HAVING A CUSTOMER FOCUS IN AGILE SOFTWARE DEVELOPMENT

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Abstract This research looks at the customer focus of agile software development teams. The study is part of a larger study examining how the twelve principles of Beyond Budgeting[1] are operationalised in the context of an agile development environment. Using two case study sites and a semi-structured interview approach the customer focus of agile teams operating within two large organisations is examined. In these organisations the direct customer is not the end user of the product; rather they are another group within the organisation downstream of the agile development team. The results suggest that while organisations may espouse to have a customer focus the structures may not be in place to enable sufficient sharing of customer knowledge and utilisation of customer feedback. Emergent themes from the study suggest that customer identification, customer characteristics, customer location and the teams' experience of the customer and their domain may have an impact on the customer focus of an agile team.

1 Introduction

The importance of the customer to agile software development teams operating within large organisations (Augustine, 2005, Highsmith, 2004) and to the organisation as a whole (Gulati, 2007, Gulati and Oldroyd, 2005) is well documented. The construct "customer focus" has been developed by the Total Quality Management (TQM) literature (Ahire et al., 1996, Sousa, 2003). Ahire et al. (1996) developed and validated a customer focus construct in the context of manufacturing firms. They found that quality is influenced by top management's commitment through customer focus. Issac et al. (2004) developed a conceptual framework for TQM in software organisations which also included the customer focus construct

[1] www.BBRT.org

and included client (customer) feedback and client involvement as part of the construct dimensions. While various dimensions of the customer focus construct have been studied in the Information Systems (IS) community, such as customer communication or relationships (Korkala et al., 2009), customer satisfaction (Mann and Maurer, 2005) and customer involvement (Kautz, 2009), the only research in IS found on the customer focus construct as validated in the TQM literature is from Ravichandran (2000) who used the end user participation as representative of the customer. However in agile software development the customer may be represented by actual customers, customer proxies, product managers or product champions (Highsmith, 2004). There is a gap in the literature surrounding the development of the customer focus construct when the customer is not the actual end user, but rather another group within the organisation.

This research looks at the customer focus of agile teams within two large organisations where access to the actual end users may be problematic. In these organisations the customer is internal and the customer focus construct is examined from the perspective of the agile team delivering products to an internal customer. This is an increasingly important area as more and more large organisations begin using agile methods. To date there has been little research carried out on the customer focus of an agile team delivering products to an internal customer. In research within IS in general, there has been a tendency to focus only on specific aspects of customer focus as opposed to adopting a more holistic approach. This research hopes to address these issues by introducing and developing a customer focus construct through case study research.

The next section of this paper outlines the theoretical development of the customer focus construct and introduces the conceptual framework. Section three introduces the research sites and research methodology. Section four highlights the findings and section five discusses emergent factors coming from the research. Section six is a discussion with a revised framework and finally section seven concludes with implications for industry and research.

2 Theoretical Development

Customer focus practices involve the establishment of links between customer needs and satisfaction and internal processes (Sousa, 2003). The quality management literature has developed instruments to measure the customer focus of the organisations quality management program (Sousa, 2003, Ahire et al., 1996, Flynn et al., 1994). These instruments have been conceptualized and contextualized within an IS environment (Issac et al., 2004) and have been adapted for use in an IS environment where the end user replaced the role of the customer (Ravichandran and Rai, 1999). Other fields such as organisational literature have also developed ways to measure and utilize customer focus (Gulati, 2007, Gulati and Oldroyd, 2005). With the introduction of agile software development processes, the role of the customer and the customer focus of the agile team take on a new signi-

ficance. This research draws on previous research on the customer focus construct. Through a review of the customer focus construct dimensions discussed in the TQM literature we have developed our conceptual framework for this study *(figure 1)*. We have adapted the construct dimensions from the previous studies to examine the customer knowledge, customer involvement, customer requirements and customer feedback loops of agile software development teams.

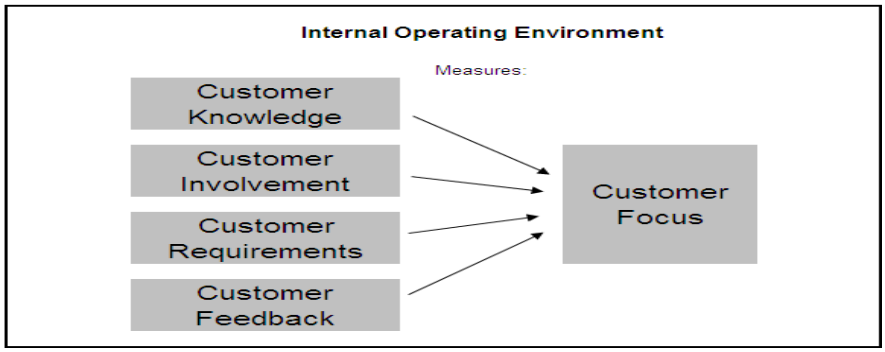

Fig. 1. Conceptual Framework

2.1 Customer Knowledge

Gulati and Oldroyd (2005) suggest a four stage process for understanding the customer focus journey. The first stage is the collection of *information* on customers. This is then consolidated and analysed to gain an insight into customers from past behaviour. This insight is then used to develop a likely understanding of future behaviour, which is used to provide real-time responses to customer needs. Customer satisfaction surveys are the standard way to gather information and gain an insight into customer perceptions. Surveys not only give general information on customers but also information on what customers are and are not satisfied with. To achieve the level of coordination and cooperation required from a customer focused organization, the correct *structural mechanisms, processes and incentives* need to be in place. These will allow employees to focus on the customer by harmonizing information and activities across units, and by encouraging people in all parts of the company to work together in the interest of customer needs. Sharing this customer knowledge is also critical in utilizing the cognitive resources within a team (Srivastava et al., 2006).

2.2 Customer Involvement

Taking the already created construct dimension from the quality management literature this research defines customer *involvement* as the extent of the customers' involvement in the product design process. Sousa (2003) describes the customer focus construct in terms of establishing strong *relationships* with the customers by emphasizing partnership arrangements and having direct customer contacts (face

to face *meetings*, plant visits). The customer is an integral part of the agile team and teams are encouraged to have a collaborative customer-developer relationship which involves a high degree of interaction between the teams and the customer (Highsmith, 2004, Beck, 2005).

2.3 Customer Requirements

Agile methods rely heavily on inputs from the customer rather than having a predefined set of requirements (Beck, 2005, Highsmith, 2004). The agile teams are expected to work closely with the customer to gather ongoing requirements throughout the project duration, obtaining timely feedback and information. However, customers' insufficient knowledge of the requirements due to the complexity and size of the system poses significant challenges (Cao et al., 2009). These challenges are even more pronounced when customers are not available or not willing to commit to the project (Fitzgerald et al., 2006).

2.4 Customer Feedback

The mere execution of customer surveys is not useful unless the results are made available to functional areas of the organization (Ahire et al., 1996). Teams should be provided *feedback* on both customer complaints and also on customer satisfaction surveys. This feedback is used for *training* if required and to improve *processes* where needed. Gulati (2007) calls this capability development, and it is a means of ensuring that an organisation has enough people that have the skills to deliver customer-focused solutions and also has the correct processes in place to deliver those solutions.

3 Research Methodology

3.1 Site Selection

Both organisations chosen for this study had within the past few years implemented the scrum methodology into their systems development operations. The development teams within both organisations had traditionally worked with a waterfall development and the transition to agile development processes raised questions on the suitability of the surrounding supporting processes. Organisational structures which had supported the use of the waterfall method meant that emphasis on customer collaboration which is the norm in agile development was a relatively new area for these organisations. In both organisations the end user was not the direct customer of the development team. The teams studied were part of a larger umbrella group and therefore their customers were more often than not an internal downstream function of the organisation.

3.2 Data Sources

In both research sites, data were collected through a variety of methods: unstructured and semi-structured interviewing, document review and observation. Data was collected as part of a larger research project.

The first case study was conducted within the Information Services (IS) division of a large multinational financial consulting firm (FCC) which builds customised software applications for internal clients. The data was collected as part of a larger research project that consisted of an in-depth study conducted over four months. Three different scrum projects were studied. Data was collected through on-site observation at iteration meetings and daily scrums, review of documentation, three workshops and nine interviews.

The second study was conducted within the IS division of a large multinational oil and gas firm (SCC) which also builds customised software solutions for internal clients. Here ten interviews were carried out with personnel from four different scrum projects and in three different locations. Follow up phone calls, emails were also used.

3.3 Data Analysis

All transcripts were recorded and transcribed entirely. The transcriptions were imported into NVivo for coding. The data was analysed based on Strauss and Corbin's approach (1998) for open and axial coding, where the initial interview questions and subsequent data analysis was based on the customer focus construct dimensions previously discussed (customer knowledge, customer involvement, customer requirements and customer feedback). Data was initially coded around these four dimensions which provided a list of "seed categories" for initial open coding (Miles and Huberman, 1999). During this stage the data collected was divided into the four main categories and then further divided into sub-categories.

The axial coding technique was then used to put the data back together by making connections between the categories and sub-categories. Reflexive remarks and memos made during both the interview stage and the analysis stage helped to interpret the data and lead to the identification of emergent themes not previously considered. Follow up phone calls, emails and site visits were arranged where possible and further documentation obtained when further information was needed or clarification was required. Data collection ended when enough categories had been defined to explain what had been observed at both sites and when no additional data were being collected to develop or add to the categories. At this point, further data collection was unnecessary as the categories were deemed to be "theoretically saturated" (Strauss and Corbin, 1998).

Precautions were taken to corroborate the interpretations made (Miles and Huberman, 1999, Yin, 2003). Emerging categories were checked for representativeness by examining them across participants. For example team members' reports of their experience with their customers were checked against the reports from other team members and the project managers or scrum masters. The participants in the study also provided commentary, correction and elaboration on drafts of the findings and framework.

4 Findings

The customer focus of the organisation is discussed first in relation to the four measures outlined in the theoretical development section of this paper. Then the emergent themes or factors identified during the analysis stage are presented and discussed.

4.1 Customer Knowledge

Customer knowledge involves learning about the customer in order to anticipate future needs and also sharing that knowledge with others within the organisation. Case A has a number of collaborative websites but none specifically dedicated to the collection and dissemination of customer information. The teams are quite open to sharing but there does not appear to be any formal mechanism or structure in place specifically for customer information. One team member commented that when several tracks were working on the same project there needs to be more knowledge sharing among the teams:

> One thing we could improve on and need to improve on is inter-team or inter-track communication (Team Member)

In case B knowledge gathered and shared on the customer also varied. Sharing customer knowledge was viewed a problematic:

> That is also one of the challenges with so many teams, how do we get interaction across the teams (Project Manager)

In other projects where there was an analysis team and close collaboration with the customer, these were not issues, with one scrum master commenting:

> We have a pretty clear view of what the customer will hopefully need in six months, hopefully (Scrum Master)

4.2 Customer Involvement

Having a good customer relationship involves the customers being directly involved in the development process and the developers having direct contact with the customers via face to face meetings. In case A there was a mixed response to this, some groups had a poor relationship with their customer, while in other projects the relationship appeared to be better:

> There are *some* customers who are really involved, they really know the area and they know the tool (Team Member)

In case B, interactions seemed better with the customer or customer representative. All teams interviewed had good interactions with their customers but this was seen as something that had improved over recent years, rather than a norm:

> We've been lucky, we have got a lot of commitment but it is not a default that everyone is committed (Project Manager)

4.3 Customer Requirements

In case A it was strongly felt that the requirements gathering was an issue for the team members, mainly because of their distance from the customer:

> [speaking about] Their requirements, we didn't even understand. They didn't really make sense. Effectively you are talking to people on this side trying to get an idea of the story rather than going direct to the customer" (Team Member)

One team member actually described getting requirements through a second party as akin to *Chinese whispers.*
In case B the requirements were usually received through the product owner who has a hands-on role in refining the product backlog with the scrum teams. The problem of not getting first hand access to the customer is raised by one developer but in general the requirements are clearly established through face to face meetings and workshops with the customer proxy.

4.4 Customer Feedback

In case A the feedback received was very much at a higher level than direct feedback to the team. Team members agreed that there was little feedback from the customer:

> You'd like a retrospective or you'd like something to say, you know, we didn't need that or you know, the usual… (Team Member)

Case B showed that the team members were involved in the feedback process and work was presented to the customer or product owners on a monthly basis. All team members agreed that there was feedback given from the principle stakeholders in some form:

> People speak clearly about what they are concerned about and what they like (at the sprint review) (Team Member)

5 Emergent Factors Affecting Customer Focus

From the first phase of data analysis it became clear that customer focus fluctuated across cases and indeed across projects. From the subsequent axial coding process four core factors emerged which had an impact on the degree of customer focus within each case and project.

5.1 Customer Identity

The notion of the customer is fundamental to current management paradigms and a major thrust of current programmes of organisational change is to replace management hierarchical control with simulated market control, i.e. organisational de-

partments are defined *as if* customers, and work-colleagues relate to each other as customers (du Gay and Salaman, 1992). When the customer is internal within the organisation it is important that their role is clearly defined. In case A, there appeared to be some ambiguity as to the identity of the customer and the role they had to play:

> I guess this other group are our customer, our direct customer (Team Member) *or*
>
> We could see him [the customer] as the person who asked for this project (Project Manager)

The second case was less ambiguous, the customer was clearly identified as the product owner and they had the role of the customer:

> They are defined as customers (Project Manager)

5.2 Customer Characteristics

Prior research has shown the importance of having the customer collaboration for agile projects (Martin et al., 2004a, Kautz, 2009, Koskela and Abrahamsson, 2004, Martin et al., 2004b). Koskela and Abrahansson (2004) found that the role of the on-site customer to be very demanding and the customer requires a strong ability to resolve issues rapidly. Martin et al. (2004) found that the customers have a pressured and stressful role. The characteristics of the customer are also highlighted in this study and appear to have a direct impact on the customer focus of the agile team. The following quote from case A illustrate this point:

> I guess there has been a continual struggle on this project, there are ourselves and the proxy customer, those two streams have fallen out of synch (Project Manager)

Case B had differing experiences with the customer, some finding that the customer was apathetic:

> Sometimes they comment on things that are good but often they sort of lean back and get information (Team Member)
> I guess they may have looked at our system in its current state for a couple of hours or so [but] there is not much keen interest there (Scrum Master)

And others finding them very involved:

> [the customer] is actually participating in the demos, in the retrospective meetings, he has been very hands-on and given direct feedback on solutions, what worked, what didn't and so on (Project Manager)

5.3 Customer Location

Agile development values close customer collaboration. The location of the customer is important for communication purposes (Korkala et al., 2009). Korkala et. al. found that in distributed teams weak customer relationships may result in inefficient communication. Their findings seem to agree with the findings of this study where an on-site customer was easier to communicate with than a customer

not located in the same office. An example from case A is where a team member stated that it:

> Would be nice if there was more synch up between the two groups

And suggested this was due to the fact that the customer was not based on site. An example from case B was where the customer was on site and the communication appeared to be more efficient:

> Sitting on the same floor it was much easier, when they needed help from us they could get it straight away and if we needed clearance or whatever we could go over to them(Team Member)

5.4 Teams Experience with Customer

Relationships are developed over time and the teams experience with the customer and the customer's domain appears to have an impact on the customer focus of the team.

An example from case A is where a customer proxy group who had 3-4 years experience with the customer gave the requirements to the development team. However as the project matured and the team gained experience with the actual customer it:

> Got to a stage where it was more efficient to deal directly with them and show them what we were building

Showing that as the team gained experience with the customer the relationship improved. An example from case B is where the team:

> Have been involved in the previous product as well so we have a pretty good understanding of the business (Scrum Master)

6 Discussion

The importance of customer focus is evident from the fact that it is one of the six categories among the Malcolm Baldridge Award criteria[2]. The strategic importance of customer focus may vary from organisation to organisation and it should be noted that when developing projects which are for internal customers, strategic priorities and work flow management may impact the relevance of customer focus for any given project. However, customer focus is still one of the vital components of a strong overall performance framework (Baldrige NQP. 2010). The revised customer focus framework is presented below.

[2]http://www.baldrige.nist.gov/PDF_files/2009_2010_Business_Nonprofit_Criteria.pdf

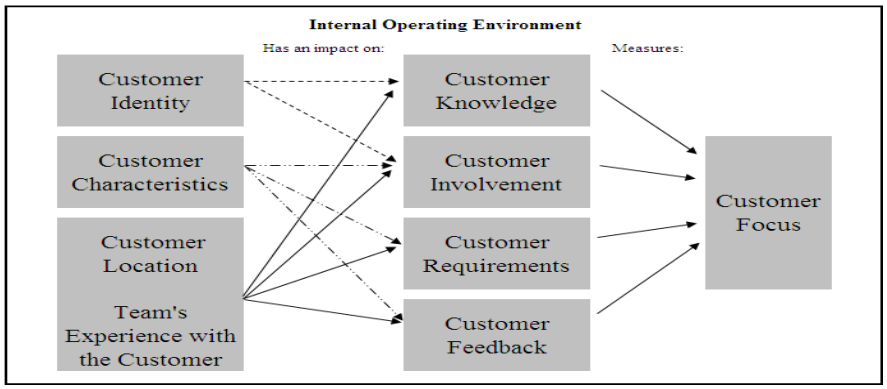

Fig. 2. Revised Customer Focus Framework

The studies presented show a varying degree of customer focus for the agile teams. The initial customer focus construct highlighting customer knowledge, customer relationships, customer requirements and customer feedback does not cover the whole spectrum of what it means to be a customer focused agile team. Other factors identified highlight the necessity to have a clearly defined customer, the importance of that customer's involvement and attitude towards the team, the location of that customer and the teams working experience of the customer. This produces a refined idea of what having a customer focus is in terms of an agile team producing software for internal customers. More research might take a quantitative approach and examine the links between these construct dimensions and the effects on measurable qualities such as customer satisfaction or customer complaints.

	Case A	Case B
Customer Knowledge	No formal structures in place to disseminate customer knowledge, poor inter team knowledge sharing	Inter team knowledge sharing needs inprovement. Scrum of scrums helps disseminate customer knowledge
Customer Involvement	Project dependent	Project dependent
Customer Requirements	Distance from the customer sometimes slowed down the response to requirement queries. Some requirements were not understood	Filtering of requirements through product owner sometimes a problem
Customer Feedback	Little direct formal feedback from customers received	There is an opportunity to get direct feedback at the end of each sprint
Customer Identity	Ambiguity as to the actual customer	Clear structure outlining customer and proxies
Customer Characteristics	This appears to be hit and miss across both cases	
Customer Location	Synchronising across time zones and large distances was an issue	Customers within same time zone and geographically close.
Teams Experience with the Customer	Both cases experiences improved relationships as the teams experience with the product or the customer increased, indicating a linear relationship between time based experience and improvements in customer relationships	

Fig. 3. Comparison of Cases

7 Conclusions

Importance to Industry

This research highlights has a twofold importance to industry.

It takes the customer focus construct and applies it to the newly emerging agile software development environment. This construct describes the importance of customer knowledge, customer relationships, customer requirements and customer feedback and the two cases studied show how customer focus may be affected within an organisation which develop software systems or applications for internal customers.

The emerging factors show that when an organisation is attempting to create a more customer focused environment they need to consider other factors such as clearly identifying the customer and their role, characterising the customer so the development team can manage their expectations of their customer, being aware that the location and accessibility of the customer impacts customer focus and also the organisation needs to try and establish long lasting relationships between teams and customers.

Importance to research

Many organisations have their own internal software development departments which develop products for in house customers. While the concept of customer focus has been researched in other areas, such as manufacturing and also from the viewpoint of the external end user (Ravichandran and Rai, 1999), customer focus has not been addressed from the viewpoint of the internal customer. This research is a start to filling this gap and uses the customer focus construct to study two organisations with internal customers. In this sense this research is exploratory and further research could be carried out which includes the emerging factors and compares customer focus across a larger number of organisation contrasting satisfaction ratings across organisations using the extended customer focus construct. The findings show that there are other emerging factors which need to be considered when looking at customer focus, customer identity, customer characteristics, customer location and the teams experience with the customer.

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