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Uncovering Customer Orientation in Product Development

A Qualitative Study based on the Software Industry

by

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Abstract

TITLE: Uncovering Customer Orientation in Product Development: A Qualitative Study based on the Software Industry

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PURPOSE: The purpose of this research project is to further advance theory on management of product development by providing insights on customer orientations. The study contributes to the literature by bringing in Actor-Network Theory (ANT) as a new perspective to theorize the process of translations between customer orientation and engineering orientation within product development.

RELEVANCE: Due to a mismatch in thinking between customer and development teams it is observed that it can be complicated for a product manager to help the development teams to perceive the product in terms of the customer usage. The inability of software development teams to incorporate customer perception into product development leads to unwanted delays and increased costs.

METHODOLOGY: A qualitative research method was employed with an interpretive approach, using an abductive approach of reasoning. Eight face-to-face and electronic semi-structured interviews were conducted, utilizing hermeneutic analysis.

FINDINGS: Our findings indicate that tensions between product development and customer orientation could be best confronted by stressing the use of technological artifacts as a medium of communication, and cross-functional management for translating customer orientation. The role of the PM as a mediator, collaborator and influencer is emphasized and crucial for negotiating a balance between a dominant engineering approach with customer orientation in product development. Knowledge visualization tools support the transfer of tacit knowledge and enable knowledge creation.

CONTRIBUTIONS: Our contribution is an in depth understanding of the underlying tension that exist when incorporating customer perception in product development. We have endeavored to make sense of product management challenges in this respect.

KEYWORDS: Product Manager, Product Development, Software, Knowledge Management, Actor-Network Theory, Customer-orientation and Product Management

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Table of Contents

- 1 Introduction..... 1**
 - 1.1 Background 1
 - 1.2 Problem Discussion 2
 - 1.3 Research Question 3
 - 1.4 Literature Review..... 4
 - 1.5 Research Purpose 7
- 2 Methodology 9**
 - 2.1 Research Philosophy 9
 - 2.2 Research Approach 10
 - 2.3 Data Collection Method..... 11
 - 2.4 Data Analysis 13
 - 2.5 Sampling 13
 - 2.6 Trustworthiness..... 15
 - 2.7 Limitations 16
- 3 Theoretical Review Framework 17**
 - 3.1 Actor-Network Theory..... 17
 - 3.1.1 Basic Concepts Of Actor-Network Theory..... 17
 - 3.2 Product Management Practices With Perspectives From Actor-Network Theory 19
 - 3.3 Final Considerations 21
- 4 Analysis 22**
 - 4.1 Product Manager as Mediator 22
 - 4.2 Cross-Functional Management 25
 - 4.3 Channels Of Communication..... 27
 - 4.4 Knowledge Dissemination 28
 - 4.5 Knowledge Visualization..... 32
 - 4.6 Summary 33
- 5 Conclusion 35**
 - 5.1 Discussion 35
 - 5.2 Implications..... 39
 - 5.3 Future Research 41
- References..... 42**
- Appendix A – Interview Questions..... 48**

List of Tables

Table 2.1 Primary Data Of Interview Participants..... 14

List of Figures

Figure 3.1 The Software Product Management Framework (Ebert & Brinkkemper, 2014) ...	20
Figure 5.1 Conceptual Framework of Product Management using ANT	36

1 Introduction

The introduction chapter underlines the significance and pertinent nature of our research topic as it relates to the software industry. How the prevailing product development business processes are proving to be a challenge for software product managers globally. This chapter sheds light on the tensions that continue to exist between product development and customer orientation. This section will further provide insight on existing literature, intended contribution, and communicate our motivation and research question.

1.1 Background

Today, in a technology driven society we rely more and more on smarter products. Whether it is our phones, refrigerators, cars, or the recently introduced smart watches, it is the software industry that is the driving force; an industry where product development plays a critical role in gaining a competitive advantage. Shorter product life cycles, fast changing technology, successfully translating new concepts and dynamic markets could result in securing or losing customers, yielding growth with revenue-producing products and services. The core of new product development processes centers on knowledge, it's creation, utilization and the management of knowledge (Sena & Shani, 2000). Hence, the nature of work in this knowledge intensive industry could be described as complex and ambiguous. Within this industry, it is software developers who are programming and are hence the creative minds behind information systems. Software companies are essentially appealing to consumer demands to create value which ultimately requires an integrated approach. This holistic process involves a Product Manager (PM) who has a crucial role to play in both business and technical aspects of a company by being an interface between strategy and development with marketing and sales ensuring work process are integrated across disciplines. This signifies the need to understand customer needs in terms of usability of the product and translate them into requirements for product development.

Product Management is defined as a process that spans from the inception stage of a product until market delivery and is crucial for value creation to the business (Ebert, 2014). It has played a significant role since Procter and Gamble first introduced it at their company as brand management in 1931 (Chisa, 2014). Having a product management mindset can greatly influence the day-to-day operations of a company. Successfully handling the planning, production and forecasting in the software industry can have promising results. For example, deciding which features to build for users; understanding the implementation of the product; and determining what business areas the product needs to expand in and why (Chisa, 2014).

Over the last few decades, the success of software companies like Microsoft and Google could be attributed to the presence of product management practices (Ebert, 2014). In relation to software, product management practices can reduce cycle time of production in addition to bringing about quality improvements (Ebert, 2007). Moreover, other benefits include increased profitability and predictability of software product life cycle (Van de Weerd, Brinkkemper, Nieuwenhuis, Versendaal, Bijlsma, 2006).

A manager in this respect essentially serves as an advocate for end users during the development phase of a product. Lysonski (2008) highlights several aspects of a PM's role: An interface between the company and the market, as well as varying departments within a company and contributing to the profit of the product, hence being acquainted with the volatility of the market. Despite the role of Product Manager (PM) varying from one company to the other, the PM is generally responsible for integrating "the various segments of a business into a strategically focused whole, maximizing the value of a product by coordinating the production of an offering with an understanding of market needs" (Gorchel, 2000). PM's are often referred to as mini CEOs, hence the accepted behavior to identify with a relative level of influence and authority. It is important to address product management insufficiencies and explore different methods of managing unpredictable situations in a rapidly changing technology industry.

1.2 Problem Discussion

More recently there has been a shift from capital-intensive industries to information-intensive and innovation driven industries (Alvesson, 2004), as such, the IT and software industry are particularly important as the challenge in this sector remains to be presented in connecting sales and marketing with strategy and product development (Cusumano and Yoffie, 1998; Ebert, 2007). Poor practices in product management can lead to delays in product deliveries and are not only costly to a firm but can lead to customer dissatisfaction, as customers may not get the product they intended. All in all, product defects and consistent rework in development affects budget and time to market. It could ultimately lead to losses in market share at the business level. In the software industry, the dynamic market environments along with heavy competition among firms in terms of similar product lines, imitation and shorter product life cycles requires firms to have strong product management teams to maintain their competitive advantage. It is therefore important to identify market trends and incorporate them in product development teams. In relation with the Resource-based view (Barney, 1991), the identification of key inputs to a firm's resources such as customer orientation leads to improvements in internal efficiency and could help achieve sustainable competitive advantage. It is crucial for management to commit to invest in nurturing the capabilities of its resource base that can lead to innovation and superior business value.

Our research idea stems from a conversation with a PM at a software firm who was unable to get customer usability translated into product development. Customer usability is identifying

usage of the product in terms of the end user so that it creates a value in their experience. As a result, customers desire for product features did not materialize the same way in the end product. This requires firms to balance and negotiate the different logics of customer orientation and engineering orientation within product development. It is observed that the mismatch in thinking in terms of customers usage aspect in development teams occur frequently and can be difficult for a PM to help the teams to perceive the product in terms of the market. This signifies the need for development teams to understand customer needs and incorporate them in the design and development stages of product as this results in unwanted product delays and increased costs. There is tension to balance customer-oriented approach and engineering approach in product development. Rennstam (2008), describes the approach taken by engineers at work as a “firewall” that depicts a protected, non-transparent community without control of the manager and having no exposure to the customer and external world. This provides with a challenge on the role of managers in merging customer-oriented logic through this engineering “firewall” where contextual knowledge of the community is highly relevant (Rennstam, 2008). Being focused on only customer-oriented approach does not work, as customers always do not know what they want. On the other hand a pure engineering approach will also not be successful since market demands need to be taken into consideration. It is important to balance both these logics in the development of products. The role of a PM is crucial in this process of translating customer usability into product development. As a result, PM’s have to negotiate the tensions that occur due to managing customer orientation and engineering orientation during development of products.

Several companies have implemented different strategies to manage product development processes, however knowledge management practices in the software industry is an evolving field of study. More specifically, knowledge management as it applies to software product development in a customer focused, market-oriented context. One of the main challenges for the PM is to manage customer oriented understanding in development teams with a pure engineering mindset. Hence, the PM has to balance the strategic goals of two competing sectors: marketing and organization of development work. In this study, we wish to explore how PM’s are leveraging knowledge creation with respect to handling the tensions between customer oriented and engineering oriented logics in product development in an increasingly competitive industry.

1.3 Research Question

This research project aims to answer the following questions:

- *How do product managers negotiate tensions between customer orientation and engineering orientation in product development?*

Thus, in order to understand how PM's handle tensions with customer orientation during product development, the study approaches the question from different directions. First, we look into how PM's acquire and capture customer insights as a part of the various product definition stages. And secondly, we explore different strategies that are employed to incorporate customer usability in product development. We aim to deepen existing research on product management by examining the latest practices in product development.

1.4 Literature Review

The literature review will address two separate areas of studies – customer orientation and knowledge management. Furthermore, it will address the importance of managing knowledge in terms of customer orientation within the context of product development.

Link between Customer Orientation and Product development

Customer orientation, one of the central components of market orientation is integrating needs and desires of end users in the organization's activities to create superior customer value (Deshpande, Farley & Webster, 1993). By creating superior customer value organizations maintain a competitive advantage. Apart from customer orientation being the central foci, other components of market orientation includes competitor and inter-functional coordination (Narver and Slater, 1994). The influence of market orientation is categorized in relation to organizational performance, innovation, customer and employee consequences (Jaworski and Kohli, 1993).

A number of studies conducted have tried to establish the link between market orientation and organizational performance. Many scholars have written about the positive and direct influence of market orientation to organizational performance (Narver and Slater, 1994; Jaworski and Kohli, 1993). On the other hand, authors (Greenley, 1995; Diamantopoulos and Hart, 1993) have proved that there is weak association between market orientation and organizational performance. On a similar note, Gatignon and Xuereb (1997) also proved that only in conditions of uncertain market demands does market intelligence have a significant impact on product development.

Between these polarized views, Baker and Sinkula (1999) & Day (1994) have suggested that through product innovation and organizational learning, market orientation has an indirect effect on organizational performance. Moreover, this standpoint of market orientation influencing product development has been heavily criticized for stifling innovation (Bennett and Cooper, 1979; Christian and Bower, 1996). Tauber (1974) argues that market orientation will lead to creation of line extensions i.e. similar product lines and will act as a barrier for major innovations.

Prior studies on the relation between market orientations and organizational performance have focused only on external moderators such as market and technology conditions. They have not given enough importance to the internal moderators associated with the organization. For instance, inter-functional coordination affecting organization structures and is observed as a part of the organizational behavior literature (Thompson, 1967). On a similar note, studies involving innovation mostly focus on radical innovations or new product development and ignored product improvements such as line extensions. Also, prior research has relatively neglected product development strategy in terms of implementation of process, structures and control systems and the degree to which it affects innovation.

Link between Knowledge Management and Product development

Managing knowledge is essential to foster innovation and creativity in product development. Davenport and Prusak(1998), define knowledge as “a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information”. Product innovation can lead to a competitive advantage and success in business (Kluge, Stein & Licht, 2001; Zack, 1999). Development of products consists of very knowledge intensive process and managing knowledge is not very easy. Knowledge management can be described as an interdisciplinary area catering to knowledge creation, storage, transfer and use in the organizational context including the use of process and tools which leads to organizational learning. Therefore, knowledge management plays the crucial role of a catalyst in product innovation (Von Krogh, Nonaka & Aben, 2001).

Prior literature has focused on different classification on types of knowledge. Nonaka (1994) uses tacit vs. explicit knowledge as the different dimensions for knowledge creation process in the SECI model. Tacit knowledge is characterized as intangible, implicit and is not easily transferable while explicit knowledge is tangible and expressible. On the other hand, Spender (1996, 1998) differentiates knowledge as individual vs. collective and its interaction with explicit knowledge within organizations. While Blackler (1995) suggests different knowledge types as embrained, embodied, encultured, encoded, embedded that exist at individual and collective levels and dominate at different organization types. More recently, knowledge management literature has been explored in relation to new product development. While Authors Carlucci and Schiuma (2004) & Carmeli and Tishler (2004), emphasize the importance of knowledge assets as key performance drivers in relation to business performance. Other researchers have suggested that the key factors related to knowledge management practices and it's impact on product development performance (Chung, Tsai & Hsu, 2007; Nassim, 2009). Another stream of research with respect to product development has focused on tools and process and how they effect in practice (Nonaka & Takeuchi, 1995; Herder, Veeneman, Buitenhuis & Schaller, 2003; Jackson, 2001; Corso & Paolucci, 2001).

In line with the process approaches, knowledge creation is crucial for product development and has moved from the aspect of managing existing knowledge to creation of knowledge (Von Krogh, 2000). Authors Newell, Robertson, Scarbrough & Swan (2009) emphasize the

processual perspective for tacit knowledge since structural perspective is suited for explicit knowledge that is easily codified. In processual perspective, knowledge is not objectified and is considered more as a practice of doing. Within the software industry, a number of knowledge creation activities during the product design and development have evolved. Based on the software development methodologies used, these practice methods are employed. According to Wenger, McDermott, Snyder (2002), Community of Practice (CoP) is a method belonging to processual perspective where knowledge creation and collective understanding is formed. While O'Dell, Elliot & Hubert (2003), suggests storytelling in the form of anecdotes and scenarios help to achieve context and meaning in knowledge creation. Apart from CoP and storytelling, other practice methods include informal meetings, databases, knowledge maps, experience workshops and knowledge brokers (Hoegi and Schulze, 2005). Similarly, Sandberg and Targama (2007) explain the use of interpretative approaches consisting of action driven methods based on experience, problem and practice and language driven methods such as workshops and training for development of knowledge. While some of these methods are well known and highly deployed within product development, others are relatively unknown and the satisfaction levels remain varied (Hoegi and Schulze, 2005). Moreover, the use of these methods depends on the type of knowledge. However, some of these methods are criticized for being ambiguous in nature and not effective and as being mere theoretical approaches. However, there are several gaps in knowledge management practices for implementing customer orientation as a part of design and development of products that this study will address. In this study we would like to examine the current practice methods and their effect in creating knowledge with respect to customer perceptions in product development. Moreover, it is necessary to manage knowledge as the basis for adapting customer orientation in product development.

Enabling and managing knowledge creation within product development is a challenging task. In this the role of a manager in influencing the understanding of the development team requires detailed examination. Authors Sandberg and Targama (2007), explain the paradigm shift of management from rationalistic perspective to an interpretative perspective. These perspectives describe the approaches on managerial influence of employee's understanding of work in organizations as this reflects on work performance. The rationalistic perspective is criticized for being rigid and inflexible since it is based on rules and instructions due to the dominant bureaucratic nature of organizations. Sandberg and Targama (2007) emphasize that understanding of work has an impact on employee actions while rules and instructions fail to influence their work. A critical stand by Alvesson (2004) is on whether knowledge can be managed, as most theories on knowledge management do not connect to theories on management in a concrete manner. Moreover, Alvesson (2004) further questions about whether managerial role being limited to administrative tasks such as policy creation, enforcement and resource allocation could be considered as knowledge management. The concept of knowledge is objectified and treated as information so that it could be managed which is not the case in reality. Nevertheless, managers can help to influence collective tacit knowledge through experiential learning process such as customer interaction (Leonard and Sensiper, 1998). In community approaches involving social relations the role of a manager is limited to being "catalysts" by facilitating the physical environment, providing guidelines,

and participant selection (Nonaka, 1994). With the manager assuming an ambiguous role in knowledge intensive work, Rennstam (2008) observes that horizontal control by methods of “peer reviewing” for managing complex work. Peer reviewing is defined as an internal activity that occurs within community of practice, where members examine and assess the work of another member. In “peership”, the notion of vertical control i.e. managerial authority is not absent but rather assumes an interactive relationship (Rennstam, 2008). An alternative form of authority suitable for managing engineering work is produced by practice of peer reviewing.

Synthesis

It is clear from the previous discussion that there is a close link between product development, customer orientation and knowledge management. Consistent with the approach that product development has a strategic role for organizational performance and adaptation of customer orientation will lead to product advantages is considered in this study. However, prior research in both streams of literature have failed to capture the need to negotiate the balance between the different logics of customer orientation and engineering orientation within the context of product development. There is a need for translations between these two logics and also for them to intermingle to create successful products. As a result, a new perspective is required to understand and examine this phenomenon of translations and negotiations in product development. Hence, an Actor-Network Theory (ANT) perspective is used as an analytical lens to observe and study this phenomenon (Latour, 2005). Bringing in ANT as a theoretical framework will help to analyze and theorize the concept of translations between customer orientation and engineering orientation within product development.

A holistic understanding is needed to analyze these integrative themes and to understand organizations as a network and the relationships and hence an open network approach such as ANT is well suited. Also, since the nature of research is based on empirical studies and is exploratory the theoretical approach based on the Actor Network theory will be the most relevant (Latour, 2005). What’s more, the Actor-network Theory (ANT) fuses what is human and nonhuman into the same structure and results in conformity between agencies. This framework will provide a systematic way to consider the infrastructure surrounding technological achievements. The ANT perspective can potentially prescribe agency to objects that is otherwise uncertain at this time.

1.5 Research Purpose

The purpose of this study is to further advance theory on management of product development by providing insights on customer orientations. This study will contribute to the literature by bringing in ANT as a new perspective to theorize the process of translations between customer orientation and engineering orientation within product development.

Moreover, as a consequence of examining using ANT, we hope to contribute theoretical concepts from the analysis.

The research study can help practitioners gain understanding on managing customer orientation in product development. First, PM's would gain insight into how they could influence knowledge creation in workflow process during product development. In the discussion, we will determine effective methods to implement in order to appropriately incorporate customer perceptions in product development practices thus presenting a framework on how PM's can better manage the product life cycle. Finally, this will help them understand the impact that leadership and communication has on development teams.

2 Methodology

This chapter describes the methodological approach that was employed for our research study. It further highlights the methods that were used to assess and undertake our data collection. Additionally, this section illustrates the importance of reflexivity and trustworthiness in the data collection process.

2.1 Research Philosophy

Our research method is based on the ontological and epistemological approaches, where the former is concerned with the nature of reality and takes more of a subjective stand and the latter endeavors to explore how reality is captured or known. Our research paper intends to understand how managing knowledge within product development can help facilitate understanding of the customer orientation process and therefore a constructionist ontological approach is appropriate. As people construct their own understanding and knowledge of the world through experience, the constructivist perspective will shed light on knowledge workers and their natural work environment and how knowledge emerges (Guizzardi, 2006). From a constructionist ontological perspective, we can gain the understanding from an insider's perspective to explore and better understand how to adapt products to the market and hence increase general understanding of the circumstances surrounding this topic. This perspective will help us understand how customer orientation is incorporated within knowledge management in product development. By understanding the constructions and meanings that different PM's place on their experiences (Easterby-Smith, Thorpe & Lowe, 2008), we aim to make sense of the role knowledge management plays with respect to customer orientation.

Likewise, to increase our understanding of knowledge management in the product development phase, with an explorative research question, an interpretive method will help us understand the context of product life cycle management and the process in which customer orientation is influenced by this context. Epistemology is concerned with how knowledge can be acquired, created, and communicated (Scotland, 2012), accordingly with the interpretive methods approach, knowledge of a reality is acquired through social construction such as language, documents, tools, and shared meanings. With this approach there is no objective reality that can be discovered by researchers (Walsham, 1993), rather we hope to gain insight and understand this sense making process. We aim to draw significance to the role of the PM and their experience of identifying the content of tacit knowledge and how they further make use of it while interfacing with the marketing and engineering teams. Essentially, the

interpretative epistemological view will enable us to understand the sense making process from PM's perspective and hence interpret their experiences.

2.2 Research Approach

In order to examine perceptions and constructions of knowledge management by product managers an interpretive paradigm using a qualitative research method will be employed. There are two main research methods, qualitative and quantitative. It is commonly understood that the main difference is that the qualitative method is generally more concerned with words, the point of view of the participant, gaining contextual understanding and meaning; and the quantitative method is more concerned with numbers, the point of view of the researcher, generalizations and behaviours (Greener, 2008, p.80). Through the qualitative approach different interpretations could be understood, hence why this approach is most appropriate. The quantitative research method is more grounded in theory testing; the qualitative method is more theory emergent (Greener, 2008, p.80).

To understand the tension between product development and customer orientation, we need to gain insight into product development processes. On this account, an abductive approach, as a process of reasoning will be applied whereby technical concepts and theories are established from lay concepts and interpretations of social life (Ong, 2012, p. 422). Because of the explorative nature of our research question, an abductive approach is preferred since it coincides with our aim to investigate how existing practices in product development and customer orientation are exercised. "Attention is given to the meanings and interpretations, the motives and intentions, which people use in their daily lives; people use largely tacit, mutual knowledge, symbolic meanings, motives and rules – which is here assumed as providing direction to their actions" (Ong, 2012, p. 423); particularly how it relates to customer orientation. Where, a deductive approach first looks at theories and hypothesizes or identifies propositions, which researchers either approve or disprove an abductive approach "intends to describe and understand motives and accounts to develop an interpretation or construct and develop a theory" (Ong, 2012, p. 424). Thus, an abductive approach is a better fit. This approach is in line with our objective to make sense of the existing challenges developers face when adapting products for end users.

In order to ensure quality in our research study it is important that we be reflexive in our approach. Reflexivity essentially requires the researcher to self reflect in order to prompt awareness about actions, feelings and perceptions (Anderson 2008; Hughes 2014). Ultimately, the researcher, as the co-creator of knowledge, is examining their relationship with the subject. This process is continuous and comprehensive and can be used not only during the reporting and analysis stage, but also when designing the research study, collecting and analysing data and finally making the findings public (Gilgun, 2006). As such, we have been cognizant of this practice and have carried it out throughout our research. During our research study we have remained reflexive by observing three techniques stipulated by Finlay

(2002). One such technique is mutual collaboration. With this method we engage in reflexive dialogue during analysis and evaluation using participant interpretation to confront our own interpretations, and hence our own unconscious biases (Finley, 2002). Additionally we have incorporated discursive deconstruction where ambiguity of meanings in language is considered and how this impacts presentation (Finley, 2002). For example, language can have multiple meanings; it is thus important to acknowledge the nuances in speech. We endeavour to highlight an account of such, if it arises, during our analysis. Lastly, we implore reflexivity as introspection where Finley (2002) goes on to say “researchers use introspection not as an end in itself but as a springboard for interpretations and more general insight”.

2.3 Data Collection Method

Many advocates would agree that interviews are beneficial in providing a rich account of a participant’s experience, ideas, impressions and knowledge (Bryman 1998; Fontana and Frey, 1994; Holstein & Gubrium, 1997), hence our chosen data collection method to conduct interviews. This method essentially enables the subject to convey to the researcher their experiences from their perspective and in their own words (Kvale, 2007). Additionally, in line with language-focused scholars, language “constructs rather than mirrors phenomena”, likewise discourse is fundamental in this respect (Alvesson, 2011). As such, interviews aim to provide ‘rich accounts’ of research topics (Alvesson, 2011). Furthermore, recording and transcribing the interview rectifies natural limitations in our memory; allows more thorough and repeated examination of the interview; opens data for public scrutiny and allows for secondary analysis; also, data can be reused in other ways than originally intended, for example transferability (Bryman and Bell, 2011). Additionally, qualitative interviewing entails the reconstruction of events referred to as retrospective interviewing, which enables a greater breadth of coverage (Bryman and Bell, 2011). Lastly, notwithstanding the benefits of ethnographic research, qualitative interviewing is advantageous, in comparison, as further insight is gained only by asking people about the issues (Bryman and Bell, 2011).

Jorgenson (1991) recommended going beyond traditional approaches to interviews; in particular, getting a sense of people’s relational selves as it pertains to the research topic (Alvesson, 2011). This is on account of moving away from what experts decide is the ‘objective properties’ but more “to the meanings and views of the subjects to be understood” (Alvesson, 2011). As such, we have asked our participants “to explain their roles and day-to-day activities”, hence further giving significance to various subject matters discussed in the analysis.

Although there are many benefits to interviewing, there are also shortcomings that merit attention. For example, an interviewer can never fully share an understanding of the phenomenon under investigation; therefore, an interviewer can only come to a partial understanding of viewpoints (Bryman and Bell, 2011). This is partly due to the complex nature of a given perspective and also one cannot fully grasp the experience of another person

(Bryman and Bell, 2011). Hence, it is noteworthy to mention our interpretive approach and accordingly our ‘interpretive understanding of social action’ (Bryman and Bell, 2011).

A semi-structured interview leaves room to investigate perceptions and constructions of “reality” by actors in organizations (Greener, 2008, p. 35). We therefore apply this qualitative technique for our investigation. This semi-structured approach in particular enables us, when necessary, to divert questions to more engaging topics that appeal to the subject matter. During this process we enquired about specific procedures and practices examining actions rather than opinions. The interview process was completed in a single stage, such that a set of fixed questions were prepared and asked to the participants first, where we probed along the way and left room for open discussions throughout. In qualitative interviews, accuracy in description and stringency in meaning interpretation corresponds to precision in quantitative measurements (Kvale, 2007). The data collection process was almost two weeks in length with interviews as our main method of qualitative data collection. The researchers conducted interviews both face-to-face and electronically via Skype, electronically primarily because of geographic constraints. Thereafter, each interview was discussed after completion so as to review the interviews as well as to refine the questions to more appropriately probe. The complete interviews varied from 30 to 60 minutes.

In order to ensure a balanced comparison, the same interview guide was prepared for all interviews (Reference Appendix A for interview guideline). The subsequent questions are related to relevant themes surrounding product development as it relates to customer orientation. Care was taken to lead the participants to various themes, but not specific opinions about the topics (Kvale, 2007). Likewise, both researchers took part in the interview process, with one person mainly asking questions and the other taking notes. As specificity is a principal mode of understanding a semi-structured interview, taking notes enabled us to formulate implicit messages and ‘send it back’ to be corroborated or refuted (Kvale, 2007); consequently ensuring a reflexive approach. This approach also enabled us to take detailed notes. Correspondingly, a qualitative research interview tries to understand facts as well as meaning (Kvale, 2007).

Due to the short duration of the research project, interviews were conducted with members from product management teams only. As such, primary data was collected from this group. In order to give a broader perspective on the tensions that exist between product development and customer orientation, it would be beneficial to interview members from the respective engineering departments of the companies that participated. The study centered only on the product management team due to the complex nature of the research topic and also due to time constraints.

2.4 Data Analysis

The text was analysed based on the hermeneutics approach where “the meaning of a part can only be understood if it is related to the whole” (Alvesson & Skoldberg, 2000, p. 53). As such, and relative to our interpretive approach of sense making, emphasis is placed on text as well as our investigation and exploration of literature concerning our research topic. The fundamental premise is that meaning cannot be derived from one interview alone but rather all interviews as a whole. Traditionally hermeneutics is rooted in understanding as opposed to being explanation oriented or scientifically theorizing (Alvesson & Skoldberg, 2000, p. 53). Thus Heidegger (1982) understood this process of examining text as engaging in disclosure, not theorizing. We therefore look to uncover explanations and understanding of the interviews – ultimately deeper meaning. It is important that text is placed into context, in order to understand it (Alvesson & Skoldberg, 2000, p. 54). Therefore, first all interviews were summarized before the analysis was approached. This synthesis process is further linked to a process of empathy: understanding by living the situation through the actor (Alvesson & Skoldberg, 2000, p. 54). This process establishes a deeper connection and more accurate depiction where the researcher, armed with broader knowledge of the subject matter, can “understand the agents better than the agents understand themselves” (Alvesson & Skoldberg, 2000, p. 54).

Moreover, in interpreting social action, it is understood that meaning of actions is not fixed to the agents who participate and perform responsibilities, but rather action is placed into a wider context of social structures and institutions (Butler, 1998, p.292). Hence, the role actor-network theory plays; what is non-human is subscribed an equal amount of agency, i.e. document management systems. Following our first stage of analysis, we used a common technique in hermeneutic analysis, where we further examined text for similarities and repetition and ultimately common themes. Lastly, the hermeneutics process of analysis is complemented by our abductive approach of reasoning. The former aims to construct textual descriptions where as the latter accounts for observations attempting to explain.

2.5 Sampling

Our research question aims to understand the process of incorporating customer perceptions in product development. Understanding this element of customer orientation requires us to target a specific group of individuals, particularly those that belonged to the product development team. Thus, a purposive sampling strategy was employed for this study. This method essentially targets a specific group of individuals who have expertise in our research topic. This method of non-probability sampling is utilized, as it is not possible to state the probability of any member of society being sampled (Easterby-Smith, Thorpe, Jackson, 2008). Our participants were selected through contacts we had in the software industry. By

contacting different friends, we were able to get in touch with participants from several companies in different regions. The table below highlights the particulars of our participants: name, company/location, job title, and the number of years as a PM. Our informed consent assured participants of their anonymity.

We took resources into consideration when choosing our sample size. Mason (2012) suggests that having a smaller sample size of interviews that are creatively and interpretively analyzed is better than running out of time and failing to analyze content properly. As such, a total of eight (8) candidates were interviewed, considering that this number will suffice to generate insight on experiences and involvement on said topic; ultimately shedding light on our research question. In trying to understand how PM's manage the challenging relationship between product development and customer orientation, interviews as a primary method of data collection is important.

Table 2.1 Primary Data Of Interview Participants

TITLE	Company Type/Region	Experience PM (years)	Interview	Date (2015)	Duration (minutes)
Vice President	Incubation Center - India	12	Skype	27th April	50
Product Manager	Consumer Electronics - Sweden	5	Face to Face	28th April	30
Customer Experience Manager	Digital Healthcare - Sweden	5	Face to Face	29th April	30
Product Specialist	Enterprise Solutions- Sweden	5	Face to Face	29th April	55
Product Manager	Semiconductor - Ireland	5	Skype	29th April	30
Senior Director	Semiconductor - USA	20	Skype	30th April	30
Product Manager	Ecommerce - India	5	Skype	1st May	50
Product Manager	Data Analytics - USA	5	Skype	6th May	40

2.6 Trustworthiness

In order to ensure we are in fact receiving the information we are seeking, obtaining trust during the interview stage is important (Easterby-Smith, Thorpe, Jackson, 2008). Not developing trust may result in the participant sharing information that they think we want to hear (Easterby-Smith, Thorpe, Jackso, 2008). For one, having a mutual friend with the participants meant trust was formed from the outset. Additionally, developing rapport by familiarizing ourselves with the individual companies to enrich our conversation during interviews. Some companies have websites, so this was one method we used to become a little more acquainted with the companies before interviewing the participants who worked for them. In order to add further credibility to our research study, with the permission of our participants, interviews were recorded. Recording aids the listening process and gives an unbiased record of the conversation (Easterby-Smith, Thorpe, Jackson, 2008). Additionally, re-listening and transcribing the interviews provided us the opportunity to hear things we may have missed during the actual interview process. Similarly, we used four quality criteria standards for our qualitative research study - credibility, transferability, dependability, and conformability (Frambach & van der Vleuten, 2013). Credibility reflects the extent to which the study is trustworthy (Frambach and van der Vleuten, 2013). By having more than one researcher involved in this study, we are aware and mindful of the practice of investigator triangulation. Additionally, with almost 70 pages of transcribed interviews, it adds richness to the empirical material as well as further credibility is added to our research material.

Generalizability of the findings may not hold good since the qualitative study has been conducted on a smaller group of product management professionals. Transferability, attempts to apply a principle of 'applicability of evidence' (Frambach and van der Vleuten, 2013). However, the results of the study could be transferable to contexts having similar conditions. For instance, product management in other computer related fields such as hardware, data processing and science and engineering fields such as automotive and pharmaceutical industries. In this respect, as per Frambach et al (2013), we intend to discuss our findings as it resonates with existing literature. Additionally, we intend to make our findings meaningful by describing it and the context in as much detail, as per concept of thick description (Frambach and van der Vleuten, 2013).

With confirmability, we engaged in peer-debriefing to discuss the research process (Frambach and van der Vleuten, 2013). Additionally, we documented the motives behind our research decisions, and endeavor to review data and literature for evidence that may disconfirm our findings (Frambach and van der Vleuten, 2013). This will ensure the evidence is at best, unbiased and objective. Lastly, dependability will ensure consistency of evidence (Frambach and van der Vleuten, 2013). Consequently, we endeavor to be flexible and open towards the analysis as per the emergent research design method.

2.7 Limitations

One limitation of the study is regarding the target group of the interview. The target group involved managers and specialists within the product management team. However, it could have been fruitful to gain perspectives from other teams such as sales and engineering within the organizations to understand the interactions between them. However, limitation on time could not permit us to conduct interviews on other teams. Another limitation is the number of interviews conducted. The study involved eight interviews in total. However, additional interviews with a larger number would have contributed to the study by providing further details. In addition to interviews, a micro-ethnographic study based on observations could have helped us gain further insights of product management and contributed more specifically to the empirical analysis.

3 Theoretical Review Framework

This chapter highlights the Actor-Network Theory as it creates an opportunity to view the intricate nature of handling customer orientation and production of engineering work in software industry from a different perspective compared to existing literature. The role translation plays is further discussed with respect to product management process.

3.1 Actor-Network Theory

Latour, Callon and Law were the primary theorists of Actor-Network Theory (ANT) approach with roots in French philosophy and sociology. ANT evolved in the early 1980's as an approach to study social phenomenon primarily for science and technology studies and later has moved to vast variety of disciplines such as law, environment, geography and accounting.

According to Latour (2005), ANT is a “theory of the space or fluids circulating in a non-modern situation”. The ANT approach is described as a complex and sophisticated method with a flavor of realism and differed from traditional theories that contain structuralist perspectives that are simple and forthright. While traditional sociological theories concentrate on explaining why some things happen, ANT on the other hand ignores any existing constructed knowledge and follows the actors without framing to explain why some things fail to happen.

3.1.1 Basic Concepts Of Actor-Network Theory

ANT theory is used to analyze heterogeneous networks of actor-networks that consist of humans and nonhuman actors. The principle of symmetry applies as non-human actors are recognized to contribute to social actors and social relationships (Latour, 2005). The basic elements of ANT theory consist of networks and actors, where a network refers to all the interactions between devices, inscriptions and forms into a local and practical position (Law and Hassard, 1999). The concept of actor is broadly defined as “an element which bends space around itself, makes other elements dependent upon and translates their will into the language of its own” (Callon & Latour, 1981). An actor could be a point as well as a network by itself. A network is a set of connections between actors and the interactions between them.

The association between human and nonhuman actors builds up networks. Example of actors include human, group of humans, technology and artifacts. The focal actor is a main actor who aligns together the interests of all actors and enrolls them for participation in the network. In case of multiple actors as in the case of organization, the focal actor is chosen based on the perspective from which the translation process is analyzed.

Translation is a significant process in the creation of Actor-Networks and bridges the gap between the different entities and elements of the network with mediation and negotiation required for action. The concept of translation is defined as “all the negotiations, acts of persuasion and violence thanks to which an actor or force takes and the authority to speak or act on behalf of another actor or force” (Callon and Latour, 1981). It describes the movement from one order to the other by aligning the interests of the actors in the network.

There are four phases in the translation process and that all translation processes may not pass through all these phases and may fail at any of these four intermediate phases (Callon, 1986).

Problematization - In the problematization phase, the focal actor defines the problem and the other actors who share the same problem are recognized. According to Callon (1986), Obligatory passage point (OPP) is a single node through which the focal actor and the other actors need to pass that signifies pursuing the shared interests towards the identified problem.

Interessement - The next phase of translation process is interessement in which the focal actor reconfirms that the interests identified for the other actors is consonant with the other actor's own interests. The focal actor aligns the interests of the other actors through negotiations and secures the identity of actors in this phase.

Enrollment - In the enrollment phase, the focal actor defines the role of the actors in relation to the network so that alignment of shared interests exists. Inscriptions are documentation of the agreement in the form of text.

Mobilization - In the final phase of translation, the focal actor needs to ensure that the other actors act in agreement with the alignments to ensure the completion of the translation process. The focal actor has a set of methods to ensure that actors enrolled do not fall out of the agreement. Stabilization of Actor-Network is achieved when mobilization stage is achieved.

3.2 Product Management Practices With Perspectives From Actor-Network Theory

ANT as theoretical approach creates an opportunity to view the intricate nature of handling customer orientation and production of engineering work in software industry from a different perspective compared to previous research. The intermingle between the different logics of customer oriented and engineering approach is related as a process of translation and to the creation of inscriptions as a part of the formation of actor-network. The successful completion of the translation process is seen as creation of actor-network within the trajectory taken by the product management process.

By applying a theoretical lens of ANT theory, product management process in software industry as an established actor-network is examined. This analysis will include certain aspects of ANT theory that have been used to explain the way product management organization handles the negotiation between the customer oriented approach and engineering oriented approach during product development. Also, observation of how customer orientation is incorporated within development work is seen as a process of translation, which aims at achieving Actor-Network stabilization. Moreover, within product management the role of artifacts contributes to the coupling of the actor's interests' aids the creation of Actor-Network is examined (Latour, 1996). The role of inscriptions in influencing the social settings within the product management process is also established.

A key to establishing the product management actor-network is addressing the role of actors within the network (Latour, 2005). The main focal actor being the PM whose role could vary from either being more associated with product marketing specialist to a technically focused project manager. This broad scope of variation in a PM role is dependent on the factors such as the company size, technology, product stage and the business model in terms of customers being other businesses or end consumers (Maglyas, Nikula & Smolander, 2013). The other actors such as the sales team, marketing team and customers are considered as a black box. According to ANT, in complicated actor-networks, an element that contains other elements is considered as a black box to simplify relationships so that its internal operations are concealed (Latour, 1987). In addition, the development team consisting of engineering managers, developers and testers are considered as a network in a wider perspective.

The role of product manager spans from product conception stage to development and is then followed by the life cycle management stage (Ebert, 2014). These stages are defined as product strategy, product planning and product development (Figure 3.1). Depending on the stage, the PM's activities vary. The current approach followed in product management includes the phase where in the PM gains customer insights indirectly through the sales organization or through market research and competitor analysis approach through the marketing organization or with direct customer interaction (Barney, Aurum & Wohlin, 2008). These result in inscriptions in the form of text such as the marketing requirements document

which define the market needs and the product requirements document which define the product. This requires the PM to have an influencing and negotiating role across the different stakeholders in the organization. A more detailed engineering requirements document is produced by the product management team after all stakeholders approve (Barney, Aurum & Wohlin, 2008).

ISPMA Software Product Management Reference Framework						Version 1.1	
Strategic Management	Product Strategy	Product Planning	Development	Marketing	Sales and Distribution	Service and Support	
Corporate Strategy	Positioning and Product Definition	Product Life-Cycle Management	Engineering Management	Marketing Planning	Sales Planning	Service Planning and Preparation	
Portfolio management	Delivery model and Service Strategy	Roadmapping	Project Management	Customer Analysis	Channel Preparation	Service Provisioning	
Innovation Management	Sourcing	Release Planning	Project Requirements Engineering	Opportunity Management	Customer Relationship Management	Technical Support	
Resource Management	Business Case and Costing	Product Requirements Engineering	Quality Management	Marketing Mix Optimization	Operational Sales	Marketing Support	
Market Analysis	Pricing			Product Launches	Operational Distribution	Sales Support	
Product Analysis	Ecosystem Management			Operational Marketing			
	Legal and IPR Management						
	Performance and Risk Management						
Participation	Core SPM		Orchestration				

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Figure 3.1 The Software Product Management Framework (Ebert & Brinkkemper, 2014)

This is followed by the development stage (Figure 3.1) wherein the engineering team works on product design, development and test. The inscriptions such as the engineering requirements documentation, target user descriptions are conveyed in the form of presentations and other forms of text. With agile methodologies being adopted across many companies within the software industry, the role of a PM is technically oriented with active participation during development team meetings (Vlaanderen, Jansen, Brinkkemper & Jaspers, 2011). Other artifacts such as collaboration tools and technology systems are used to

aid development teams. In the product life cycle management stage, the role of a PM consists of reviewing product performance and integrates customer feedback in terms of product enhancements and extensions.

3.3 Final Considerations

It can be concluded that the PM has a significant cross-functional role in the organization. The PM should be an influencing authority in the process and needs to mediate and negotiate between the different actors. As a consequence, the success of the translation process depends on the degree of alignment between the various actors and their engagement to the network (Callon, 1991). Also, the strength of coordination between the actors in terms of adhering to rules in the interaction has an effect on the stabilization of the network (Callon, 1991). The explanatory approach above has been a textual representation of the product management interactions and has not covered a diagrammatic representation. However, based on our findings a conceptual analysis will be provided in our conclusion. The explanation has covered only the product development trajectory within the contextual information due to the complexity of the network and could not include the wider scope ranging from the product strategy, sales and product marketing areas.

4 Analysis

This chapter will present the empirical findings of our research in effort to answer our research question on “how product managers negotiate tensions between customer orientation and engineering orientation in product development”. Our research analysis endeavors to understand the meanings and significance of a product manager's work processes and practices. By understanding the entire phenomenon associated with the work of all participants we are able to identify trends and themes often associated with their responsibilities; namely, a responsibility to oversee a product from inception to the phase-out stage. We apply Actor-Network Theory as a framework to guide our investigation.

The empirical data was analyzed with an ANT perspective to explore the different kinds of tensions that arise and the strategies that are undertaken to negotiate these tensions at an operational level. The process of translation serves as a guiding thread to examine the various themes that have revealed themselves throughout our research study. In order to give a richer account, and hence a voice to our participants a hermeneutic approach of textual analysis will be applied. This will provide a more intimate account of work processes and thus a deeper understanding of product management strategies. Below we provide a categorization of our research findings based on the process of translation.

- Product Manager as Mediator
- Cross-Functional Management
- Channels of Communication
- Knowledge Dissemination
- Knowledge Visualization

4.1 Product Manager as Mediator

When a PM has to fuse customer-centric logic in product development work that is purely dominated by an engineering oriented approach, he has to manage the tensions that arise during this task. The PM employs different strategies as a coping mechanism to confront challenges inherent in the product management process. By convincing and influencing stakeholders the PM is able to productively manage the pressures that emerge from product management practices.

According to Ebert (2007), the PM is responsible for the business case and ensures product developed create value to the customer and company. Ebert (2007) further stresses on the need to balance the product strategy based on the needs from markets and customers. Across all phases of product management framework, the product management team has a central role and requires getting the different departments within the organizations to work together. Our empirical findings exhibit that this involves collaborating with multiple stakeholders internal and external to the organization at different stages of the development process. Most of the participants we interviewed stated that one of the biggest challenges they faced were getting acceptance from the different stakeholders during product strategy.

According to one of our participants,

As a PM my primary responsibility would be to define the right problem set for the customer and second thing would be, is this problem worth solving from the company's perspective. Next thing to consider is whether it is worth to solve that problem in terms of how big is the opportunity and can I solve that problem profitably and can I solve it in a better way than my competitors. In case of deliverables I would need to have a business case, gain stakeholders approval before doing the requirements for the product. That's the first milestone.

The above quote illustrate the negotiations that the PM undergoes in the product strategy phase. The PM is responsible for a business case in terms of defining a product with a strong market and build confidence with internal stakeholders on the proposition of building the product. It is the PM who has to convince the stakeholders of the business case and the product idea and get them to agree on the future course of actions. In order to achieve this the PM's role will involve influencing and balancing the expectations of conflicting stakeholders. An important dimension to accept a business case would be associated with the value it creates to the business. Therefore, the PM has to argue and have relevant support material in terms of market research and customer interests to tackle internal bureaucracy and stakeholder approval for business case acceptance. The importance of a PM possessing negotiation skills in order to integrate the different departments to work together is supported by Ebert (2007).

Negotiation skills are further demonstrated during the release planning phase when reconciling tensions that arise in the product planning stage. Release planning is defined as the process of making products market-ready in incremental phases (Van de Hoek, Hall, Heimbigner & Wolf, 2006). This stage includes two distinct phases: requirements prioritization phase followed by a second phase generally referred to as the release planning.

The requirements prioritization phase is the first stage of the release-planning phase where the PM is responsible for selecting the prioritized requirements that will go in the different releases. Requirements engineering is a primary task of a PM during the product planning phase and it is key to map the customer needs into product features (Carshamer & Regnell, 2000). Many times prioritization of requirements are not done in a systematic manner and also does not give priority to critical stakeholders (Gorschek, Fricker, Palm & Kunsman, 2010). Therefore it is observed that the PM has to prioritize multiple requirements based on

business value and customer priorities. Also mastering stakeholder needs in requirements engineering is important so that continuous change to requirements do not occur. For instance, it could have a negative impact due to a lack of vision and result in insufficient management of product requirements.

According to one PM,

Apart from negotiation with management and stakeholders, the PM has the need to react to customer needs. Customers know what they want, not what they need! Different customers with different requirements will lead to product road map being pulled in all directions. The PM should know how to say 'no' to marketing and sales and have right arrangement to fight for his causes.

Due to multiple requirements from different customers, the PM is under pressure from the sales team and customers to incorporate the product features that they demand. The PM has to prioritize the requirements of the customers with an existing product roadmap and development schedule and get the agreement of the internal stakeholders. However, the complexity in the interactions and the interdependencies that follows makes it difficult to balance the expectations of various stakeholders. The various stakeholders being customers, sales and engineering teams. It is evident that the PM has to align the needs of the product with business and project needs and also take into consideration the perspectives of different stakeholders in the planning stages. Authors Barney, Aurum & Wohlin (2008) suggests that this alignment is critical to generate value creating successful products.

The second phase is where a set of prioritized requirements are selected to be implemented in the incremental product releases (Van de Hoek, Hall, Heimbigner & Wolf, 2006). According to Carlshamre (2002), release planning is crucial for product success since requirements engineering meets market perspective at this stage.

According to a PM (Blake),

There is always tension as sales team wants more products and more features than the engineering team is able to deliver. Engineering team is always under pressure to develop more and more. PM is a mediation role that helps to optimize the products and features so that we can get the most on the return of investment in engineering. If you are doing the job well, then you are a tension point between both organizations and you are making engineering work hard while you also make more sales and this is when release planning is based on business value.

In this phase, the PM has to identify critical stakeholders and negotiate conflicts in order for the right set of products features to be selected for release. This illustrates the conflict arising between the sales and engineering team, where the sales team has to meet customer demands and in turn pushes for more product features from the development team. This can sometimes serve as a source of friction due to competing requirements. The PM is therefore compelled to resolve customer requests that the sales team requires that may conflict with development

schedule of the engineering teams. However accommodating all requests is impossible as it will impact the schedule of the engineering teams and may result in product delays. Apart from mediating the conflict the PM has to ensure that the right set of products features are selected for the various releases. Moreover, the PM has to monitor the progress of the engineering team during the development stage so that delays are avoided and product launches are right on time to market.

It can be understood that the role of a PM is a complex one, where one needs to negotiate, influence and balance the conflicting demands of the different stakeholders at different phases of the product lifecycles. Apart from solely focusing just on product planning, these negotiations are a part of the process in steering the different parts of the organization towards customer oriented product development. Mastering stakeholder needs and having accountability towards business objectives has a positive impact on product development (Ebert,2014).

4.2 Cross-Functional Management

When using the translation process of ANT to examine the downstream flow of product management processes the first stage involves capturing requirements followed by communicating these requirements to the internal teams such as engineering, sales and marketing. This translation process is examined in detail to identify areas that will enhance the level of customer orientation. During this stage, the significant role of collaboration and cross-functional management play is emphasized.

According to Hutchings & Knox (1995), in order to move from product development that is more technology-centric to one that is more customer-centric, understanding market and user needs is the first step in capturing customer requirements. While there are different ways of gathering information such as through market research, competitor analysis, or customer engagement, the sense of contextualization for the problem should be maintained at all phases to succeed in customer centric development (Hutchings & Knox, 1995).

One PM makes reference to direct customer engagement:

Customer requirements are gathered directly from customer and then translated to product design. Customers are asked to describe their problems and that is fitted as product features.

While another PM described indirect customer engagement to capture customer requirements as:

Interviewing sales team and where possible accompanying them on customer visits when products are reviewed and see what their problems are so that I can gain the insight

Majority of the respondents confirmed that a market driven approach consisting of direct customer engagements and indirect feedback of customers through sales were considered for capturing customer insights in the product strategy and planning phases. It is very important that requirements are captured with a context of the customer. By contextualized requirements the product manager understands the market, the customer and the reason behind designing the product. Furthermore, this will involve deeper understanding of the customer's problem, the product usability and the solution should be taken into consideration. This is key to the translation process since requirements that are captured out of context will be vague and misleading. Moreover, this could result in wrong interpretations and lead to consistent change in requirements and lead to products delays.

Many of the respondents stressed on the need to have collaboration and transparency across the various internal teams as a strategy to incorporate customer orientation.

One PM expressed the importance between various internal teams:

The most important aspect of managing a product is to almost be the customer for the product, so as a product manager you're representing the market and the customer to the internal teams and the organizations. I try to create direct transparency between engineering and sales team. Also, make internal teams understand the market clearly. Marketing and Sales team need to have good working relationship with the engineering team.

The above quote signifies the mediating role of the PM in aligning the various internal stakeholders. Transparency between teams will ensure alignment in the roles and allow for accountability. Ebert (2007) describes accountability as meeting the work output in terms of content, quality and schedule. In this scenario, accountability for content is considered as customer centric product development. In order to have accountability and alignment among the internal teams, key delegates representing the different teams could help to achieve accountability by ensuring that customer centric focus is executed. There will be numerous advantages with a core product team involving people from different departments. First, they will bring about different perspectives and help to analyze the customer information and translate them to consistent requirements documents (Hutchings & Knox, 1995). With cross-functional management, these documents that are created can be framed without ambiguity and hence can lead to positive impact in product development. Next, the cross-functional management will help synchronize the activities and be responsible for creating customer contextualized work process.

It is clear that a strong customer-centric focus is required to transport the customer value in the different stages of product management. Consequently, it can be understood that emphasis on cross-functional teamwork would facilitate and expedite product development and improve product quality. What is essentially central in cross-functional management is how to best capture information; hence focusing on the customer becomes paramount to understanding the market. The question is then how does a PM turn this information into a solution. By having a systematic approach where collaboration is fostered a more efficient negotiation process is possible. This further leads to varying channels of communication and the role of artifact to further translation customer perceptions.

4.3 Channels Of Communication

By examining the process of translation for customer orientation using ANT, artifacts in the form of inscriptions i.e. documentation plays a critical act for communicating the requirements across the different internal stakeholders of the organization. The role that artifacts play when it involves knowledge dissemination and creation through virtual knowledge networks is reinforced. It therefore remains essential to evaluate knowledge as “embedded into an artifact, and data” (Grundstein & Rosenthal-Sabroux, 2007) where non-human actors “influence the circulation of knowledge creation”.

In most of the respondent’s opinions, following the problem definition stage, artifacts are utilized to aid in the process of translation; namely documentation. According to Ebert (2014), the documents for requirements, business case and product roadmaps serve as primary tools for the PM to manage people in organizations. The role of documents facilitates transparency and allows for business and technical judgment (Ebert, 2014).

According to one PM:

Understanding the customer at deep & first hand level is required. In terms of ‘who is the customer?’ How is he going to use it? What is his problem? How does the PM want it solved? These are captured in the marketing requirements document and are transformed to product requirements specifications and functional specifications. The product manager should not get into programming and technical level details in these specifications.

These specifications help the PM to disseminate information to different stakeholders. Inscriptions plays a significant role in the PM’s work as it is used from capturing market requirements to defining the product and its features and later for requirements engineering and release planning. The information conveyed in the documents depends on the intended audience. For instance, functional specification is the document intended for the engineering team and in the above quote the information conveyed here is at an abstract functional level

and will not involve the design details. It is observed that the role of inscriptions is very important and very crucial in communicating the customer requirements within product development. From the quote we can draw the PMs reluctance to dictate the specifics involved in the development process. By communicating the customer's usability of the product the PM is drawing inspiration from the engineering team. Thus using artifacts to articulate customer requirements and leaving engineers to further develop product features. Ultimately, in pursuit of creativity, further insight can be drawn by not imposing on the creative mindset of the programmers. The PM subsequently described how it was "the best way of accomplishing the feature requirement".

Another PM explains the various types of documents that are created below:

Once we have a business case that has been approved by the stakeholders, we come up with a product proposal. The product proposal is the order for a new product and as to what should be included in the order of the product. The product proposal is transferred into requirements documents such as market requirements, user requirements and system requirements. PM's do it in different way...some come up with a market requirements document and then a product requirements document ...while some PM's combine the two....

Here, the PM can be viewed as the main actor initiating the inscription with the role of an actant. Also, it is observed that these documents revolve around the product, their features and the detailed requirements within each feature with respect to different stakeholders. Ultimately, as the product owner, the PM is communicating the product requirements to various stakeholders using the documents. The communication in turn facilitates interaction among the PM and the stakeholders. The requirements engineering process would benefit from a standardized approach on product management processes ensuring a structured system as it varies across organizations. This opinion was expressed by other participants and can potentially lead in failure to translate customer orientation when capturing requirements.

4.4 Knowledge Dissemination

For this study, knowledge management practices reveal themselves to play a significant role in sharing knowledge across functional groups. Having a systematic strategy in knowledge intensive software industry can be viewed as a measure to facilitate the process of negotiation and thereby the process of translation. From the empirical material it is apparent that PM's have different ways of managing knowledge with respect to customer insights in product development. While technological artifacts have inspired an easier translation process the manner in which it is executed is critical to the process of adding value to customer orientation. This vision to leverage knowledge takes shape both by sharing and creating understanding. It further ensures collaboration bolstering the way teams work together.

Artifacts reinforce the software industry's norms about sharing and promote inclusiveness in knowledge creation. This reinvigorated process of knowledge sharing and knowledge creation using tools aids in the understanding of what insights are in fact useful in the product development process. It is therefore evident, based on our findings that PM's treat this process at the forefront of the development phase, rather than subordinate to any other activities. Capturing information is not only important but rather the successful completion of the translation process.

One PM expressed the following,

I try to describe 'what' needs to be done and not 'how' it needs to be done...I try and stay away from telling engineers from how to do it because I think it's their domain...use all available methods of communication & conveying the "what". Usually that is a presentation in Powerpoint to start painting the picture, then spreadsheets or a word document for describing individual requirements with as much details as u can.

Knowledge has continuously been viewed as a strategic resource that can generate a sustained long-term competitive advantage (Gaal, Szabo, & Lajos, 2015). Thus far, it is has been evident that cross-functional collaboration is essential for product development, and more importantly, effective knowledge sharing tools to ensure successful progress. Above is an example of Spreadsheets, Word documents and PowerPoint as a form of "communication" and "conveying the 'what'" to engineers. As such, it has become apparent that "exchange of information and knowledge among employees is a vital part of knowledge management" (Gaal, Szabo, & Lajos, 2015).

Knowledge sharing is an undertaking that entails helping others obtain information and knowledge, develop new ideas, collaborate with others to solve problems or implement processes (Cummings, 2004). This knowledge can be either tacit or explicit (Nonaka, 1994). There have been progressive changes in product development practices with a growing attempt to adopt collaboration tools. Today, more and more companies are using more creative tools to collaborate and help facilitate the information sharing process. In developing products, collaboration tools have proven valuable in knowledge creation. What we are therefore witnessing is not only an exchange of knowledge, but rather collaborative knowledge management tools that empower the engineering team to team-up to create content. This is especially significant since tacit knowledge is not easily transferable. Therefore together, cross-functional collaboration enables knowledge integration and further knowledge creation. Consequently, by coping with the difficulties inherent in tacit knowledge, the PM is confronting existing tensions between product development and customer orientation. What subsequently arise are discussion forums and communities of practice (COP) that further enhance knowledge development techniques.

One PM mentioned the following,

In our organization, collaboration tools are used extensively. An integrated tool that helps people to connect and share information online. Also, it has a chat interface and discussion forums on design and test issues as well as customer interactions.

Similarly another PM mentioned the following,

We have a community session every week where teams from different development centers interact live using an online collaboration tool. Here we discuss critical issues with respect to development work as well as customer insights and market trends.

Here, collaboration tools used for CoP's and discussion forums are utilized to further enhance understanding by drawing from multiple knowledge bases. According to Hargadon & Sutton (1997), COP allows the larger community of practitioners to mingle their ideas and gives way for solutions to complex problems. Also, the interaction among people with different expertise in the community gives rise to different perspectives. Herein, the tacit dimension of knowledge makes participants particularly valuable contributors to this group collaboration effort as this form of knowledge is more easily obtained through interaction (Leonard and Sensiper, 1998). Moreover, best practices are shared that can further contribute to the achievement of desired results during the product development process. Ultimately, as further insight is gathered, experiences often stored as tacit knowledge becomes purposeful by virtue of intuitions and flashes of inspiration (Leonard and Sensiper, 1998).

Apart from collaboration tools, direct customer engagements is encouraged with technical days and lunch & learn meetings that allow for customer feedback on prototypes of future products.

As one PM expressed,

Engineers need to develop real understanding so create as many opportunities as possible to interact with customers. Customer orientation is brought by inviting customers for lunch at cafeteria where we interview them and listen to their thoughts.

In spite of its advantages one must acknowledge that direct customer engagement does not happen to all engineers in development teams and only lead engineers could get direct engagement. However, to allow other members to participate one must include group interaction (Holtzblatt & Beyer, 1993). Workshops provide the platform for group interaction and are more effective in terms of bringing in innovative ideas. By bringing together multiple stakeholders to gain further knowledge about the customer “each skilled person frames both the problem and its solution by applying mental schemata and patterns he or she understands best”, thus resulting in a host of varying perspectives and ultimately new ideas and products (Leonard and Sensiper, 1998).

One participant described his strategy to use workshops:

When you start a new product, you have a workshop where you go through, this is how the market looks like, this is the customer, this is how we should think when we design it... but we try to give them a lot of freedom. They come up with say ten solutions and then sometimes they will come with inventive ideas as well.

There are many ways of knowledge creation regarding product development. In this particular case, the PM uses workshops to disseminate information, inviting team members to develop preliminary designs and proposals by discussing the ‘market’, the ‘customer’ and thoughts on the ‘design’. By providing a holistic view, teams are able to involve each other in their thinking process and this newly gained insight enables them to see a solution through, in a different light. By participating in these workshops team members are able to embody the practices of others. In order to contribute to a bigger picture, ideas are disseminated to a wider audience. Ultimately the culmination of ideas results in a multitude of “solutions” and “inventive ideas”.

Moving forward, what subsequently manifest are visual techniques to further synthesis knowledge creation efforts; techniques described below as story telling and process maps.

There is a shift in the knowledge creation methods were influencing on understanding is done through the use of storytelling with emphasis on visual methods. According to Sole & Wilson (2002), narrative forms are very powerful and help to generate emotional connections as well as transfer tacit knowledge. Storytelling allows to solve complex issues due to an efficient transfer of tacit knowledge (Sole & Wilson, 2002). As such a shift in the knowledge creation methods used where influencing on understanding is done through the use of storytelling with emphasis on visual methods.

One of our participants explains the use of Storytelling:

Storytelling takes the form of identifying with a persona or a user of your system. So I would talk about ‘what the impact is’, ‘what it means to the user’, ‘why is it important’ etc. It’s trying to give the developer a concept of, ‘who is this for? what do they want to do? and ‘why do they want to do it?’. So that’s the story, and then we have additional information on the story, we call those ‘conversations’ and ‘validations’. They give more contextual information and helps the developer know what’s going on with the story.

Below, another participant described the impact of storytelling using visual methodology.

Storytelling is used to describe the customer, for example, the target customer to investor, sales marketing and engineering teams. Storytelling is used in different contexts. I have used storytelling to convey and describe customers to developers - put it in a visual metaphorical way, makes it easy to deliver details. Visual techniques by which product manager can map market, product, customers, features, roadmap and have conversation with everybody in community.

Similarly another participant mentioned the use of process maps,

In our organization we use process maps on the customer journey that are visual representations of the needs of the customers, their problems and how to solve them

The above examples illustrate a transition from an emphasis on traditional documentation management methods of knowledge sharing into more visual representation of information for knowledge creation. Through storytelling and process maps engineers are able to relate to the customer. Here, technology serves as an artifact to aid the narrative process describing the customer and hence plays a critical role in knowledge creation. Through storytelling and process maps engineers are able to relate to the customer. By identifying with a persona for example a PM can better articulate what the customer is feeling and the service it will provide. This intimate account is essentially prioritizing the customer experience rather than putting emphasis on the product. This technique, in essence, is adding a human dimension to an otherwise data driven process. Clarity in the product development process is thus gained. Eventually, the story telling technique is further reinforced by the use of artifacts for knowledge visualization.

4.5 Knowledge Visualization

From the above discussion on knowledge creation for customer orientation in product development, there is an overarching pattern on knowledge visualization techniques used in the various practice methods. It is also observed that information technology (IT) systems in the forms of artifacts are used for visualizing knowledge. According to Eppler and Burkhard (2007), knowledge visualization is the use of graphics to construct and convey knowledge of experiences and insights that are highly complex.

As one PM described,

I have experience with customer process and i can visualize it but others cannot. It helps to communicate to marketing and development teams. Different kinds of visualization techniques are used on the type of audience. Some members respond to text well while most of the members respond to visuals. Combination of these techniques is powerful.

The technology artifacts are used as communication devices for employees to aid in sense-making and meaning construction in their work. The technology artifacts can be understood to make comprehending complex matters more manageable and less challenging. Eppler and Burkhard (2007) emphasize that visualization tools and techniques depends on physical and virtual setting and the amount of people involved on the interaction.

Eppler and Burkhard (2007) emphasize on the usage of particular formats for different target groups. For instance, tables and quantitative diagrams are used for target group consisting of management while for employees the use of visual metaphors and process maps are used. It is observed that for knowledge creation related to customer orientation visualization techniques are being used with technology providing the framework in the form of tools. As ANT is closely related to semiotic theory it is observed that visual learning is essentially reducing the cognitive processing capacity by incorporating signs and symbols. In this regards, symbolic interactionism holds that meanings we associate with objects can change, hence documentation, earlier regarded as ample and adequate for knowledge exchange, is not as sufficient, especially now in a technology driven society. Networks of integrated systems have made a complex process of translation possible. Hence, the role of actants is considered as a social interaction tool. People are therefore able to articulate themselves, and hence express tacit knowledge through an intermediary.

As one PM expressed,

We use online collaboration tools in development team meetings. It is very useful since we have development teams in USA, Ireland and India. This tool has built in features to express conceptual and ad-hoc diagrams for employees to interact in joint meetings. It serves the purpose of making it easy to deliver details as a visual metaphor.

Here it is seen that technology artifact has a significant role in collaborating across geographical spread of development teams and helps in the social process of interaction simultaneously with learning from visual representations. The ANT theory further alludes to punctualization, where a bridged network is greater than the sum of its individual parts. Here, a synergy between colleagues enables knowledge to be captured more simply. Knowledge visualization tools have become tokens where as quasi objects they have strengthened and substantiated network abilities. All in all, our findings indicate an inward approach to leverage knowledge is key to successfully incorporating customer orientation in product development.

4.6 Summary

The analysis chapter presented a more in depth analysis of the tensions that exist between product development and customer orientation. In order to further explore our findings the following themes were derived. The first theme is “PM as a Mediator”. Here the critical role the PM plays as a mediator, largely by convincing and influencing stakeholders is explored. The PM creates value for the customer by integrating various segments of a whole and this is achieved in three main ways. Negotiating with different stakeholders internal and external to the organization at different stages; convincing stakeholders; and lastly the alignment of

different stakeholders, which is necessary to achieve customer orientation. The second theme is “Cross-Functional Management”. With an increasing approach on customer centric development as opposed to one that is technology centric, the outcome is the need to have collaboration and transparency across internal teams. This cohesiveness reduces stress on existing tensions and thereby avoids network breakdown (ANT) as well as reinforcing and strengthening the flow of customer orientation. The third theme is “channels of communication”. Here, artifacts as inscriptions reinforce the importance of communication to achieve coherence. The use of artifacts improves the process of translation, it better informs stakeholders, and overall it confronts the challenges that the PM faces when incorporating customer perception in product development. The fourth main theme is “Knowledge Dissemination”, where effective knowledge sharing methods are understood to play a central role in product development. Here we witness many practices used to enable knowledge dissemination, such as: storytelling, COP, workshops, etc. By having these practices it helps engineering teams to operate more seamlessly so as to incorporate customer usability in engineering work. The final theme of “Knowledge visualization” reveals that visual learning methods are becoming widespread. As such, visualization as a cognitive tool enables more complex representation of ideas to be more easily formulated by the contributor and subsequently grasped by the beneficiary.

5 Conclusion

In this final chapter we summarize our research, and draw conclusions based on our study. Additionally the broader view for our main findings are discussed and their relation to the literature and theory. Moreover, limitations of the current study, implications as well as suggestions for future research will be presented.

5.1 Discussion

The aim of the study was to examine *how do product managers negotiate tensions between customer orientation and engineering orientation in product development?* A new approach to product development requires better product development processes that involve understanding customer needs. It is observed that there are knowledge gaps in implementing customer needs in development of products. Besides technical acumen, engineers developing products need to have sensitivity towards customer needs.

Product management procedures play a critical role in connecting customer needs with product development. The primary aim of this study is to theorize customer orientation in product development processes. This study used Actor-Network Theory (ANT) as a theoretical lens to look into product management processes in order to find significant practices that were inconsistent with customer centric focus. The research question is answered by bringing in ANT perspective, that depicts the strategies undertaken to synthesis and balance the polarized logics of customer orientation and engineering orientation in product management. First, it provides insight on the dimensions of a PM as a mediator, a collaborator and influencer for negotiating a balance between a predominantly engineering approach with customer orientation in product development. Second, it highlights the importance of cross-functional management for translating customer orientation to different teams and the role of artifacts as a medium of communication. Third, practices employed towards shaping knowledge of knowledge intensive workers and the role of technology artifacts for knowledge visualization.

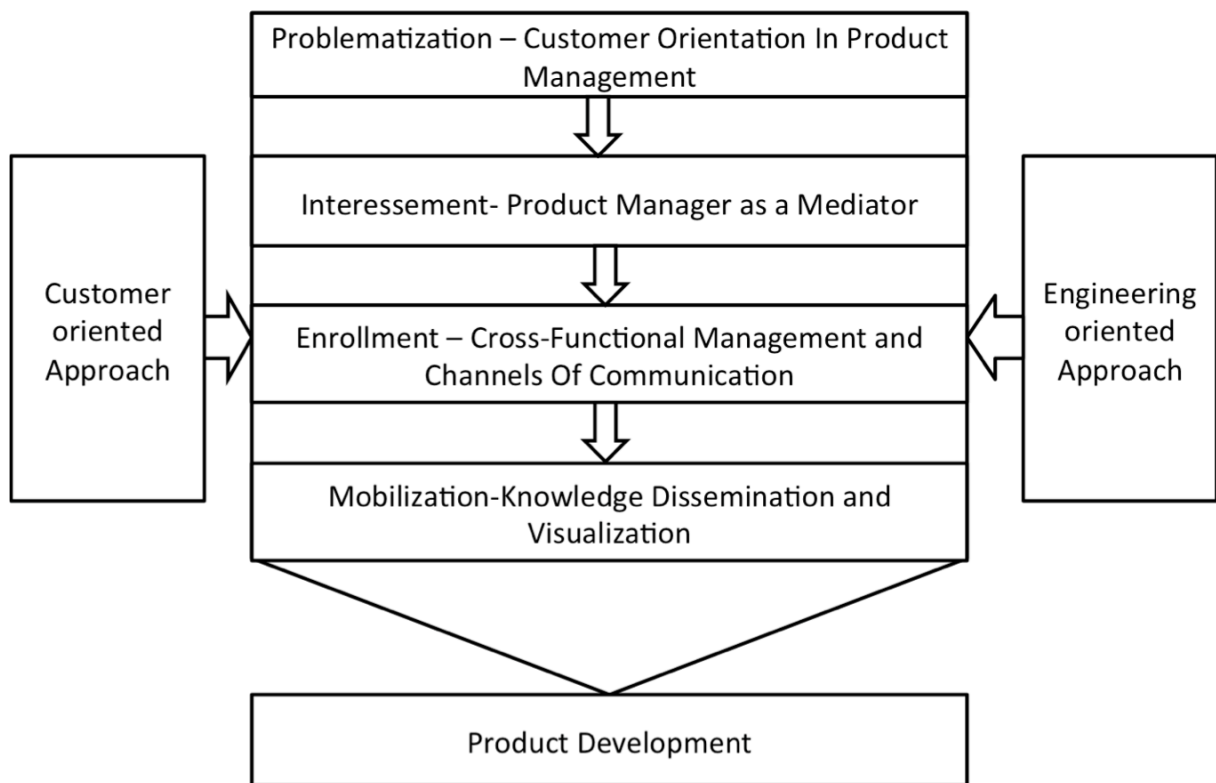


Figure 5.1 Conceptual Framework of Product Management using ANT

On reflecting upon the empirical material using the four-stage translation of ANT, a conceptual model derived is presented. Further, a discussion on the examination of product management processes and the process of translating customer insights in order to arrive at the above understanding.

PROBLEMATIZATION

CUSTOMER ORIENTATION IN PRODUCT MANAGEMENT

The problematization phase involves conceptualizing the problem as incorporating customer orientation in product development where the existing approach is primarily engineering oriented. This requires revamping all stages of the product management process involving different parts of the organization in order to balance the tensions between focusing the different logics of customer-centric and engineering-centric approaches. The Obligatory passage point (Callon, 1986) is perceived as customer orientation within product development. The PM being the focal actor and other actors such as management representatives from Sales, Marketing, and Engineering divisions are identified as having shared interests to the problem.

Based on our analysis, it is observed that customer oriented culture is purely driven as a strategic emphasis by management as an organizational goal that will impact product development. Since it has been related to having a positive impact on business performance due to product success and increased market share (Narver & Slater, 1991).

In our empirical analysis, we found that managerial systems are key to implement customer orientation on an organization wide basis. Managerial systems relate to the main functions and process frameworks of product management (Kok & Biemans, 2009). One main finding is that there is no standardization of processes and terminology used in product management practices in the industry. For instance, this is due to size and significance of product management teams varying among organizations due to the company size, technology domain and product types. This results in inefficient product management practices such as failure to correctly capture customer requirements or consistently modify requirements resulting in consistent rework and product delays.

INTERESSEMENT PRODUCT MANAGER AS MEDIATOR

In order to bring about the change, the interessement stage of the translation process (ANT) will be two fold with the first phase involving approval of management and gaining their support. In our analysis it is observed that the PM needs to have authority in order to introduce changes in processes that will involve stakeholders from different parts of the organization. Once the authority is granted by the management, the PM needs to take a proactive approach to collaborate with conflicting stakeholders so as to foster an alliance that aims at customer oriented development at different phases of product management.

The empirical analysis demonstrates that the dimension of a PM as a mediator to collaborate and influence the various stakeholders is key for negotiating the balance of a predominant engineering approach with customer orientation in product development. In the analysis the mediation role of a PM is evident in various product management phases such as product strategy and planning phases. In these phases the PM has to align and resolve conflicting stakeholder requests in terms of business case acceptance where he has to convince the stakeholders internal to the organization on the product proposition and influence them towards working towards the product idea. Another instance where the PM has to negotiate the requirements of conflicting stakeholders i.e. sales and engineering teams to get the optimal set of features for the product release planning

The above finding expands on Maglayas, Nikula & Smolander (2013) discussion on a PM's different profiles in an organization i.e. experts, strategists, leaders and problem solvers. The various activities that a PM may undertake are depicted by these profiles. The literature (Maglayas, Nikula & Smolander, 2013) suggests the role of problem solver for communication and collaboration problems. We further contribute to this discussion by contributing mediator profile that is key to handle the tensions that arise due to the presence of different logics. In our finding this mediator profile is a synthesis of various activities such as influencer and conflict resolver in addition to collaborator and communicator. Influencer

and conflict resolver is key to align the various stakeholders into working towards the common goal of customer orientation.

ENROLLMENT

CROSS-FUNCTIONAL MANAGEMENT & CHANNELS OF COMMUNICATION

In ANT terminology, the enrollment stage involves the PM defining the role of other actors i.e. the internal stakeholders in relation to others to implement customer orientation in product development. One important finding is the importance of contextualizing while capturing requirements, which could be through direct customer engagement, or gaining insights indirectly through feedback from sales. Contextualization of the customers is developing understanding about the customer, the problem and their usage of the product and incorporating that as a solution by means of a product.

Next, the empirical analysis suggests that transparency and collaboration is key to proliferate customer orientation amongst the various teams involved. The role of the representatives is key to propagate customer centric focus within their departments. Our findings suggest that creating a cross-functional team of representatives from sales, marketing and engineering departments will spearhead their respective teams towards customer orientation. These findings have moved beyond Ebert's (2006) discussion on teamwork and the role of PM as a leader. In this study, the role of key representatives is to act as carriers for communicating and incorporating customer centric focus on product development. In addition, they will be accountable and help to strategize the process with a focus. The above finding will help to expedite customer orientation and hence develop successful products.

In the enrollment stage, the empirical analysis demonstrates the important use of artifacts such as documents to align and communicate the requirements so that everybody has a shared understanding. Examples of these include business case, market requirements, product requirements and functional specifications. According to ANT, here the artifacts are non-human actors who act in the translation process to communicate the customer requirements. In the above finding, it is observed that the role of artifacts is critical in the translation process. First, artifacts in the form of inscriptions i.e. documents and text are used for communicating product requirements to different stakeholders. It takes specific forms of business case requirements for the management team, functional requirements for engineering team and market requirements for marketing team. However, if framing of information in the inscriptions is ambiguous, it could lead to misinterpretation of the text and result in translation process failure (Hutchings & Knox, 1995).

MOBILIZATION

KNOWLEDGE DISSEMINATION & VISUALIZATION

In the mobilization phase, the PM needs to ensure that the other actors act in agreement to ensure successful translation of customer orientation. The empirical data was analyzed taking

into consideration the engineering team and how managers shape their understanding with respect to customer usability.

Based on the empirical data, in the mobilization phase the PM ensures that the teams adapt knowledge management practices to ensure customer orientation in their work. Diffusion of customer orientation, especially with respect to engineering teams is critical i.e. design, implementation and test phases of software need to embrace customer usability. This involves knowledge creation and understanding among knowledge workers in engineering teams. It was found from the analysis that in order to adapt design and development towards customer needs different practice methods are used to develop tacit knowledge through knowledge sharing mechanisms. The methods deployed for knowledge diffusion are online collaboration tools, community of practice, customer interactions, storytelling and process maps. There is a clear shift from customary methods of knowledge sharing to action learning methods such as community of practice and storytelling.

Moreover the empirical analysis also suggests the role of technology as an artifact in influencing knowledge shaping. Previously, the role of IT in knowledge management has been limited to codification and storage of knowledge (Lee & Choi, 2003). However, in our findings, to move the understanding of engineers with engineering-centric focus towards customer usability and needs, information technology tools are used for describing the insights of customers. Apart from community of practice (COP) and online collaboration tools, practice methods having a visual medium such as visual storytelling, process maps and user personas are being widely used. With these visual methods, knowledge management systems have shifted to address human and social factors. These visual methods influence the cognitive process and help to retain customer centric information of significance (Swap, Leonard, Shields & Abrams, 2001). The authors Swap et al (2001) further stress on the fact that explicit forms of communications such as visual methods help to reduce misinterpretations.

5.2 Implications

Based on the empirical data, some theoretical and practical implications related to embedding customer orientation in product management are presented. The insights from the study provide management with directions for developing and practicing customer-centric product development process.

Regarding theoretical implications, this research provides an examination of customer orientation in product management. This phenomenon is examined using a new perspective using the analytical lens of Actor-Network Theory (ANT) that provides an in-depth understanding about the product development process. By bringing in ANT perspective, the study has theoretically contributed to identifying significant areas of improving translation of

customer orientation within product development process. Also, we have developed a conceptual framework that identifies the key areas that are critical for translation success.

By legitimately considering the agency of non-humans (technological artifacts), we are no longer viewing this topic as agency (human) in contrast to structures, but rather both are viewed as agencies connected through networks of translation and negotiation. Non-human actors are at the forefront of understanding the process of translation in product development. We therefore address how networks can facilitate the process of overcoming tensions. As software engineers continue to face the challenges associated with incorporating customer perceptions and the challenges of keeping pace with a quickly evolving technology driven society, it is important that agency is extended to technology and no distinction is made.

Technology can produce more creativity, and possibly contribute to radical innovation. Our findings do not indicate a direct correlation between restorative measures to address customer orientation and innovation, but this logic is conceivable. In a highly competitive market, it is critical that a company stay ahead of the curve. Consumers are continuously waiting for the “next big thing”, and if PM’s effectively manage customer orientation, it could potentially lead to radical innovation. This is primarily achieved by including the engineers in the creative production process where it is important to understand the various actors in a network, ensuring they work in agreement to have a successful translation process. By looking inward to address product development challenges, a company can essentially remain competitive and innovative. As discussed in the literature review section, prior research has criticized customer orientation for stifling radical product innovations. Also, it has also been noted that prior research has ignored product development strategies that act as internal moderators for organizational performance and the degree to which they impact major innovations. Hence our research is in line with the above argument, where we examine product development strategy in terms of processes and structures within organizations. The degree to which these strategies affect innovation requires more in depth study. However, with current methods to facilitate tacit knowledge creation we believe that apart from incorporating customer orientation, innovation is also encouraged.

Regarding practical implications, within the context of product management, organizations need to carry out a systematic analysis of the different interfaces in terms of stakeholders that interact with product management. This is due to the fact that product management teams vary from one organization to the other based on the company size, technology and product type. In addition, product management perspectives should augment understanding one’s own product development process towards understanding customer-centric focus. This extension should involve the software development models, the product development process, customer understanding and the company’s organizational and operational structure.

Moreover, based on this study it is observed that new methods of knowledge creation are necessary for development teams to gain understanding with respect to customer. From the empirical data, it is evident that new forms of practices such as storytelling i.e. in visual forms, design thinking, user personas have evolved. Hence, product management needs to create and assess possibilities in terms of new practice methods that work best for them. By

deploying best practices in development processes can be of great importance in creating successful products.

5.3 Future Research

In this study we have shed light on emerging trends in knowledge creation methods that aim to influence customer oriented thinking in development teams. The emerging trends are towards methods such as design thinking and visual methods of storytelling such as process maps, user case stories and online collaboration tools. Future research could give deeper understanding towards how these new methods affect knowledge creation and their effectiveness in product development. Moreover, a quantitative study could explore the utilization and satisfaction levels of these methods in customer centric knowledge creation.

Also, in this study we have shown insight to the critical role of PM as a collaborator and influencer that is crucial for translating customer-centric focus in product development. Future research on similar lines could bring about other profiles for a PM that is crucial for managing customer orientation. This could help us to understand about the necessary skills required in a PM and in turn help to streamline and strategize the product management process by assigning responsibilities to the most qualified person.

Furthermore, in order to gain a deeper understanding of how customer orientation coupled with the facilitation of tacit knowledge creation could lead to radical innovations, further research on these subjects would prove valuable for new product development. In summary, this study advances prior understanding of product development as it relates to customer orientation. Overall, our study illustrates the importance of internal moderators such as processes and strategies that are crucial for overall organizational performance that impact customer orientation within product development.

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Appendix A – Interview Questions

- 1) How would you describe your role as a Product Manager? Could you describe your day-to-day activities?
- 2) How would you describe your interaction with other departments with the organization? How often are the interactions?
- 3) Could you describe the process of ‘requirements engineering’ for product development?
- 4) What are the main challenges that you face as a Product Manager? Why are they considered challenges?
- 5) How do you as Product Manager communicate customer insights and product requirements to the development team?
- 6) Could you describe the work of the developers, their logic and ideas and how they relate to an understanding of the market and what it wants?
- 7) How do you as a Product Manager handle customer orientation in product development?
- 8) Could you describe the practices and processes that are followed during design and development stages to incorporate customer perceptions?
- 9) What guides the developers creativity and work, and why? How is knowledge shared amongst development team members?
- 10) What current practices with respect to customer orientation are you most satisfied with and why?
- 11) What would you change about current practices of a Product Manager? Could you describe why you would like to change it?
- 12) Have you ever experience a time a product did not transpire the way it was intended to a customer? What caused it?