respondents from all divisions; R&D, Pre-sale and Consulting feel that the application has become better. The earlier contact with customers in general and the feedback is considered important for R&D. One Consulting respondent expressed that the Early Adopter Program works well, and that the customer implementation is proceeding according to plan.
“Now with the Early Adopter Program it has been so luxurious that we have had a contact from R&D work with me and my Early Adopter customer.[sic]”

– Consultant

On the other hand, one R&D respondent mentioned that the result of the customer evaluations probably did not meet the expectations of the R&D employees involved. The same respondent mentioned that this might be the reason to why it has not yet been carried out for the last core release. The respondent further states that there might also have been a competence issue, not enough preparation for the execution and lack of understanding of why it was performed the first time.

Another reason mentioned to why, was that the initiative originally came from the centre of the organisation, but now the responsibility lies on each product group. One Business System Analyst expressed concerns that these evaluations may therefore not be conducted. If any evaluations will be conducted, it will be after Release to Market. A third possible reason mentioned was that the time between the beta release and Release to Market was longer for Applications 8, compared to Applications 9, and that the Stabilisation phase is hectic for the Early Adopters.

“If it is going to be done, it is after they are live on Release to Market which is primarily due to the short time between the Beta-tests and Release to Market, and that it is calmer for customers after Release to Market.”

– Business System Analyst

5.6 RELEASE TO MARKET - WEBINARS

During the Release to Market phase (figure 18) the application is packaged; documentation and training material is produced, and made ready for delivery by R&D. Final validation is performed with technical benchmarking and installation tests.

The released application is Rolled Out to Pre-sale and Consultants within IFS. After this phase it is up to Pre-sale and Consultants to sell and implement the application at the customers’ locations.

The formal way to transfer information about the new functionality, and for Pre-sale and Consultants to learn about new features, is through webinars (online videos). In the Webinars functionality is walked through live in the application, or with snapshots, together with commentary. R&D delivers the information from a product process perspective, meaning how the functionality works, on a detailed level. The pronounced target is Pre-sale employees. An internal department, called IFS Academy, is responsible for educating Consultants and partners about the application.
5.6.1 When Knowledge is Integrated

When developing the documentation and training material it was found that there is integration between R&D and Pre-sale and Consultants, but to a varying degree and sometimes, not at all. A Business System Analyst who produces the webinars emphasised issues regarding describing the benefits with the functionality, and added that it would be good to involve Pre-sale employees earlier in this process.

“It would be good to integrate Pre-sale employees when we are about to describe benefits, and then it would be good to have more contact with Pre-sale at an earlier stage.”

– Business System Analyst

The integration that is performed is when the webinar script is reviewed, before it is uploaded. No Consulting person was mentioned to be involved during the development of webinars.

5.6.2 How Knowledge is Integrated

Before the webinar script is reviewed a draft is produced based on the project description, the Product Roadmap, and with continuous communication with the account manager. The webinar script is then reviewed by a Pre-sale person and by the marketing department, who have the possibility to give R&D some input before it is recorded. To make sure that the webinars that are being uploaded looks the same between all product groups, an instruction video on how to record a webinar has been developed. When it is recorded, often by a Business Solution Analyst, the content and details are decided more specifically. The webinars are complemented with short overviews, also in the form of webinars. The webinars are then uploaded to IFS rollout portal on an internal web page, and made available for the regions. The only feedback that R&D get on the webinars, and how they have been received, are through the amount of views for each webinar.

5.6.3 Factors Influencing Knowledge Integration

Several Pre-sale respondents mentioned that R&D do a great job with the presentation material, and that is has become better the last years. On the other hand, Consultants perceive large variation between Webinars in terms of content, format (video, power point, and word document), and quality of the product information. Consultants were found to be disappointed with the presentation material. When Consultants receive information about the application through webinars they have to translate, and interpret, the information to a business process perspective; how the functionality will help, and serve the customer’s business processes. The interviews showed that there is functionality that Consultants do not manage to apply to a business process, due to insufficient descriptions or unusable functionality in general. A Product Director started to reflect over this fact during the interview. He said that since it is important to transfer the information about the functionality produced, R&D might need to make additional webinars, exclusively for Consultants, containing information more appropriate for their use.

“I think it is important that we give information. And maybe we need to do more webinars for Consulting, and we maybe need to make overview variants to. But I think that we have started well there.[sic]”

– Product Director
6 ANALYSIS

This chapter compares the theoretical findings with the empirical findings to answer the research questions. IFS’s product development phases are analysed separately, where each phase is analysed with respect to each research question, and the theory connected to each question. Every phase starts with analysing when knowledge integration happens. Then follows how it is performed today, and how it should be performed. Further, which factors that influence knowledge integration are analysed. Finally, each phase ends with the mechanisms that are used by R&D, to facilitate knowledge integration. The findings are summarised at the end of this chapter.

6.1 PRODUCT ROADMAP - PRODUCT REFERENCE GROUPS

R&D involve Pre-sale and Consultants during the Product Roadmap phase, and both parties perceive the integration as valuable. Unfortunately not all Pre-sale and Consultants are represented during the socialisation step, and the externalisation step has issues during implementation. Factors found to negatively influence knowledge integration are; lack of understanding, opportunity, motivation, and horizontal distance. Mechanisms that exist, and are used today, to facilitate knowledge integration are; global teams, group problem solving and decision making, routines, rules and directives, and a coordinator role. Though, most of them are not used in the most efficient way, why the knowledge integration is hampered.

6.1.1 WHEN KNOWLEDGE SHOULD BE INTEGRATED

It was found that to gather knowledge from a wide range of customers and industries R&D gathers information from the regions through the so-called product reference groups. The product reference group consists of representatives appointed by each regional manager (head of the region) and the composition of regional representatives differs between each product reference group. According to Witell et al. (2014), gathering information about customers in early phases of the product development phase is important. It is also important to ensure that the organisation meets the requirements from a global perspective according to Schiuma and Carlucci (2012). They further add that the value creation is delivered through conversion of knowledge into products and services. The idea and intention with using the reference groups are therefore considered as appropriate.

Armstrong and Kotler (2014) and Edvardsson and Olsson (1996) emphasise the use of both customers and internal stakeholders when developing a product. Grant (1996) states that to create customer value it is important to use all sources of knowledge. Since there is no structured way of appointing Pre-sale and Consultants as regional representatives it is unclear if all different customer roles, and their different needs, are represented by Pre-sale and Consultants. However the situation, it can be concluded that the product reference groups are one important tool to understand what knowledge that carries most weight, and have the greatest potential to deliver customer value. Though, there seem to be different opinions within R&D on how the product groups shall be used.

6.1.2 HOW KNOWLEDGE SHOULD BE INTEGRATED

In this phase, two knowledge spirals were identified; one that concerns the gathering of customer knowledge before a meeting, and one during the meeting. The knowledge gathering starts when the regional representatives gather information through their personal networks. This corresponds to the first step in the knowledge spiral that Nonaka et al. (1996) call
socialisation. According to Lam (2000), tacit knowledge needs to be transferred during close involvement and cooperation, while explicit knowledge only needs to be written down and shared. Since most of the Product Directors do not control how the information is collected, they cannot be sure that the regional representatives gather the most relevant customer knowledge. Since the regional representatives collect information in an informal way, it can be concluded that the steps in the knowledge spiral, that Nonaka et al. (1996) call socialisation and externalisation, have shortcomings in implementation. The regional representatives rarely report their sources of knowledge, which might explain why their intentions are questioned by both R&D and other Pre-sale and Consultants. If the regional representatives would be more transparent with their collection of customer knowledge, the Product Directors’ willingness to embrace their knowledge might increase.

The externalised documents that do exist have been described as differing in level of detail and thoroughness, which further indicate that the externalisation step differs between regional representatives. Some product groups do not use a document to gather the information in. The product groups who do write down the information, and then compiles the information into another document, seem to be more satisfied with the product reference group as a method for gathering customer knowledge. Combining knowledge from several documents in one document corresponds to the step that Nonaka et al. (1996) names combination. The document is then meant to be distributed in advance to the other members in the product reference groups. Making information available for other employees corresponds to the internalisation step in the knowledge spiral by Nonaka et al. (1996).

The second turn in the knowledge spiral starts at the reference group meeting. Once at the meeting the information is presented and discussed. Thereby tacit knowledge can be obtained through conversion, and observation, and the knowledge spiral restarts in accordance with the model by Nonaka et al. (1996). The socialisation step seems to be conducted differently between product groups; some have a more democratic way of handling input while in others, the input has less influence on the Product Director’s decision. The discussion areas are then written down in a report that the Product Director uses as input for the Product Roadmap. Nonaka et al. (1996) say that externalisation happens when tacit knowledge is conceptualised, which is done when a discussion is documented. Nonaka et al. (1996) further state that the combination step requires created knowledge to be gathered into one knowledge system. Since the Product Roadmap is updated with the new input from the meeting, combination can be concluded to be performed. Nonaka et al. (1996) further state that internalisation, distribution of knowledge, is the last step that closes the knowledge spiral. The Product Roadmap is spread to the different product group’s members through a PowerPoint, but also compiled into a common application roadmap, which is sent out to the regions. With this last step the knowledge spiral is accomplished since the result is shared with other individuals, and the knowledge spiral have the right conditions to be able to continue to spin.

6.1.3 Factors influencing product reference groups’ knowledge input to Product Roadmap

The product reference groups are structured in silos, after the application’s functional areas, and consist of different employees chosen in an informal way. Most product reference groups lack employees from one or more regions, and often also lack a Consulting or Pre-sale representative. It showed, for example, in that the input was less creative and visionary. Since the regional representatives have other more prioritised tasks, it can be concluded that it is hard for them to represent others than those with similar positions, and who are close to them in some way. Kang et al. (2010) and Jacobsen and
Thorsvik (2008), argue that lack of understanding of others may lead to less integration and loss of knowledge. Since some product reference groups lack a Pre-sale or Consultant, R&D might lack understanding of why it is important to include a wide variety of regional representatives. This indicates that not enough recognition of individual knowledge domains, as Grant (1996) highlights as important to have, exists. The purpose with the product reference groups is to represent the regions, and the different stakeholders in them, and with the current group composition, R&D risks overlooking available knowledge. Also, since the product groups have little interaction between each other, R&D risks missing a lot of areas they might have in common. They also risk overlooking areas, due to the assumption that it is the responsibility of another product group. Due to globalisation, and the large organisation that IFS is, it is hard to select one representative that can represent all countries, and stakeholders, within a region. The current form and structure of the product reference groups seem to be suboptimal.

In turn, many employees within the regions also feel that they have no contact with their regional representative, and therefore no way of influencing the Product Roadmap. The opportunity to influence the Product Roadmap from a regional stakeholder perspective depends on whether you are included in the regional representative’s network, or not. Adler and Kwon (2002), highlight the importance of having the opportunity to be able to integrate knowledge. Therefore, R&D might get input that is not representative for IFS as a whole, because regional employees lack opportunity to reach out to the regional representative.

In general, Pre-sale and Consultants were found to be motivated. They said that collaborating with R&D increases their possibility to influence the application, which in turn will benefit their sales and revenues in the long run. This corresponds to what Lin (2007) calls reciprocal benefits. One respondent also mentioned that the possibility to share knowledge with others was a source to motivation, which resembles what Lin (2007) calls enjoyment of helping others. Something that R&D seem to lack is the last motivational factor that Lin (2007) call knowledge self-efficacy, which can be facilitated by choosing the right people from the beginning according to Parker (1998). It can also be created with the right encouragement (Parker, 1998). Since some Product Directors and other R&D respondents questions the knowledge that the product reference groups generate, it can be questioned if the right feedback and encouragement is given by R&D. Bhandar et al. (2007) complements these factors by highlighting the importance of identifying motivators for each individual participating in the exchange of social capital.

The fact, that Product Directors and other R&D respondents questions the knowledge that is generated by the product reference groups, might be explained by the factor that Grant (1996) calls Commonality of specialised knowledge. Since the participants of the product reference groups are meant to represent a lot of different aspects, such as different product areas, customers, and their respective region, their common ground of knowledge might differ greatly. Grant (1996) states that if there is little common ground, knowledge integration cannot be made since the involved parties do not understand each other. This might be one reason to why the knowledge output from the product reference groups, and the perception of their contribution, seem to differ so much.

It was also found that R&D seems to listen more to larger and well established regions, and is also influenced by and collaborates more, with regions closer to them in terms of horizontal distance. Physical distance is something that Daft (2013) addresses as a common source to problems with knowledge integration. Specifically, in globally dispersed organisations that have autonomous regions. However, he also emphasises the variety for learning, development of diverse capabilities, and startling innovations in
products that is offered in this setting. In order for that to happen knowledge must be transferred from the regions into the global organisation (Daft, 2013). This indicates that R&D should consider to involve some regions more than they do today, to capture knowledge and opportunities. But it is also a question of resources and global preconditions, which complicates the possibility to capture them. To be able to decide what regions that have greater potential, and to find out where undiscovered knowledge resides, it is important that all regions are represented as a whole. It is also important that the regions potential is described in such a way that they can be evaluated, and compared with each other. Although, larger and established regions are more likely to capture and deliver more customer value, smaller and undeveloped regions should be given the same opportunity to present their business cases under equal conditions.

Most of the respondents, both R&D employees and Pre-sale and Consultants, agree on the fact that there is a lot of valuable knowledge in the regions, which could be useful for R&D. This indicates that, what Bhandar et al. (2007) and Adler and Know (2002) calls ability; the right competences and resources, do exist in the regions. It is rather a problem with presence of other mentioned factors.

6.1.4 MECHANISMS FACILITATING KNOWLEDGE INTEGRATION

There are several mechanisms that were found to have an influence on knowledge integration during this phase. Knowledge is integrated from many different stakeholders through the product reference group. The existence of reference groups corresponds to the mechanism that Daft (2013) calls global team, or more generally, group problem solving and decision making defined by Grant (1996). Knowledge integration is facilitated by the composition of people (Daft, 2013) and as Edvardsson and Olsson (1996) highlight; gathering knowledge from different sources enables the creation of customer value.

With the current product reference group R&D have a limited scope regarding their knowledge input. Not all Pre-sale and Consultants are represented and Regional representatives are further perceived to be more motivated to represent their own region or even country most times. This is also a common drawback when using global teams according to Daft (2013). He further states that global teams risk developing an “us against them” mentality. Another explanation to this perception might be the fact that the regional representatives are supposed to represent many different stakeholders within their region, which in turn are autonomous, and therefore might have differing needs. With differing needs comes different knowledge, and therefore knowledge might vary a lot between the regional representatives (section 6.1.3). With little common knowledge and understanding of each other it seem only natural that the knowledge output from the product reference groups is fragmented and perceived as non-consistent.

This further indicates that the appointed coordinator for knowledge integration on a regional level (the regional representative) have difficulties representing the entire region. Daft (2013) says that it is hard for a coordinator to coordinate both across countries and functions, which is what the regional representatives have to manage today. Daft (2013) further states that it is preferable to locate the coordinator in the country where the coordination needs to be performed to better absorb knowledge, and act more quickly. Today IFS does the opposite since the regional representatives are set out to represent all countries in their respective region.

The opportunity for Pre-sale and Consultants to influence the content and priority of the product roadmaps was found to be limited depending on whether they were included in the regional representative’s network or not but also due to physical distance. In addition, R&D have no control over the gathering of
knowledge on a regional level, which partly can be explained by the fact that each Product Director has their own routines for how to organise the product reference group. Cummings and Teng (2003) complement this analysis with their finding about research and development teams and how they can be more effective with several knowledge integration mechanisms. Some of the product reference groups have attempted to structure how the regional representatives gather customer knowledge with another mechanism, which Grant (1996) calls rules and directives. But the instructions on how the regional representatives should be selected, how they should gather and present their results is unclear.

6.2 PRE-STUDY - ACCOUNT MANAGERS
In the Pre-study phase R&D integrates account managers’ knowledge in a target group analysis. When used as intended, this integration is valuable for R&D. This knowledge integration is not always performed, or performed with different kinds of Pre-sale and Consultants. When integration exists though, the knowledge spiral is completed. The factor that negatively influences knowledge integration was found to be opportunity. Mechanisms that facilitate knowledge integration during the target group analysis are; group problem solving and decision making, and rules and directives. Though, since not enough rules and directives exist, the mechanism routines also enhance knowledge integration.

6.2.1 WHEN KNOWLEDGE SHOULD BE INTEGRATED
According to the empirical findings R&D sometimes takes help from the account manager to decide a proper scope; purpose and usefulness of the project. Unfortunately R&D seem not to use the account managers to the extent that they could, since they were found to appoint, and use, account managers too late sometimes. This indicates that not all available knowledge is utilised. It was also mentioned that the Pre-study phase sometimes is excluded, if time is not available. According to Armstrong and Kotler (2014) and Witell et al. (2014), it is crucial for an organisation to understand customer needs early to create a competitive product that generates customer value. Berggren et al. (2011), Lin and Chen (2006), and March (1991) also support that integration between an organisation and its’ environment, called exploration of knowledge, is important. Several researchers highlight the importance of getting feedback to know whether exploration of knowledge is needed, and to ensure right interpretation of information (Durnell Cramton, 2012; Zetterquist et al., 2012). Therefore, it is important for R&D to get input from the account managers as early as possible and in early phases of the product development process, when changes easier can be made.

At this stage of IFS product development process primarily the core level of the application is affected, but the actual application is also planned on, and therefore partly being created. Armstrong and Kotler (2014) and Edvardsson and Olsson (1996) argue that both internal stakeholders and customers should be considered when developing products to create both goods and service value. Therefore, using several account managers in this phase should be considered important since they contribute with different knowledge, and different customer value. Since the account manager’s aim is to represent the customer, and R&D sometimes only uses one representative, not all knowledge seem to be taken into consideration. The choice of having only one account manager throughout the product development process has its consequences. In this phase some customer value are most likely not created since not all Pre-sale and Consultants is, or can be, represented by one person.
6.2.2 **HOW KNOWLEDGE SHOULD BE INTEGRATED**

When R&D do not integrate with account managers during this phase, no knowledge spiral can exist which results, as mentioned above, in that R&D miss out on early knowledge input. However, when R&D do integrate with account managers, the knowledge spiral that Nonaka et al. (1996) describe, was found to be closed. This can be concluded since R&D and the account manager conduct meetings that are documented, and later compiled into the project backlog, which in turn is available and presented for all team members. Whether the internalisation should include other employees outside of each project, to increase the possibility to exploit knowledge and facilitate socialisation to a wider extent, is further elaborated on in section 6.4.

Since not all Pre-sale or Consultants influencing the application are represented during the meetings, which corresponds to the socialisation step, the socialisation step has potential to become better by including more than one account manager.

6.2.3 **FACTORS INFLUENCING KNOWLEDGE INTEGRATION**

Several Business Requirement Owners mentioned that they have a hard time finding account managers. The fact that no formal process exists and that the Business Requirement Owners limited internal network is used instead results in that the choice of account manager is also limited. Time to do so was also mentioned as a limiting factor. In combination, these issues make it hard for Business Requirement Owners to choose the most appropriate account manager. Reasons mentioned are connected to the factor social capital and to what Adler and Kwon (2002) and Bhandar et al. (2007) call *opportunity*. It is important for organisations to enable integration of knowledge to be able to make good use of it (Bhatt, 2000; Berggren et al., 2011).

According to the empirical findings, it seems that Pre-sales and Consultants are *motivated* to help R&D, and no connection to lack of the motivational factor can be supported. In addition, R&D are aware of the importance of getting input from the account manager. An initiative has been taken to adapt the meetings to the account manager’s schedule, indicating that *recognition of individual knowledge domains*, as described by Grant (1996), exists.

Regardless motivation and a common understanding the opportunity for integration is still lacking. Since both R&D and many researchers (Armstrong and Kotler, 2014; Edvardsson and Olsson, 1996; Grant, 1996; Nonaka et al. 1996 etcetera) emphasise the importance of using internal stakeholders, finding a solution where the account managers participate more should be considered high priority.

6.2.4 **MECHANISMS FACILITATING KNOWLEDGE INTEGRATION**

In this phase the mechanism that Grant (1996) calls *group problem solving and decision making* was found to be used since R&D uses an account manager and other R&D members to produce a target group analysis. Grant (1996) believes that complex and uncertain tasks need communication-intensive forms of work, and recommends meetings for group problem solving. As concluded earlier (section 6.2.1.) it is important to involve both Pre-sale and Consultants to gather different knowledge about the customer, indicating that using account managers is important. It was also concluded (section 6.2.2.) that R&D needs to integrate a wider selection of account managers that represent different customer roles during these meetings.
Two additional mechanisms were found to be used that explain why R&D performs the target group analysis like they do. The first reason is that R&D partly has what Grant (1996) calls rules and directives. R&D have some directives on what the account manager should contribute with, but there are no clear directives on which internal stakeholders; Pre-sale and/or Consultants, that should be involved as account managers, or how many that should be included. The second reason is that since there are vague rules and directives on how the account managers should be selected, each Business Requirement Owner uses what Grant (1996) calls routines. It has been concluded (section 6.2.3) that the Business Requirement Owners sometime lack opportunity, or the right social networks, for selecting an account manager, and instead settles with the same person they usually cooperate with. The result is that it sometimes takes too much time to find an account manager, and not all internal stakeholders (and thereby customers) are represented.

6.3 PROJECT PLANNING - OPEN IDEA

During the Project Planning phase, the formal way of integrating knowledge is through Open Idea. An informal way that is used as well is the personal networks. The input that R&D get is considered valuable. Though, R&D have the preconditions to close the knowledge spiral, they sometime misses out on the internalisation step in the knowledge spiral, leading to bad consequences for knowledge integration. Several factors that negatively influence knowledge integration were identified; motivation, recognition of individual knowledge domains, and commonality of specialised knowledge. To facilitate knowledge integration R&D currently uses some rules and directives. It was found not to be enough though.

6.3.1 WHEN KNOWLEDGE SHOULD BE INTEGRATED

To anticipate customers’ needs are hard on a global market (Parry et al., 2012; Mont, 2001). By a proper use of Open Idea, R&D can get input on improvement and changing demands from every country, and area IFS operates in. With the knowledge obtained, R&D can further define what the application should be, and how it should be developed. Open Idea contributes to, what Armstrong and Kotler (2014) calls, core product and actual product.

Integrating knowledge from all different internal stakeholders enhances the customer value creation process since different knowledge resides within different stakeholders (Armstrong and Kotler, 2014; Edvardsson and Olsson, 1996; Grant, 1996). Integrating external knowledge corresponds to March’s (1991) definition of exploration. Early in the development process input from internal stakeholders make an important impact on the product (Witell et al., 2014). But it is also important to find a balance between exploring new knowledge and exploiting knowledge to keep up with market demands and a high development speed (Berggren et al., 2011; March 1991). Since getting feedback of product performance is needed to ensure that suboptimal solutions is not developed (Durnell Cramton, 2011), it is important for R&D to check Open Idea on a regular basis but also to choose carefully what to implement and when to do it.

Since the Pre-sale and Consultants seem to use other informal ways (for example using personal networks) to reach R&D, it is questionable if Open Idea is a good way to gather customer knowledge. The use of personal networks show that Pre-sale and Consultants are not satisfied with the current method used. IFS has a tradition of keeping their employees for a long time, which enables the creation of networks among senior employees. In what extent these networks include younger employees cannot be stated. How many Pre-sale and Consultants that actually contacts R&D are uncertain. It can be assumed that it is far from all employees who has a direct contact with R&D, and that it must be harder for younger employees to share
their knowledge. As mentioned, different stakeholders contribute with different knowledge (Armstrong and Kotler, 2014, Edvardsson and Olsson, 1996; Grant, 1996), therefore it is important for R&D to ensure that they get input from a wide range of internal stakeholders. Using personal networks might therefore not be an adequate solution either.

6.3.2 **How Knowledge Should Be Integrated**

The gathering of customer knowledge from Open Idea, corresponds to the knowledge spiral that Nonaka et al. (1996) have developed. Socialisation is performed when Pre-sale or Consultants log a request in Open Idea, but little tacit knowledge can be transferred through the text-based system. When Pre-sale and Consultants use their personal networks instead of Open Idea, the socialisation step is performed through direct contact. It is easier to transfer tacit knowledge through direct contact, and close involvement according to Lam (2000). The advantage with using personal networks is that more tacit knowledge can be gathered compared to when R&D uses Open Idea. The drawback is that not all internal stakeholders have built up a personal network that they can communicate their knowledge through.

Either way, the requests are prioritised and gathered in JIRA, corresponding to the externalisation step. The ideas are then combined with existing tasks in the project backlog. What is missing, compared to the knowledge spiral by Nonaka et al. (1996), is to internalise the feedback to the source for the request, and other individuals it might concern. This fact results in that Pre-sale and Consultants logging requests, are unaware of knowledge that already have been mediated. Neither do they know what requests that might be under development, or have been incorporated, in the application. Nonaka et al. (1996) argue that the knowledge spiral must continue to spin to utilise knowledge in an efficient way. The individual tacit knowledge, residing within the internal stakeholders, is not of use for the organisation before it is converted to explicit knowledge that is collective (Baxter et al., 2010, Inkpen and Dinur, 1998; Kang et al., 2010). With no common or formalised rules on how product groups shall use Open Idea, problems with closing the knowledge spiral seem to appear, which prevents the knowledge spiral to spin on.

6.3.3 **Factors Influencing Knowledge Integration**

Feedback was mentioned by respondents to be lacking, and when it was given it was done differently depending on product group. This seems to result in Pre-sale and Consultants being unmotivated to use Open Idea. Since the ones logging requests do not get feedback, they do not feel that their knowledge is appreciated, indicating lack of what Lin (2007) calls knowledge self-efficacy. Respondents have said that they stopped using Open Idea since they do not get anything out of it, or feel that they help anyone, indicating lack of what Lin (2007) calls enjoyment of helping others and reciprocal benefits.

From the empirical findings it can be stated that R&D seem not to prioritise giving feedback to ones logging requests. This indicates that, what Grant (1996) calls, recognition of individual knowledge domains is lacking. Lack of understanding may lead to less integration (Kang et al., 2010; Jacobsen and Thorsvik, 2008), which in this case have shown in that Pre-sale and Consultants have stopped using Open Idea. Lack of common knowledge, in terms of commonality of specialised knowledge described by Grant (1996), also showed. This can be concluded since requests are written in terms of solutions rather than problems complicating R&D’s interpretation of the requests. Due to not enough common knowledge
about each other, the integration of knowledge is complicated, and the consequence might be less customer value created.

6.3.4 MECHANISMS FACILITATING KNOWLEDGE INTEGRATION

Open Idea is a formalised tool that both Pre-sale and Consultants are supposed to use. Therefore, it can be concluded that some rules and directives exists on how knowledge should be gathered through Open Idea, which according to Grant (1996) shall enhance knowledge integration. However, since Open Idea is a passive way of collecting customer knowledge, it is important that R&D continuously reflects on which Pre-sale and Consultants that use the system, and actively collects information from those who do not. This should be done to ensure that they get input from all Pre-sale and Consultants, which has been concluded (section 6.3.1) to be important.

Additional issues have also been identified with Open Idea, described earlier. First of all R&D do not always provide feedback, and how they communicate what they do with the requests differ between product groups, resulting in motivation problems. Second it was found that R&D have trouble understanding the requests due to the way they are written today. Mentioned issues can be connected to not enough of, what Grant’s (1996) calls, rules and directives. According to Burgess (2005), it is important for an organisation to send clear messages for how knowledge integration activities shall be performed. To motivate Pre-sale and Consultants to log requests, both own ideas and customer driven ideas, R&D must show that they do read, consider and appreciate the requests. According to Burgess (2005), it is important to support and recognise individuals who actively participate in exchange activities.

6.4 DEVELOPMENT - ACCOUNT MANAGERS AND PRODUCT GROUPS

During Development R&D integrate knowledge using account managers, which are used to guide the projects towards developing a customised product. However, Business System Analysts and System Engineers expressed uncertainties about what they develop. They related their uncertainty to lack of customer knowledge. Several R&D respondents also mentioned that they experienced lack of integration between projects. Therefore, internal and external integration of knowledge was found suboptimal. In this phase, several knowledge spirals where missing. Factors negatively influencing knowledge integration during the Development phase were identified to be; opportunity, recognition of individual knowledge domains, and commonality of specialised knowledge. Some mechanisms that facilitate knowledge integration were also identified; rules and directives, sequencing, group problem solving and decision making, and coordination role. However, most of them were not sufficiently used, resulting in that the problems still are present.

6.4.1 WHEN KNOWLEDGE SHOULD BE INTEGRATED

Using internal stakeholders, to ensure a competitive product on a global market, is supported and encouraged by several researchers (Armstrong and Kotler, 2014; Heide et al. 2011; Mont, 2011; Parry et al., 2012). Since the account manager is supposed to represent any general customer, R&D make their best to incorporate external knowledge. But, as concluded earlier (section 6.2.1), R&D often only use one account manager, and some knowledge is thereby unexploited.

At this stage most of the functionality has already been decided, and it is the account manager’s job to verify that the development team moves in a direction that satisfies the customer. Beyond this
development step Witell et al. (2014) state that changes only have a minor impact on the customer value creation, indicating that this phase is crucial. But, since the larger attributes already have been defined this phase is more about realising the ideas into an actual application. This indicates that the goods part of the potential value is created at this phase. It also becomes easier for Pre-sale and Consultants to develop how they will deliver the application to the customer, indicating that the service part of the value also can be clarified here.

It can be concluded that several R&D respondents are dissatisfied with the knowledge input since they complained over the account manager’s attendance ratio at development demonstrations. Since the involvement of account managers varies, and parts of the customer information come from R&D employees higher up in the hierarchy instead, Business System Analysts and Software Engineers feel too isolated from the customers. They desire more integration. This was also supported by Pre-sale and Consulting respondents, who stated that it would be beneficial for R&D to get a deeper understanding of the customer with the help from Pre-sale and Consultants. On a more operational level (Business System Analyst and System Engineer level), R&D seem to lack what March (1991) defines as exploration, and only perform what he calls exploitation. To avoid exploitation of incomplete or inaccurate knowledge, and thereby the development of suboptimal solutions, a balance including exploration of knowledge is important (March, 1991).

R&D respondents also emphasised that they have little to no knowledge about how the customer uses the application, and what functionality Pre-sale- and Consultants sell, and later implement. An understanding for the internal stakeholders is crucial since they all are part of the value creation process, and deliver different parts of the product and thereby different customer value (Armstrong and Kotler, 2014; Edvardsson and Olsson, 1996). This indicates that to create more customer value, R&D should obtain a deeper knowledge from Pre-sale and Consultants, and they need to understand that Pre-sale and Consultants contribute with different knowledge.

Not only external knowledge was emphasised to be lacking, knowledge about other product groups was also mentioned to be missed out on. In this phase, the product groups separately gather knowledge for their product development indicating that knowledge might not be gathered in the most efficient way. Several product groups might develop parts of the application unconsciously that other groups also could have a use for the functionality. One reason for this unawareness depends on the fact that projects mostly belong to individual product groups, which are organised in silos. It might also depend on the fact that R&D employees historically have perceived cross projects as tougher, and therefore are reluctant to cooperate between projects, and over functional areas. Armstrong and Kotler (2014), Edvardsson and Olsson (1996), and Grant (1996) state that it is important to use all sources of information when creating customer value. It can therefore be concluded that it is important to know what knowledge the other product groups have, so that the entire organisation can exploit that knowledge. In R&D’s case, since projects tend to change, it is important that this information is internalised so that the Project Managers can coordinate affected projects with each other.

6.4.2 HOW KNOWLEDGE SHOULD BE INTEGRATED

Regarding the account managers, it was found that a complete knowledge spiral is performed in accordance to the model that Nonaka et al. (1996) describe, the times when the account manager do attend to development demonstrations. Tacit knowledge is obtained through
direct interaction with the account manager. The outcome is written down, and incorporated into the existing backlog, which in turn is made available for all members in the development team. Whether the information should be spread more to facilitate socialisation with other product groups as well is further elaborated on below. In times when the account manager is absent, no knowledge spiral can be identified. Since no other knowledge spiral between customers and the development team exists, the development team apply their existing knowledge instead, which corresponds to March’s (1991) definition of exploitation.

Regarding information about what functionality the customers use, little statistical information is obtained from Pre-sale and Consultants by R&D. Therefore, it can be concluded that a knowledge spiral for utilising parts of Pre-sale and Consultants’ knowledge regarding functionality, is lacking. Statistical information is available according to respondents, and this information is what Nonaka et al. (1996), Grant (1996), and Jonsson (2012) call an explicit form of knowledge. Such explicit knowledge can be obtained without the knowledge owner (Lam, 2000), indicating that this knowledge could be a complement to the knowledge gathered through account managers. The advantage with statistical information is that more explicit information can be gathered from a wider choice of internal stakeholders in an effective way.

Looking at the integration between product groups within R&D, it can be assumed that there is no formalised process for how meetings between product groups should be executed. The only step in the knowledge spiral that is implemented, sporadically, corresponds to what Nonaka et al. (1996) call socialisation. This conclusion can be made since employees discuss and exchange information at product group meetings. Due to the socialisation step being the only known step performed, R&D cannot ensure that the knowledge spiral is closed. Absence of steps, or a complete knowledge spiral, result in that duplication of work is performed and that R&D miss out on synergy effects between product groups.

6.4.3 Factors Influencing Knowledge Integration
R&D respondents mentioned that they do want the account manager to be present at the demonstrations, and Pre-sale and Consultants stated that they also are motivated to participate. It seems that both parties understand what they have to gain from the exchange, which is fundamental for motivation to exists according to Adler and Kwon (2002) and Bhandar et al. (2007). Despite this fact interaction between R&D and Pre-sale and Consultants is perceived to be lacking by most respondents. What has been mentioned as a reason to the absence of account managers is scheduling issues, which corresponds to Adler and Kwon’s (2002) definition of lack of opportunity. Another reason mentioned was that the account managers contribute much more during smaller group meetings compared to large group meetings.

Bhandar et al. (2007) state that during this phase ability is the most important social capital factor needed, but to make use of knowledge opportunity must be created. According to R&D respondents the Pre-sale and Consultants at IFS possess a lot of useful knowledge, which according to Adler and Kwon (2002) and Bhandar et al. (2007) forms the basis for ability to exist. Therefore R&D need to create an opportunity for them to utilise this knowledge.

One reason to why insecurity exists among Business System Analysts and System Engineers is due to the lack of understanding of customers’ business processes, and what Pre-sale and Consultants do. The vague connection between functionality and the customers’ business processes indicates lack of commonality of specialised knowledge, which Grant (1996) refers to as the common ground of knowledge that individuals
can build their integration on. R&D develops functions, while Pre-sale and Consultants use a business oriented approach when performing their tasks. If the development team do not know how the small pieces of functionality should be combined, and used in a bigger perspective, it must be hard to design functionality so that it fits into a business process. By obtaining a deeper understanding of different business processes, through more interaction with both customers and Pre-sale and Consultants, R&D can create more customer value. What also can be concluded is that R&D cannot get input from several departments from one account manager, since the account manager is either a Pre-sale person or a Consulting person.

Another reason to why the insecurity exists among Business System Analysts and System Engineers could be explained by the fact that there are different perceptions of what knowledge needed. Higher up in the organisation one Product Director expressed the opinion that operational R&D employees do not need more integration than they already have today. Grant (1996) mentions that organisations with vertical distance should allocate decision power to the source of knowledge. Since the ones actually performing and developing the functionality expressed a need of market-oriented knowledge, they probably should be allowed to decide on whether they need more knowledge integration by themselves. Björkholm and Brattberg (2010) complement this analysis by stating that it is important that developers have close cooperation with market-oriented departments, to develop what the market wants. This also indicates lack of what Grant (1996) defines as recognition of individual knowledge domains between R&D employees. Due to insufficient customer information R&D might over-engineer solutions according to one Product Director. According to March (1991), a common consequence when an organisation exploits knowledge without first exploring knowledge is that the organisation creates suboptimal solutions.

Looking at the integration problem between product groups, the empirical results show that R&D employees are aware of that they do have different knowledge, and that more cross- integration would be beneficial. There is also evidence that successful functionality have been developed due to information being spread between the product groups, so common knowledge can be concluded to exist. However, since there is no formalised process, routine, or encouragement for cross-functional meetings, it can be concluded that there is a lack of Adler and Kwon’s (2002) factor opportunity.

6.4.4 **Mechanisms facilitating knowledge integration**

In order for R&D to get input on the application from account managers, the mechanism that Grant (1996) calls group problem solving and decision making, is used. During meetings account managers are supposed to give input according to the methodology prescriptions, which indicates that the mechanism that Grant (1996) defines as rules and directives is also used. Though, it was found that the rules and directives are not followed, and the attendance ratio decreases over time, which partly was explained by the difficulty to attend.

Business System Analysts and System Engineers expressed issues with understanding the customer, and they would like to have more integration than what they have today. Kang and Kim (2013) argue that it is the organisations responsibility to ensure that the individuals have the right conditions to access necessary knowledge. Burgess (2005) adds that it is important that organisations clearly communicate what exchange activities that is needed. Burgess (2005) further says that managers should support individuals who actively participate in exchange activities by reducing their workload, and recognise it at performance evaluations. Therefore, it is important that Business System Analysts and System Engineers communicate
what knowledge integration they need, and that the management are responsive to their needs. Some
product groups have found a way to overcome this problem and have held meetings separately with the
account manager. This measure corresponds to Grant’s (1996) mechanism sequencing, which can enhance
the planning for knowledge integration by separating the activities where specialist knowledge is needed.
Not all product groups seem to be aware of this solution, resulting in that the problem still affect the
development teams.

Mechanisms were found to be used regarding knowledge integration within R&D as well. It was found
that not enough knowledge integration between product groups is performed. Though, ad hoc, meetings
have been held between product groups due to curiosity rather than demand. This indicates that Grant’s
(1996) mechanism group problem solving and decision making is performed informally. Grant (1996)
emphasises that this mechanism is rather costly in comparison to other mechanisms, but that it can be
needed when performing complex task. Inkpen and Dinur (1998) argue that especially transfer of tacit
knowledge is enhanced by this mechanism. Due to the importance of knowledge integration between
product groups, R&D should consider using group problem solving and decisions making mechanism but
in a formalised way. Using several mechanisms at the same time is something that Cummins and Teng
(2003) state shall enhance knowledge integration. Since the Project Managers can be said to hold a role as
coordinator for integration, and the fact that that it is a more cost efficient mechanism, a combination of
the two could be an efficient solution.

6.5 STABILISATION - EARLY ADOPTER PROGRAM
During this phase R&D uses Early Adopters to integrate knowledge, and they do it well and in accordance
with the knowledge spiral. However, some motivation might be lacking, which in turn might influence the
execution to some extent. Several mechanisms that facilitate knowledge integration were also found to be
used, they are; group problem solving and decision making, rules and directives, and coordination role.
Although, it was found that not enough rules and directives were set to ensure knowledge integration

6.5.1 WHEN KNOWLEDGE SHOULD BE INTEGRATED
R&D involves customers in an Early Adopter Program to assess the quality of the
application and ensure that it is released to the market without any significant flaws.
According to Witell (2014) this phase does not provide the product with any
substantial increase in the goods part of the customer value. However, according to R&D the Early
Adopter Program is very important to get the first customers to use the latest version of IFS Applications.
The fact that IFS has a lot of satisfied Early Adopters also adds weight to marketing and sales cases. These
important factors are something that Armstrong and Kotler (2014) and Kindström et al. (2012) would call
intangible attributes and benefits, or augmented product, who customers value when they choose between
products. In contrast to Witell et al. (2014), but with support from Armstrong and Kotler (2014) and
Kindström et al. (2012), it was found that the Early Adopter Program adds customer value by proving IFS
Applications usability and reliability and therefore reinforcing the augmented product. It was found as an
essential argument for IFS when approaching new customers. Since it is the Pre-sale and Consultants that
deliver the service part of the application, it is also important that they are aware of what benefits the
application brings to the customer.

Another source of knowledge is the customer evaluations that R&D have used in the past. Besides
incorporating the feedback in the current release, the idea is to gather feedback that can be used in coming
releases R&D are able to integrate knowledge very early in the product development process. According to Witell et al. (2014), this provides the opportunity to create more customer value compared to gathering information late in the process. Schiuma and Carlucci (2012) emphasise the importance of creating customer value due to the increasing pressure of globalisation, which further stresses the importance of performing customer evaluations. Therefore, R&D should consider conducting customer evaluations as early as possible so that they can use that knowledge in early phases for both enhancement projects and entirely new projects.

6.5.2 How Knowledge Should Be Integrated
During the beta tests, in Linköping, the knowledge spiral that Nonaka et al. (1996) describe, was identified and understood as complete, meaning that the circle is closed before starting again. Socialisation with the Early Adopters are conducted through discussion, and externalised when the adopters log ideas and shortcomings in the application, which in turn is externalised, combined, and internalised by the affected product group through their project backlog. The intention and implementation with using the Early Adopters can therefore be considered as successful.

During the development of IFS Applications 9, customer evaluations have not yet been performed and no knowledge spiral can therefore be said to exist for this activity. But during the development of IFS Applications 8, R&D performed evaluations, and Nonaka et al.’s (1996) knowledge spiral performed at that time was considered being complete. If R&D do not perform the customer evaluations they will miss out on an opportunity to utilise valuable customer knowledge that Early Adopters possess. In addition, the longer R&D wait, the longer it takes before the knowledge spiral can continue to spin, which will generate more knowledge, and thereby customer value.

6.5.3 Factors Influencing Knowledge Integration
Regarding customer evaluations concerns were mentioned about the product groups’ execution being unprepared, unadvised, and that they should have considered and valued the opportunity to gather customer knowledge better. But these were only speculations from the respondents and therefore conclusions cannot be drawn upon that information. However, the shorter time frame compared to the time frame for IFS Applications 8 is a fact, which can be connected to an opportunity problem as described by Adler and Kwon (2002). Given the stated above (section 6.5.1-6.5.2) it can be concluded that it is important that R&D prioritise, and performs, the customer evaluations as soon as possible.

6.5.4 Mechanisms Facilitating Knowledge Integration
Several identified mechanisms, described by Grant (1996), were found to be used during this phase. First, R&D use the group problem solving and decision making mechanism since the use of Early Adopters, and other Pre-sale and Consultants, at test sessions facilitates knowledge integration. Face-to-face meetings is said to be more efficient according to Durnell Cramton (2001), which is enabled during the test weeks. Second, R&D have appointed one coordinator to each Early Adopter, which is in line with the recommendations by Daft (2013). Through these two mechanisms, and with support from earlier discussion (section 6.5.1) about the augmented value that the Early Adopter Program give rise to, R&D have found an efficient way to gather knowledge.

Regarding the customer evaluations, it can be concluded that the mechanism that Grant (1996) calls rules and directives were present during the first round of evaluations (during the development of IFS
Applications 8), but seems to have been, and still is, absent for IFS Applications 9. This might depend on the fact that motivation problems appeared since the result of the customer evaluations did not meet the expectations the first time. I enough rules or directives would exist, there would be no uncertainty regarding whether the customer evaluations would be performed or not.

6.6 Release to Market - Webinars

At this phase, problems with creating the release material and transfer of the application was found due to too little knowledge integration with Pre-sale and Consultants. During this step, socialisation with Pre-sale employees are limited and with Consulting, non-existent. Two factors influencing knowledge integration were identified; recognition of individual knowledge domains, and common ground of knowledge. In this phase, R&D uses sequencing and routines as mechanisms to facilitate knowledge integration, but it was found not to be enough.

6.6.1 When Knowledge Should Be Integrated

During this phase the application is packaged and made ready for delivery so that the regions can sell and implement the application to customers. Little customer knowledge seems to be gathered, but much knowledge about the application is transferred from R&D to the regions. According to Witell (2014) customer value is primarily created in the early phases of the product development process indicating that no or little customer value is created during release to market. Several product groups seem to take help from Pre-sale and Consultants when developing the webinar script. By doing so R&D try to ensure that Pre-sale and Consultants understand the application, and are given the opportunity to deliver value to the customer, which is positive.

From the statement by a Business System Analyst though, it can be concluded that not all product groups uses this opportunity for help. The Business System Analyst further expressed difficulties with expressing the benefits with the application, indicating that there are some difficulties with communicating what Armstrong and Kotler (2014) calls augmented product. The augmented product does, in this case, include the benefits for the customer and how the different functions can be combined to fulfil different needs. This indicates that parts of the customer value that R&D have created, and part of information needed for the Pre-sale and Consultants to create their part of the customer value, might not be transferred to the customer.

6.6.2 How Knowledge Should Be Integrated

Before the webinar is being recorded, a webinar script is produced and reviewed, which corresponds to the socialisation and externalisation steps in the knowledge spiral by Nonaka et al. (1996). An overview of the webinars is also produced, which corresponds to the combination step. When the webinar is recorded, and uploaded to the roll out portal, the knowledge spiral is closed. This knowledge integration therefore resembles the knowledge spiral described by Nonaka et al. (1996) with the exception that Consultants are not involved in the socialisation step, which further indicates that the knowledge spiral do not exist with Consultants. Since the roll out portal lacks a formal communication channel regarding feedback, R&D cannot get any feedback from Pre-sale or Consultants after the webinars have been published. This prevents the knowledge spiral from spinning further. Further, it result in R&D being unaware of whether the information about the product has been transferred sufficiently or not.
6.6.3 **FACTORS INFLUENCING KNOWLEDGE INTEGRATION**

Since Consultants are not the target, but still users of the webinars, they are of course less satisfied with the webinars. This fact might partly explain why there is functionality that is not used by Consultants or customers since, according to Kang et al. (2010) and Jacobsen and Thorsvik (2008), lack of understanding of others needs might lead to loss of knowledge. Since there is no integration between R&D and Consultants in the creation of the webinars, valuable information about functionality, and how it is used, is not gathered. By that, Consultants’ understanding are also inhibited. Some of the product groups do not even involve a Pre-sale person when conducting the webinars. Mentioned issues indicate that R&D, lack what Grant (1996) calls *recognition of individual knowledge domains*. Kang et al. (2010) and Jacobsen and Thorsvik (2008) also mention that lack of understanding of others’ needs may lead to less integration, and to loss of knowledge.

The empirical findings also highlighted the fact that R&D should reflect on how they can increase the common understanding, internally and externally, of how the webinars should be designed since contradicting opinions regarding the webinar design were found among Pre-sale and Consultants. Grant (1996) mentions that a common ground of knowledge is important to build further knowledge integration on.

6.6.4 **MECHANISMS FACILITATING KNOWLEDGE INTEGRATION**

In this phase two mechanisms for knowledge integration was found; *sequencing* and *routines*. R&D uses what Grant (1996) calls sequencing when they take help from Pre-sale employees to form the webinars. First, R&D writes the script and then the Pre-sale person can give input. Though, it can be said that this activity is of a more routine rather than rule characteristic. If perceived as needed R&D can take help from Pre-sale employees and go over the suggested content in the webinars, and not all product groups seem not to be aware of or are unable to take help. Thereby the information distribution is obstructed. Since the current work with the webinars seem to result in loss of potential customer value, the routines used seem not to be enough and an additional mechanism might be needed. In absence of rules and directives, routines can help guide the individuals with how to conduct knowledge integration activities (Grant, 1996), but sometimes several and various mechanisms is needed to enhance knowledge integration (Cummings and Teng, 2003), which can be concluded to be the case for R&D during this phase.
6.7 SUMMARY OF FINDINGS AND ANSWERS TO THE RESEARCH QUESTIONS

The analysis showed that customer value is created in all phases but to a differing degree. It also showed issues regarding the socialisation, externalisation and internalisation steps from the knowledge spiral. Further, all social capital and organisational structure factors, and two common knowledge factors, that influence knowledge integration was identified. The use of all mechanisms, described in the literature (chapter 2), were found. That they enhance knowledge integration were identified as well, except for global teams, and rules and directives.

6.7.1 WHEN KNOWLEDGE SHOULD BE INTEGRATED

Early in the product development process Pre-sale and Consultants’ can help define the core and actual products attributes that will meet the customers’ needs. This is also in line with Witell (2014) who states that information should be incorporated in early phases of the product development process, to create customer value. It can also be concluded that when Pre-sale and Consultants is excluded from early product development phases, it creates problems in later stages of the product development process. For example, the absence, of what March (1991) calls, exploration result in that some of the Business System Analysts and System Engineers have a hard time defining the products quality and benefits. Instead they use their existing knowledge, which corresponds to what March (1991) calls exploitation, resulting over-engineered solutions and waste of resources that could be used more efficiently. Business System Analysts and System Engineers have expressed a desire for more interaction with the customer, Pre-sale, and Consultants to better understand what the customer needs. This is in line with Zetterquist et al. (2012) who argue that feedback is needed to determine whether more exploration needs to be done before continuing to exploit knowledge.

During the pre-study, project planning and development phases the product progresses further towards its final design. Throughout the development the foundation for some of the benefits, or what Armstrong and Kotler (2014) calls the augmented product, is defined through market analysis and input from Pre-sale and Consultants. Although, the empirical findings suggests that the augmented value is not realised until later phases, of the product development process, when the product is introduced to the customer.

At the end of the product development process, the products quality can be verified through beta tests by direct involvement of customers, Pre-sale, and Consultants. This gathered knowledge about the product is critical for IFS to prove the products reliability for other customers, and show the benefits or augmented product that IFS Applications contains. This finding is in contrast with Witell (2014) who claims that information obtained in test and launch phases have a minor impact on the goods part of the customer value creation.

This study has shown that different Pre-sale and Consultants represent different customer roles within the customer organisation, and therefore contribute with different knowledge, which can be utilised for the creation of customer value. It was stated by R&D respondents that Pre-sale and Consultants contribute with different perspectives, which also is shown in the reference groups and use of account managers. This is in line with Armstrong and Kotler (2014) and Edvardsson and Olsson (1996) who emphasise the importance of considering both customers and stakeholders when developing products.

In summary it can be concluded that the core and actual part of the product is created early. This study have also shown that the basis for the creation of the augmented product is set early, but input late in the
development also have a big impact on the value creation, which is in contrast to earlier research by Witell et al. (2014). Moreover, different parts of the customer value is created by different Pre-sale and Consultants. Hence, all different Pre-sale and Consultants need to be involved during the entire product development process to successfully integrate knowledge, and in turn create customer value.

6.7.2 **How Knowledge Should Be Integrated**

Knowledge integration between R&D and Pre-sale and Consultants starts with a socialisation step, even though it sometimes only consists of text messages via internal communication tools. When the socialisation step is insufficient, the consequence is that tacit knowledge becomes hard to integrate, and does not become collective knowledge that the organisation can exploit, as in the case with Open Idea. This finding supports the theory, by Nonaka et al. (1996), about socialisation being dependent on the proximity of the individuals engaged in knowledge creation, and that transmission of tacit knowledge builds on discussion and observation. It was also found that when the socialisation step is non-existent, or performed without one or several Pre-sale and Consultants’, their knowledge is unabsorbed by R&D. This can be exemplified with the current composition of the product reference groups, and with the absence of Consultants knowledge input when conducting Webinars. This is in line with Cohendet et al. (1999), who states that transmission of knowledge is influenced by the networks formed for exchanging knowledge. These insights show that if the socialisation step is hampered, less knowledge will be passed on to the next step.

This study supports Nonaka et al. (1996) and their statement about the importance of conducting the externalisation step when integrating knowledge. This was verified in the empirical findings. When the externalisation step was not performed between product groups, knowledge integration was consequently hampered since they worked in silos. The study also showed that when the externalisation step is performed, the transmission of knowledge is secured, which is in line with Nonaka et al. (1996). What has been further discovered is that when the knowledge is being externalised, and is passed on to other individuals, the credibility of the knowledge increases. If the transformation of tacit knowledge into explicit concepts are insufficient, the newly created knowledge (during the socialisation step) might disappear, or be interpreted in another way by involved parties. This was exemplified in the product reference groups were it can be concluded that the product reference groups who write down the gathered knowledge is more satisfied, and perceive that the product reference groups is more useful. Also, the product reference groups that report their sources cannot be questioned to represent their region.

Regarding the combination step no conclusions of its impact regarding performance can be drawn since this study did not show any flaws in the combination step. When the combination step was missing, so was the complete spiral. Therefore, no conclusions can be derived explicitly to the combination step. Although, empirical findings from the pre-study, and findings from an earlier research by Lundquist and Läckström (2014), reveals that if knowledge is not combined into a single system, problems with efficiently finding knowledge appears. This is also in line with Nonaka et al. (1996) who defines the combination step as a process of gathering and implementing knowledge concepts into one knowledge system. They and other authors (Blackler, 1995; Lam, 2000) further argue that the knowledge spiral needs to be closed to successfully integrate knowledge.

Regardless the performance of the first three steps, the last step (internalisation) has shown to have a great impact on knowledge integration. In the case with Open Idea, R&D do not have a formalised process for
how they should respond to the ideas that are uploaded to Open Idea. Since R&D sometime wait for a substantial period of time before they give feedback, or do not give feedback at all, the internalisation step can be concluded to work improperly, resulting in that created knowledge does not spread among Pre-sale and Consultants. In turn, the knowledge spiral is prevented from continuing to spin, and the same knowledge might be uploaded to Open Idea again and again until the knowledge spiral is finally closed. Inefficient utilisation of Pre-sale and Consultants’ time and competence become the result. This empirical finding supports Baxter et al. (2010), Inkpen and Dinur (1998), and Kang et al. (2010) who state that tacit knowledge has little value until it is distributed to all individuals in an organisation. The conclusion is that when the internalisation step is lacking, or performed improperly, further knowledge integration is severely inhibited and effectively prevents exploitation of knowledge.

Sometimes several or all steps in the knowledge spiral are missing, which makes it hard to draw specific conclusions connected to specific steps in the knowledge spiral. But what can be concluded is that knowledge integration is obstructed when these gaps in the knowledge spiral occur. The result is that R&D have less knowledge about the customer, and that Pre-sale and Consultants have less knowledge about IFS Applications, which results in less customer value being created. A concrete evidence of the steps importance showed in departments working in silos leading to duplication of work and limited synergy effects. This is in line with Nonaka et al. (1996) who argue that all steps in the knowledge spiral needs to be performed to take advantage of all knowledge that exists in an organisation.

The conclusion is that knowledge integration is hampered regardless of which step that is missing in the knowledge spiral. Depending on which step, knowledge can disappear, be misinterpreted, or exploited to a different degree. The result is always less created customer value. An important finding, not found in earlier discussed theory, is that the credibility for the obtained knowledge, during the socialisation step, increases when externalisation is made.

6.7.3 FACTORS INFLUENCING KNOWLEDGE INTEGRATION

The empirical findings showed that lack of the common knowledge factor recognition of individual knowledge domains result in that R&D develops functionality, and uses communication tools that Pre-sale and Consultants do not understand, and therefore avoid using. There is also a lack of recognition of individual knowledge domains within R&D, between different hierarchical levels, resulting in Business System Analysts and System Engineers wanting more knowledge integration with customers directly, Pre-sale, and Consultants. These empirical findings support Kang et al. (2010) and Jacobsen and Thorsvik (2008), who argue that lack of understanding of others may lead to less knowledge integration and loss of knowledge.

The factor commonality of specialised knowledge was also identified, which is illustrated by the fact that Pre-sale and Consultants communicate solutions through Open Idea, while R&D expects descriptions of problems. The factor was also found in the differences between the functions that R&D develops, and the business processes that the Pre-sale and Consultants try to make out of the functions. These findings imply that Grant’s (1996) theory, that little common ground results in that knowledge integration cannot be made beyond primitive levels, is correct. These findings also indicate that knowledge integration is lacking between R&D and Pre-sale and Consultants, and that knowledge is lost due to misunderstandings and lack of communication. R&D respondents have also mentioned that some functionality is not being implemented or used by customers in different regions. This fact support Durnell Cramton’s (2001)
theory, which says that too little common knowledge in geographically dispersed collaborations result in failure to convey information, and information being unevenly distributed.

The empirical findings found support for Adler and Kwon’s (2002) definition of opportunity, who state that the opportunity lies in the possibility to utilise resources that contacts hold. This can be illustrated by the fact that R&D conducts development demonstrations without account managers because of scheduling difficulties, or that the customer evaluations have not yet been conducted for IFS Applications 9 due to a tight timetable.

It was found that in absence of the three motivational factors; knowledge self-efficacy, enjoyment of helping others and reciprocal benefits, that Lin (2002) highlights help enhancing knowledge integration, knowledge integration is negatively affected. Support for this statement showed in the case with Open Idea when Pre-sale and Consultants used other communication ways, to reach R&D, due to lack of feedback.

The empirical findings clearly indicate that horizontal distance in organisations creates knowledge integration challenges. Through the product reference groups it becomes evident that regions autonomy creates an environment where each regional representative defends their own interests. This is in line with Daft (2013), who states that it becomes difficult to plan on a global scale with autonomous regions, since each region only acts to satisfy the needs of their geographical area.

Among Business System Analysts and System Engineers, knowledge about the customers were said to be desired in a higher extent than what it seemed that R&D employees in a more leading and strategic position perceived as important. This empirical finding implies that there exist vertical distance in the organisation, and that there is a gap between where the competence is located, and where decisions are made. This proves Grant’s (1996) theory, which says that when knowledge integration is needed between different departments, a gap between decision power and knowledge emerges since one manager cannot inhibit all knowledge residing in his or her department.

Support for Grant’s (1996) factors language, other forms of symbolic communication and shared meaning, and Adler and Kwon’s (2002) factor ability could not be attested with empirical findings from this report.

To sum up, there are many factors that can influence, and hamper, knowledge integration in organisations. One is enough to decrease knowledge integration, but the effect of the factor might vary. Some factors are also hard to prevent and correct due to existing organisational structure or physical distance.

6.7.4 Mechanisms Facilitating Knowledge Integration

There are several mechanisms that facilitate knowledge integration, and in the empirical findings support for four mechanisms described in the theory (section 2.4) were found. Rules and directives is said to facilitate interaction (Grant, 1996) and give direction of what knowledge integration activities that are needed (Burgess, 2005). By using rules and directives R&D try to gather knowledge in a formalised and effective way, as in the case with Open Idea. However, most times R&D do not succeed with using the mechanism rules and directives, which partly can be explained by the fact that not enough rules and directives are set. Although, the empirical findings also showed that rules and directives regarding customer evaluations for Applications 8 enabled knowledge integration.
The use of *sequencing* enhanced the attendee ratio of the account managers, when used by a product group. When additional meetings have been provided for the account manager, the product development team perceive a higher attendance ratio. Hence, sequencing of steps and activities have been shown to be useful, which is in line with Grants (1996) statement that sequencing can reduce simultaneous integration between people, which can ease planning for knowledge integration.

This study confirms that *routines* can facilitate knowledge integration, which is in accordance with Grant’s (1996) statement that absence of rules and directives can be counteracted with routines. To take help from Pre-sale employees as a mean to improve webinars is not a pronounced approach used by all product groups. But, when Pre-sale employees’ input is used it becomes easier for R&D employees to develop the Webinars.

R&D also use several *group problem solving and decision making mechanisms* to enhance knowledge integration. During informal meetings between product groups, important knowledge was exchanged, which led to synergy effects through new successful functionality. This empirical finding support Grant (1996) and Inkpen and Dinur’s (1998) theory that recommend the problem solving and decision making mechanism for complex and uncertain tasks.

A more specific method for globally dispersed organisations is the use of *global teams*, which was found to exist in the studied case. The product reference groups do represent global teams, and the empirical findings support Daft’s (2013) theory about global teams seems to facilitate knowledge integration in globally dispersed organisations. Although, what also have been found is that the regional representatives mainly defend their own interests, have trouble representing their entire region and that disagreements arise between regions. This supports Daft’s (2013) theory, which highlights a drawback with using global teams; the risk for developing an “us against them” mentality. It has also been found that the product reference groups’ credibility decreases due to their conflicting views and knowledge.

The use of a *coordination role* has also shown to be effective. In the studied case, input from the Early Adopter Program has successfully been gathered through the help by a coordinator responsible for each early adopter. Though, as concluded by Daft (2013), the coordinator cannot coordinate across countries and across functions. This statement can be verified with the empirical findings regarding problems with the regional representatives. The regional representative’s work as coordinator, and to have the responsibility to gather knowledge from both different countries and functions do not work properly. This result in regional representatives representing their own interests, rather than the entire region as intended.

Cumming and Teng’s (2003) statement that the use of several mechanisms, at the same time, can enhance knowledge integration can be supported by the empirical findings. This was shown during the development of webinars when R&D use the mechanism sequencing to enhance knowledge integration with Pre-sale employees. Their input can thereby be obtained without simultaneous presence of R&D. At the same time there is a lack of rules and directives, which some product groups counter with the use of routines regarding involvement of Pre-sale employees. On the other hand, when combining several mechanisms, as in the case with product reference groups, problems appeared due to insufficient use of the mechanisms. Hence, issues with implementation of individual mechanisms cannot be compensated by increasing the number of mechanisms.
Support for Grant’s (1996) mechanism rules and directives, was found to be used in this study, but could not be verified to enhance knowledge integration from the empirical data gathered in this study.

In conclusion several mechanisms were identified to support knowledge integration. In addition, the use of several mechanisms at the same time have shown to be efficient, as well as the importance of using them properly. Also, even mechanisms seem to have drawbacks, and it is important to be aware of them to prevent them from happening.
7 CONCLUSIONS AND DISCUSSION

This chapter presents the findings of this study both theoretical implications and managerial implications that can be applied to a wide range of organisations. Specific IFS recommendations can be found in Appendix H. Thereafter, a discussion of the limitations of the study, and areas for future research are presented.

7.1 THEORETICAL CONTRIBUTION

The purpose of this study was to analyse how organisations can create customer value through knowledge integration. The focus was on how knowledge that already resides within a globally dispersed organisation can be integrated during the product development process. From this study following conclusions can be drawn:

- Internal stakeholders contribute to customer value creation, throughout the entire product development process, with their different knowledge.
- Successful knowledge integration requires a continuously turning knowledge spiral, which includes a balanced interaction between R&D and their environment.
- Knowledge integration processes must be carefully designed, and formalised, with respect to mechanisms and factors associated with knowledge integration.

This study provides support to theories regarding knowledge integration and customer value creation, but also several new findings. The following discussion aims to give a nuanced insight into the subject.

First, in contrast to Witell et al. (2014), this study shows that customer value is created throughout the entire product development process. Witell et al. (2014) say that little customer value, in terms of the goods part, is created during test phase late in the product development process. However, this study implies that goods value, and specifically augmented value, is created during the phase that resembles what Witell et al. (2014) calls the test phase. Although, important to mention is that Witell et al. (2014) investigated companies classified as service or manufacturing firms separately, while IFS can be classified as both a manufacturing and a service company (simplified, R&D stands for the manufacturing part, and Pre-sale and Consulting stands for the service part).

Second, in line with what Armstrong and Kotler (2014) and Edvardsson and Olsson (1996) state, this study supports that different internal stakeholders contribute with different knowledge. However, the study also found that problems appear due to contradicting customer knowledge. How an organisation should handle, and prioritise, the contradicting knowledge is something that has not been elaborated on in the selected literature base. A related aspect, which also originates from prioritising issues, is to decide when enough knowledge has been gathered. One way to deal with mentioned problems is to evaluate the cost versus benefit of the knowledge integration. Another way to prioritise could be to evaluate the knowledge input from a key-customer perspective, and which input that would be of most value to the key customers.

Third, this study supports that knowledge is successfully integrated in an organisation if a knowledge spiral is completed and continues to spin, in accordance with the theory by Nonaka et al. (1996). In addition, the empirical findings suggest that when the externalisation step is lacking, the credibility of the knowledge decreases. This results in that some individuals in the organisation questions the knowledge, and rejects parts of it. Therefore, the externalisation step does not only help promote reflection and
interaction between individuals, but also fulfils an important purpose in terms of conveying a message of credibility.

Fourth, the empirical findings from this study show that when opportunity is not created, or facilitated, by top management, encouragement for exploring knowledge within R&D departments is limited. Lundquist and Läckström (2014) support this hypothesis by stating that there might be a need for a marketing mindset within R&D departments. This further indicates that organisations that lack opportunity to integrate knowledge also lack a customer focused corporate culture, which might lead to unwanted products being developed.

Fifth, it has been determined that the pressure of globalisation forces organisations to create more customer value. To gather international expertise and facilitate knowledge integration of multi-skilled members from different countries, organisations can establish global teams (Daft, 2013). The empirical findings confirm Daft’s (2013) statement that there is a risk for global teams to develop an “us against them” mentality, which in turn reduces the credibility of their resulting knowledge output. This study further elaborates on global teams by pairing Grant’s (1996) knowledge integration factor commonality of specialised knowledge to Daft’s (2013) mechanism global teams, in an attempt to explain why disagreements occur. Since the regional representatives’ knowledge originates from their ordinary environment in autonomous regions, it is natural that their knowledge and expertise also differ, which in turn might give rise to conflicting goals and interests.

7.2 MANAGERIAL IMPLICATIONS

Several findings from this study can be applicable to a wider range of organisations who wants to ensure customer value creation through knowledge integration.

Since there are different types of value (goods and service value), which is created through integration of knowledge from different internal stakeholders, it is critical that knowledge is gathered from a wide range of internal stakeholders. The reason is that internal stakeholders are in contact with, and represents, different customer roles within the customer organisations, and therefore obtain different customer knowledge. For example, a salesperson has contact with the purchaser from the customer company and the consultant has contact with the user of the product.

Another benefit with integrating knowledge with internal stakeholders is that they obtain a better understanding of the product, which facilitates their creation of customer value. What also has been highlighted in this study is that augmented value, in other words intangible attributes and benefits with the product, is created during the test phase. Hence, managers should consider validating the product, at the end of the product development process, through tests with real customers. By gaining satisfied customers, the organisation can further prove the quality of the product with facts and actual examples, which otherwise would be impossible, and thereby create augmented value.

In large organisations there is always a risk that different regions or departments have conflicting interests since the internal stakeholders meet with different customers. Hence, it is likely that the knowledge that R&D integrates with different internal stakeholders sometimes is contradicting. Therefore it is important that managers have a plan for how to handle such situations, which shall be based on the strategy goal of the organisation. With a well-defined way of hot to prioritise differing knowledge input, connected to the strategy, the organisation becomes capable of managing conflicting knowledge.
The significance of knowledge integration must be mediated and understood across the organisation, and throughout the entire product development process. Regardless of tool (meeting, mail, online forum etcetera) used to enhance knowledge integration, R&D can ensure that knowledge is integrated as long as they use a formalised, and structured process. The process should be repeatable, and give clear directions to all involved on how the knowledge integration shall be performed. The process should also avoid creating additional work for involved parties. The process should start with socialising, preferably face-to-face, where knowledge can be exchanged between R&D and internal stakeholders. This knowledge should then be documented, so that involved individuals ensure that they have understood each other correctly. This will also increase the credibility of the knowledge for those who did not participate during the socialisation step. The knowledge should then be compiled with existing knowledge within the R&D department, in some kind of knowledge system, so that all knowledge can easily be found at the same place. The knowledge must then become available to other internal stakeholders so that they can create their part of the customer value.

Globally dispersed organisations face great challenges with knowledge management due to the huge amounts of different customers, and needs. One way to enclose and capture widespread knowledge is to assemble global teams, teams that include internal stakeholders that represent different roles and regions. Note, however, that it is important that each representative only represent countries or roles, a combination of the two often lead to conflicting responsibilities. Another related challenge in such group compositions is the “us against them”-mentality where each representative fight for their respective affiliation, instead of the organisations common good. One explanation to such disagreements is the lack of common knowledge, which can be explained by the participants’ different knowledge context in each region. Therefore, it is important to choose individuals that have enough common knowledge regarding relevant goals and interests. It is also suggested to choose individuals with high self-esteem, a proactive personality style, cognitive ability, and intrinsic motivation from the beginning. It is also important to create an environment where individuals feel that they are informed, listened to, and encouraged to speak, to promote team-spirit and motivation to work towards a common goal.

7.3 LIMITATIONS AND FURTHER RESEARCH

The theoretical contributions and the practical implications from this case study are drawn on the studied company’s specific conditions, such as organisational structure and industrial context. To draw more general conclusions other organisations and industries need to be studied as well so that comparative case studies can be performed.

This study only included a selection of internal stakeholders; Pre-sale and Consultants. Therefore, further research should consider how other stakeholders could be used to gather customer knowledge and create more customer value. Suggestion of stakeholders that should be involved is representatives from all regions and from all different internal departments but also external partners. Another aspect of internal stakeholders’ knowledge is how contradicting knowledge from different stakeholders should be prioritised. A third aspect of internal stakeholders’ contribution of knowledge regards whether they have the organisations or their regions best interest in mind. An interesting research area would be to investigate if motivation can be influenced by corporate culture.

Another limitation of this study is the selection of respondents. Since most of the respondents speak fluent English and origin from Northern and Western Europe or North America there were little differences in
culture and language which may give rise to other knowledge integration factors that are common in globally dispersed organisations. It would be interesting to investigate how growth regions and regions such as South America and Asia perceive the communication with R&D and how the application meets their customers’ needs.

During this study focus has been on how R&D can create more customer value through integration of knowledge from Pre-sale and Consultants and how R&D enables the creation of services through the development of the application. Another limitation of the study is therefore that little consideration was taken to how Pre-sale and Consultants create their service offering and how they can benefit from knowledge integration with R&D. Further research could benefit from having the same approach as this study and by using the same research questions a comparative study could be performed, but with a different perspective.

This study concluded that the internal stakeholders possess knowledge that could be beneficial for R&D in their product development process and that it could contribute to the creation of more customer value. But the study did not conclude what kind of knowledge that R&D lacks and what kind of knowledge that Pre-sale and Consultants’ possess. Also, the study did not investigate what the benefits with the knowledge integration would be compared with the increased costs. Such conclusions would further assist R&D in their choice of methods, processes and mechanisms aiming to facilitate knowledge integration.
REFERENCES

Articles and books


Yin, Robert. 2006. Fallstudier: Design och genomförande. Liber AB, Malmö

Websites


APPENDIX

APPENDIX A  INTERVIEW SCHEDULE PRE-STUDY.......................................................... I
APPENDIX B  INTERVIEW QUESTIONS VS RESEARCH QUESTIONS.......................... II
APPENDIX C  INTERVIEW GUIDES............................................................................ V
APPENDIX D  INTERVIEW SCHEDULE MAIN STUDY................................................. IX
APPENDIX E  ROLE DESCRIPTION.......................................................................... XI
APPENDIX F  UPDATED INTERVIEW GUIDE........................................................... XIII
APPENDIX G  UPDATED INTERVIEW QUESTIONS VS RESEARCH QUESTIONS .... XVII
APPENDIX H  PRACTICAL IMPLICATIONS FOR IFS................................................... XX
## Appendix A  
### Interview schedule pre-study

<table>
<thead>
<tr>
<th>Person</th>
<th>Day</th>
<th>Media</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manager</td>
<td>21/1</td>
<td>Live</td>
<td>30 min</td>
</tr>
<tr>
<td>Manager</td>
<td>22/1</td>
<td>Live</td>
<td>40 min</td>
</tr>
<tr>
<td>Manager</td>
<td>23/1</td>
<td>Live</td>
<td>40 min</td>
</tr>
<tr>
<td>BSA</td>
<td>23/1</td>
<td>Live</td>
<td>60 min</td>
</tr>
<tr>
<td>Manager</td>
<td>26/1</td>
<td>Live</td>
<td>45 min</td>
</tr>
<tr>
<td>Manager</td>
<td>27/1</td>
<td>Live</td>
<td>50 min</td>
</tr>
<tr>
<td>Manager</td>
<td>27/1</td>
<td>Live</td>
<td>60 min</td>
</tr>
<tr>
<td>PM</td>
<td>27/1</td>
<td>Live</td>
<td>75 min</td>
</tr>
<tr>
<td>BSA</td>
<td>28/1</td>
<td>Live</td>
<td>75 min</td>
</tr>
<tr>
<td>Evangelist</td>
<td>29/1</td>
<td>Live</td>
<td>60 min</td>
</tr>
<tr>
<td>Manager</td>
<td>30/1</td>
<td>Live</td>
<td>50 min</td>
</tr>
<tr>
<td>Manager</td>
<td>30/1</td>
<td>Live</td>
<td>30 min</td>
</tr>
<tr>
<td>Consultant</td>
<td>2/2</td>
<td>Live</td>
<td>70 min</td>
</tr>
</tbody>
</table>
## Appendix B  Interview questions VS research questions

<table>
<thead>
<tr>
<th></th>
<th>R.1</th>
<th>R.2</th>
<th>R.3</th>
<th>RQ.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>PD process</td>
<td>Knowledge spiral</td>
<td>Common knowledge</td>
<td>Social capital</td>
<td>Organisational structure</td>
</tr>
<tr>
<td>1</td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>a</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>b</td>
<td></td>
<td>x</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>c</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>d</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>3</td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>a</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>b</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>c</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>d</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>a</td>
<td></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Match between interview questions and research questions for Pre-sale/Consulting

<table>
<thead>
<tr>
<th></th>
<th>R.1</th>
<th>R.2</th>
<th>R.3</th>
<th>RQ.4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PD process</td>
<td>Knowledge spiral</td>
<td>CK</td>
<td>SC</td>
</tr>
<tr>
<td>1</td>
<td>x</td>
<td>x</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>a</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>d</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>a</td>
<td>x</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>9</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>a</td>
<td>x</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>x</td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>a</td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td></td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
Appendix C  Interview guides

**Introduction to the interview**
- Explain who we are and the purpose of the study
- Explain the purpose of the interview and the value of the respondent
- It will take approximately 30/60 minutes
- Ask if it is alright with recording
- Inform that the answers will be an anonymous

**General control questions**
- Tell us about yourself and what you work with

<table>
<thead>
<tr>
<th>Questions R&amp;D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>When &amp; how integration</strong></td>
</tr>
<tr>
<td>1. Describe the interaction with Pre-sale from PRM to roll out regarding customer information?</td>
</tr>
<tr>
<td>a. When (time)</td>
</tr>
<tr>
<td>b. With whom</td>
</tr>
<tr>
<td>c. How</td>
</tr>
<tr>
<td>d. What happens next with the information you get?</td>
</tr>
<tr>
<td>2. How is this knowledge incorporated in your work?</td>
</tr>
<tr>
<td>3. Describe the interaction with Consulting from PRM to roll out regarding information about the customer?</td>
</tr>
<tr>
<td>a. When (time)</td>
</tr>
<tr>
<td>b. With whom</td>
</tr>
<tr>
<td>c. How</td>
</tr>
<tr>
<td>d. What happens next with the information you get?</td>
</tr>
<tr>
<td>4. How is this knowledge incorporated in R&amp;D’s work?</td>
</tr>
</tbody>
</table>

**Common knowledge**
| 5. Describe how you think the verbal communication works with Pre- Sale |
| 6. Describe how you think the written (mail, intranet) communication works with Pre-sale? |
| 7. Do you perceive differences in use of language (parlance) between R&D and Pre-sale? Exemplify! |
| 8. Describe your level of insight in Pre-sales work and their expertise? |
|   a. In what way does your level of insight influence the collaboration with Pre-sale? |
| 9. Describe how you think the verbal communication works with Consulting |
| 10. Describe how you think the written (mail, intranet) communication works with Consulting? |
| 11. Do you perceive differences in use of language (parlance) between R&D and Consulting? Exemplify! |
12. Describe your level of insight in Pre-sales work and their expertise?
   a. In what way does your level of insight influence the collaboration with Consulting?

**Social capital**

13. Describe the relationship between R&D and Pre-sale?
14. Describe your personal relationship with Pre-sale
   a. Do you get/can you get valuable customer information from Pre-sale?
15. What motivates you to exchange knowledge with Pre-sale?

16. Describe the formal relationship between R&D and Consulting?
17. Describe your personal relationship with Consulting
   a. Do you get/can you get valuable customer information from Pre-sale?
18. What motivates you to exchange knowledge with Consulting?

**Org. structure**

19. Do you feel that your opinion is considered when taking decisions regarding you competence area?
   a. If no, whose opinion is valued the most?
      1. Why, do you think?
      2. If yes, what do you think is the reason?

20. How is Pre-sales knowledge about the customer considered when taking decisions regarding the product?
21. How is Consultings’ knowledge about the customer considered when taking decisions regarding the product?

22. Is there a difference when collaborating with Pre-sale/Consulting from other regions than Scandinavia?
   a. If yes, in what way?

23. How is the collaboration facilitated and encouraged by the organisation in general?
   a. Methods and processes?
   b. IT- Systems?
   c. Events?

**Sum-up**

Is there any question that you think we should have asked?
Is there anything that you want to add?
Is it OK to contact you if for complementary questions?
We would like to thank you for your time and for the interview!
**Introduction to the interview**
- Explain who we are and the purpose of the study
- Explain the purpose of the interview and the value of the respondent
- It will take approximately 30/60 minutes
- Ask if it is alright with recording
- Inform that the answers will be an anonymous

**General control questions**
- Tell us about yourself and what you work with

<table>
<thead>
<tr>
<th>Questions Pre-sale/Consulting</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>When &amp; how integration</strong></td>
</tr>
<tr>
<td>1. Describe the interaction with R&amp;D from the Strategic conference to product release regarding customer information?</td>
</tr>
<tr>
<td>a. When (time)</td>
</tr>
<tr>
<td>b. With whom</td>
</tr>
<tr>
<td>c. How</td>
</tr>
<tr>
<td>d. What happens next with the information you get?</td>
</tr>
<tr>
<td>2. How is this knowledge incorporated in your work?</td>
</tr>
<tr>
<td><strong>Common knowledge</strong></td>
</tr>
<tr>
<td>3. Describe how you think the verbal communication works with R&amp;D</td>
</tr>
<tr>
<td>4. Describe how you think the written (mail, intranet) communication works with R&amp;D?</td>
</tr>
<tr>
<td>5. Do you perceive differences in use of language (parlance) between R&amp;D and Pre-sale/Consulting? Exemplify!</td>
</tr>
<tr>
<td>6. Describe your level of insight in R&amp;Ds work and their expertise?</td>
</tr>
<tr>
<td>a. In what way does your level of insight influence the collaboration with R&amp;D?</td>
</tr>
<tr>
<td><strong>Social capital</strong></td>
</tr>
<tr>
<td>7. Describe the relationship between R&amp;D and Pre-sale/Consulting?</td>
</tr>
<tr>
<td>8. Describe your personal relationship with R&amp;D</td>
</tr>
<tr>
<td>9. What motivates you to exchange knowledge with R&amp;D?</td>
</tr>
<tr>
<td><strong>Org. structure</strong></td>
</tr>
<tr>
<td>10. Do you feel that R&amp;D considers your opinion when taking decisions regarding your competence area?</td>
</tr>
<tr>
<td>a. If no, whose opinion is valued the most?</td>
</tr>
<tr>
<td>I. Why, do you think?</td>
</tr>
<tr>
<td>b. If yes, what do you think is the reason?</td>
</tr>
<tr>
<td>11. How is Pre-sales knowledge about the customer considered when taking decisions regarding the product?</td>
</tr>
</tbody>
</table>
12. Is there a difference when collaborating with R&D from Linköping and Sri-Lanka?
   a. If yes, in what way?
13. How is the collaboration facilitated and encouraged by the organisation in general?
   a. Methods and processes?
   b. IT- Systems?
   c. Events?

Sum-up
Is there any question that you think we should have asked?
Is there anything that you want to add?
Is it OK to contact you if for complementary questions?
We would like to thank you for your time and for the interview!
## Appendix D  Interview schedule Main Study

<table>
<thead>
<tr>
<th>Person</th>
<th>Day</th>
<th>Media</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>BSA</td>
<td>13/3</td>
<td>Live</td>
<td>60 min</td>
</tr>
<tr>
<td>BSA</td>
<td>17/3</td>
<td>Live</td>
<td>60 min</td>
</tr>
<tr>
<td>BSA</td>
<td>18/3</td>
<td>Live</td>
<td>60 min</td>
</tr>
<tr>
<td>Consulting</td>
<td>18/3</td>
<td>Live</td>
<td>60 min</td>
</tr>
<tr>
<td>Pre-sale</td>
<td>18/3</td>
<td>Lync</td>
<td>30 min</td>
</tr>
<tr>
<td>PM</td>
<td>20/3</td>
<td>Lync</td>
<td>60 min</td>
</tr>
<tr>
<td>Consulting</td>
<td>23/3</td>
<td>Lync</td>
<td>35 min</td>
</tr>
<tr>
<td>Pre-sale</td>
<td>23/3</td>
<td>Lync</td>
<td>30 min</td>
</tr>
<tr>
<td>Pre-sale</td>
<td>24/3</td>
<td>Live</td>
<td>45 min</td>
</tr>
<tr>
<td>SE</td>
<td>25/3</td>
<td>Live</td>
<td>75 min</td>
</tr>
<tr>
<td>SE</td>
<td>25/3</td>
<td>Live</td>
<td>60 min</td>
</tr>
<tr>
<td>BRO</td>
<td>26/3</td>
<td>Live</td>
<td>60 min</td>
</tr>
<tr>
<td>Consulting</td>
<td>27/3</td>
<td>Lync</td>
<td>30 min</td>
</tr>
<tr>
<td>Consulting</td>
<td>30/3</td>
<td>Live</td>
<td>60 min</td>
</tr>
<tr>
<td>PD</td>
<td>30/3</td>
<td>Live</td>
<td>60 min</td>
</tr>
<tr>
<td>Pre-sale</td>
<td>31/3</td>
<td>Lync</td>
<td>30 min</td>
</tr>
<tr>
<td>Pre-sale</td>
<td>31/3</td>
<td>Lync</td>
<td>30 min</td>
</tr>
<tr>
<td>Consulting</td>
<td>1/4</td>
<td>Live</td>
<td>50 min</td>
</tr>
<tr>
<td>PD</td>
<td>7/4</td>
<td>Live</td>
<td>30 min</td>
</tr>
<tr>
<td></td>
<td>Date</td>
<td>Type</td>
<td>Duration</td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
<td>-------</td>
<td>----------</td>
</tr>
<tr>
<td>BRO</td>
<td>7/4</td>
<td>Live</td>
<td>60 min</td>
</tr>
<tr>
<td>Pre-sale</td>
<td>10/4</td>
<td>Lync</td>
<td>60 min</td>
</tr>
</tbody>
</table>
Appendix E  Role description

Following is a description of the different roles of the respondents, used for the interviews. The information is gathered from IFS intranet.

Product Director

The Product Director is responsible for resources within his/her product area. The Product Director is also involved in the Product Reference Group, and responsible for translating the Product Roadmap into an execution plan, which is an ongoing iterative process with defining new projects. The plan spans over two to three years and consists of suggested projects, and releases, and is broken down into investment areas. The Product Director then appoints a Business Requirement Owner, a steering committee, and a Project Manager for the project.

Business Requirement Owner

The Business Requirement Owner plays a key role in ensuring that the project becomes a business success, and meets the market requirements. This includes performing important tasks during the project start-up and development phase, as well as tasks related to rollout. It is the responsibility of the Business Requirement Owner to appoint account managers. The Business Requirement Owner owns the functional backlog of the project, and is responsible for functional backlog prioritisation. But, the Project Manager is responsible for the overall project prioritisation. The Business Requirement Owner is also responsible for explaining the scope, functional requirements, and to set an objective for the project, involved teams, and/or other relevant parties.

Business System Analyst

A Business Systems Analyst applies IFS’s development and support standards, guidelines, processes and tools, together with product and business domain knowledge. They perform a variety of tasks including requirement analysis, solution design, customer support, and quality assurance activities. This includes formulating requirements into application solutions; writing functional specifications, performing application testing, case/call handling, bug verification, writing training material and documentation, performing application training, performing Pre-sales activities etcetera.

Project Manager

A Project Manager is overall responsible for the life cycle of a project based on the project directive, by planning, executing, and delivering a project that creates maximum customer value, and quality through efficient utilisation of project resources and processes. A Project Manager should work with operational personnel aspects within the project to contribute in making the competence, and satisfaction, of each individual to grow over time. A Project Manager should also work with improving R&D Project Management processes and tools, as well as contribute to developing other R&D methodology processes.

Software Engineer

A Software Engineer applies IFS’s development and support standards, guidelines, processes and tools, together with the programming language constructs. They perform a variety of tasks including design and
programming. This includes; modelling, coding business logic, creating reports, building user interfaces, debugging, creating scripts, performance tuning, code deployment etcetera.

Pre-sale

A Pre-sale employee works primarily with new customer projects, but also business development with existing customers. They are responsible for the identification of current, and future, business processes that can be supported by IFS Applications. New client projects involve collection and analysis of customer demands, and assessment of how IFS Applications can fit the customer. The role also includes suggesting and guiding existing customers towards improvements and adaptations, as the business of the client develops.

Consulting

A Business Consultant works with customer counselling, planning, and training of customers, as well as with subproject management. Their main task is to implement and manage the use of IFS Applications. This is done by identifying and developing the customers’ business processes, suggest solutions and/or improvements based on the customers’ needs.
Appendix F    Updated Interview guide

Introduction to the interview
- Explain who we are and the purpose of the study
- Explain the purpose of the interview and the value of the respondent
- It will take approximately 30/60 minutes
- Ask if it is alright with recording
- Inform that the answers will be an anonymous

General control questions
- Tell us about yourself and what you work with

<table>
<thead>
<tr>
<th>Questions R&amp;D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>When &amp; how integration</strong></td>
</tr>
<tr>
<td>1. Do you learn about the customer from Pre-sale employees?</td>
</tr>
</tbody>
</table>
|    a. When?  
|    b. With whom?  
|    c. How?  
|    d. What happens next?  
|    e. Do you perform customer evaluations?  
|    f. Do you have statistical information about customers’ usage of the product? |
| 2. How do your colleagues learn?     |
| 3. Do you share knowledge with Pre-sale employees |
| 4. Is the collaboration facilitated and encouraged by the organisation in general? |
|    a. Methods and processes?  
|    b. IT-Systems?  
|    c. Events? |
| 5. Do you learn about the customer from Consultants? |
|    a. When (time)  
|    b. With whom?  
|    c. How?  
|    d. What happens next?  
|    e. Do you perform customer evaluations?  
|    f. Do you have statistical information about customers’ usage of the product? |
| 6. How do your colleagues learn?     |
| 7. Do you share knowledge with Consultants? |
| 8. Is the collaboration facilitated and encouraged by the organisation in general? |
|    a. Methods and processes?  
|    b. IT- Systems?  
|    c. Events |
### Common knowledge

9. Describe your level of insight in Pre-sale employees’ work?
   a. Does your level of insight influence the collaboration with Pre-sale employees?

10. Describe your level of insight in Consultants’ work?
    a. Does your level of insight influence the collaboration with?

### Social capital

11. Describe your personal relationship with Pre-sale employees

12. What motivates you to change knowledge?

13. Describe your personal relationship with Consultants

14. What motivates you to change knowledge?

### Org. structure

15. Is the intention and purpose with the functionality transferred to you?

16. How is Pre-sale employees’ knowledge about the customer considered when taking decisions regarding the product?

17. How is Consultants’ knowledge about the customer considered when taking decisions regarding the product?

18. Is there a difference when collaborating with Pre-sale/ from other regions than Scandinavia?

### Sum-up

Is there any question that you think we should have asked?

Is there anything that you want to add?

Is it OK to contact you if for complementary questions?

We would like to thank you for your time and for the interview!
Updated Interview guide Pre-sale/Consulting

**Introduction to the interview**
- Explain who we are and the purpose of the study
- Explain the purpose of the interview and the value of the respondent
- It will take approximately 30/60 minutes
- Ask if it is alright with recording
- Inform that the answers will be an anonymous

**General control questions**
- Tell us about yourself and what you work with

<table>
<thead>
<tr>
<th>Questions Pre-sale/Consulting</th>
</tr>
</thead>
</table>

**When & how integration**

1. Do you learn about the product from R&D people?
   a. When?
   b. With whom?
   c. How?
   d. What happens next?
   e. How do your colleagues learn?

2. Do you perform customer evaluations?
   a. Do you have statistical information about customers’ usage of the product?

3. Do you share knowledge with R&D people?

4. Is the collaboration facilitated and encouraged by the organisation in general?
   a. Methods and processes?
   b. IT-Systems?
   c. Events?

**Common knowledge**

5. Describe your level of insight in R&D peoples’ work and their expertise?
   a. Does your level of insight influence the collaboration with R&D people?

**Social capital**

6. Describe your personal relationship with R&D people

7. What motivates you to change knowledge?

**Org. structure**

8. Is the intention and purpose with the functionality transferred to you?

9. How is your knowledge about the customer considered when taking decisions regarding the product?
10. Is there a difference when collaborating with R&D people from other regions than Scandinavia?
   a. If yes, in what way?

**Sum-up**

Is there any question that you think we should have asked?
Is there anything that you want to add?
Is it OK to contact you if for complementary questions?
We would like to thank you for your time and for the interview!
Appendix G Updated interview questions VS research questions

<table>
<thead>
<tr>
<th>R.1</th>
<th>R.2</th>
<th>R.3</th>
<th>RQ.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>PD process</td>
<td>Knowledge spiral</td>
<td>Common knowledge</td>
<td>Social capital</td>
</tr>
<tr>
<td>1</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>x x x x x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>x x x x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>x x x x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>x x x x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>f</td>
<td>x x x x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>x x x x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>x x x x x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>x x x x x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>x x x x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>x x x x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>x x x x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>f</td>
<td>x x x x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>x x x x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>x x x x x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>x x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>a</td>
<td>x x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>x x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>c</td>
<td>x x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>
## Match between interview questions and research questions for Pre-sale/Consulting

<table>
<thead>
<tr>
<th>R.1</th>
<th>R.2</th>
<th>R.3</th>
<th>RQ.4</th>
<th>PD process</th>
<th>Knowledge spiral</th>
<th>Common knowledge</th>
<th>Social capital</th>
<th>Organisational structure</th>
<th>Mechanisms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>a</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>c</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>e</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>f</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>2</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>3</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>b</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix H  Practical implications for IFS

In order for IFS to create more customer value the following issues were found (chapter 5), and discussed (chapter 6), in this study:

- Gathering of customer knowledge through product reference groups
- Selecting proper account managers
- Open Idea as a tool for knowledge integration
- Account managers attendance ratio at demonstrations
- Getting customer knowledge during development
- Cooperation between product groups
- Cooperation with Early Adopters
- Developing Webinars

Since the empirical findings have different causes and explanations, the measures also need to be specifically adapted to each situation. Recommendations for how IFS could adjust their organisation, and better integrate knowledge to be able to create more customer value, are presented below.

**Gathering of customer knowledge through product reference groups**

This study identified two problems with the product reference groups. First, the regional representatives’ responsibility to represent prospects, customers, several countries and roles, is too much to handle for so few regional representatives. This is in line with Daft (2013), who states that a coordinator cannot coordinate across both countries and functions. Second, due to the regions autonomy the regional representatives’ knowledge differs too much, leading to lack of common knowledge and disagreements.

To get unified product reference groups, R&D could decrease the regional representatives’ responsibilities from a coordinating perspective. R&D could also narrow the purpose with the product reference groups, so that appropriate regional representatives with sufficient common knowledge can be selected. It is important to send a clear and comprehensive message about how knowledge should be gathered to enhance knowledge integration (Burgess, 2005). R&D are therefore recommended to consider whether it is most important that each region is represented, or that representatives are selected in a way that is more aligned with the organisations common goals, and in that way increase the common knowledge of the product reference groups’ participants.

**Selecting proper account managers**

Since it is the organisation’s responsibility to ensure that the individuals have the appropriate social networks (Kang and Kim, 2013), it should be of high priority for R&D to get input from both Pre-sale and Consultants, and a formalised process of selecting account managers should be introduced. This would both ease the process, and reduce the time needed to find proper account managers.

IFS is also recommended to use several account managers since it was found that different Pre-sale and Consultants see problems from different angels, due to that they have interaction with different customer roles within the same customer company. To start with, R&D can sort out which employees that frequently are logging requests in Open Idea. They are at least motivated to help, since they take their time
to log requests. R&D could then create a database where names of proper candidates can be stored. Open Idea therefore gets a second mission; to work as a tool to find candidates for the position.

If this will not be enough, R&D could also introduce a new role for each product group, a coordinator. This person should be in charge for the choice of account managers, and have the overall responsibility for the process.

Open Idea as a tool for knowledge integration
Since it was concluded that the use of Open Idea as a tool for knowledge integration is valued by R&D, R&D should consider solving the motivation problem, and the perception that Open Idea is not read, or considered, by R&D.

Mentioned problems can be fixed by providing clear rules and directives for R&D employees that explains how feedback on the requests should be handled. According to Bhandar et al. (2007) it is important to identify motivators for the participants. To build up the three motivational factors that enhances knowledge integration (knowledge self-efficacy, enjoyment of helping others and reciprocal benefit), managers need to create an environment where individuals feel informed, listened to, and encouraged to share knowledge (Parker, 1998). This environment can be created if R&D provide feedback, and thereby show their gratitude. The feedback should be given in the same way by all product groups, and it should be done more frequently compared to today. Even if the suggestion is not implemented, feedback should be given (preferably with an explanation to why).

If R&D neglect to give feedback to Pre-sale and Consultants, it was concluded (section 6.7.2) that Open Idea become an insufficient way of gathering knowledge since far from all Pre-sale and Consultants uses it today, or will continue to use it. In addition, the knowledge spiral cannot continue to spin, resulting in R&D missing out of knowledge.

As discussed (section 6.3.1), other methods (such as personal networks) are used today instead of Open Idea, but no one seem optimal. Therefore, the recommendation is that R&D should consider looking at other options for gathering knowledge. Important to think of, when choosing methods is that a wide range of Pre-sale and Consultants should be involved. Also, a two way communication, including feedback, is preferable.

Account managers attendance ratio at demonstrations
In order for R&D to solve the problem with decreasing attendance ratio during development and the demonstrations, they first need to find the reason to why. Is there not enough time? Not enough motivation? Or, does the account manager not want to feel bothersome? Most likely it is a combination of several factors. It was also mentioned that smaller groups were preferable to get as much input as possible from the account manager, which is the reason why R&D should use account managers in the first place.

R&D, and more specifically the product groups, is therefore recommended to become more flexible and responsive with the demonstration dates. Also, R&D should consider introducing an additional demonstration meeting, to create the opportunity for using the mechanism sequencing. Thereby, R&D creates both smaller groups, but R&D also give the account manager an additional time slot to choose from. Measurements, in terms of becoming more flexible, have already been initiated by one product...
The fact that this product group perceives the solution as a positive change indicates that the rest of the product groups should follow.

**Getting customer knowledge during development**

The problem with Business System Analysts and System Engineers feeling too isolated from the customer can be solved in several ways. Even if the best solution would be to create a direct contact with the customer, it is not justified economically to let Business Solution Analysts and Software Engineers visit the customer. Other methods, that are more economically efficient, should be considered.

As mentioned (section 6.4), more customer information could partly be obtained by increasing the account manager attendance ratio, in accordance to the suggestion previously described (see “Keep account manager attendance ratio high through incentive”). Though, most likely it will not be enough.

Since some R&D respondents mentioned that they would like information about what functionality the customer uses, what Pre-sale sell, and Consultants implement, gathering statistical information would increase the understanding for the customers. One Pre-sale respondent mentioned that they can produce statistical information about what functionality the customer uses through the CRM-system, but that it is hard to access. With some effort, gathering statistical information from Pre-sale and Consultants would be a way for R&D to go.

The procedure with combining information, about different customers from different projects, is what Grant (1996) would call sequencing. How Pre-sale gather this information needs to be explained to R&D and Consultants. R&D should then try to ease this process in some way since it was described as hard. When all parties know how the statistical information can be gathered, each customer project can then compile the information about what their customer uses. Then all this information can be compiled into one larger document, which in turn can be analysed to get a better overview of IFS Applications’s strengths and weakness. This document then needs to be internalised in the organisation, and incorporated into the projects quite early, preferably before the development phase when it was asked for. The recommendation is to incorporate the information during the project planning phase, when changes can be made more easily.

**Cooperation between product groups**

To break down barriers between the product groups actions have been undertaken and meetings have been held a few times on the initiative of a product group. These initiatives, and the fact that additional meetings were mentioned by a Project Manager to be good to conduct, indicates that additional meetings might be needed to ensure that knowledge is transformed through the spiral, and spread within the organisation.

R&D are therefore recommended to introduce formalised meetings between product groups, and create an opportunity for integration that is not supported by the organisation today. In addition, R&D are recommended to set rules and directives on how these interactions shall be performed.

**Cooperation with Early Adopters**

The opportunity that R&D have to gather input about the application from real customers as early as they do, seems not to be utilised in the extend that it could, which can be concluded since the Early Adopters even ask for R&D to come visit them.
The time between the beta tests and Release to Market was shorter for Applications 9 than during the development of IFS Applications 8, which was mentioned as a contributing factor for the absence of customer evaluations for Applications 9. It is of course a resource question, but R&D are recommended to perform the evaluations as soon as possible. R&D must have in mind that this is a unique opportunity to get feedback from users directly, it will not be provided later.

Once R&D do perform the customer evaluations, it is important to be realistic; not all areas within the application can be tested and evaluated through the customer evaluations. Careful consideration and selection of appropriate areas should be conducted, preferably those areas that are perceived as having the biggest impact on the application for most customers. For example, if completely new functionality, or areas have been developed, it would be a good idea to consider evaluating specifically those parts in the application that are affected. Other areas that would be interesting are the ones that R&D have got a lot of complains for, or areas that they consider changing. The evaluations could then work as input during the Pre-study phase.

**Developing Webinars**

All the customer value that has been created throughout the development of IFS Applications will not be utilised, or delivered, to the customer if the transfer of product information is insufficient. The additional customer value that is created by Pre-sale and Consultants is dependent on this transfer, and problems were found to origin from the absence of Consultants’ involvement. Some R&D respondents even mentioned that they should consider a change regarding the webinars. In addition, today it is a transfer of product information that is conducted, but it would be better to communicate the product information.

This leads to the recommendation for R&D to also incorporate Consultants in the creation process for the Webinars, so that they can give their input. Also, R&D should create a channel for Pre-sale and Consultants to provide their feedback when the Webinars have been released. Otherwise the knowledge spiral cannot continue to spin, and thereby R&D misses out on important knowledge. Besides ensuring that the application is communicated through a two way channel, a better understanding for the connection between functionality and business processes can, most likely, be expected to be obtained by R&D.