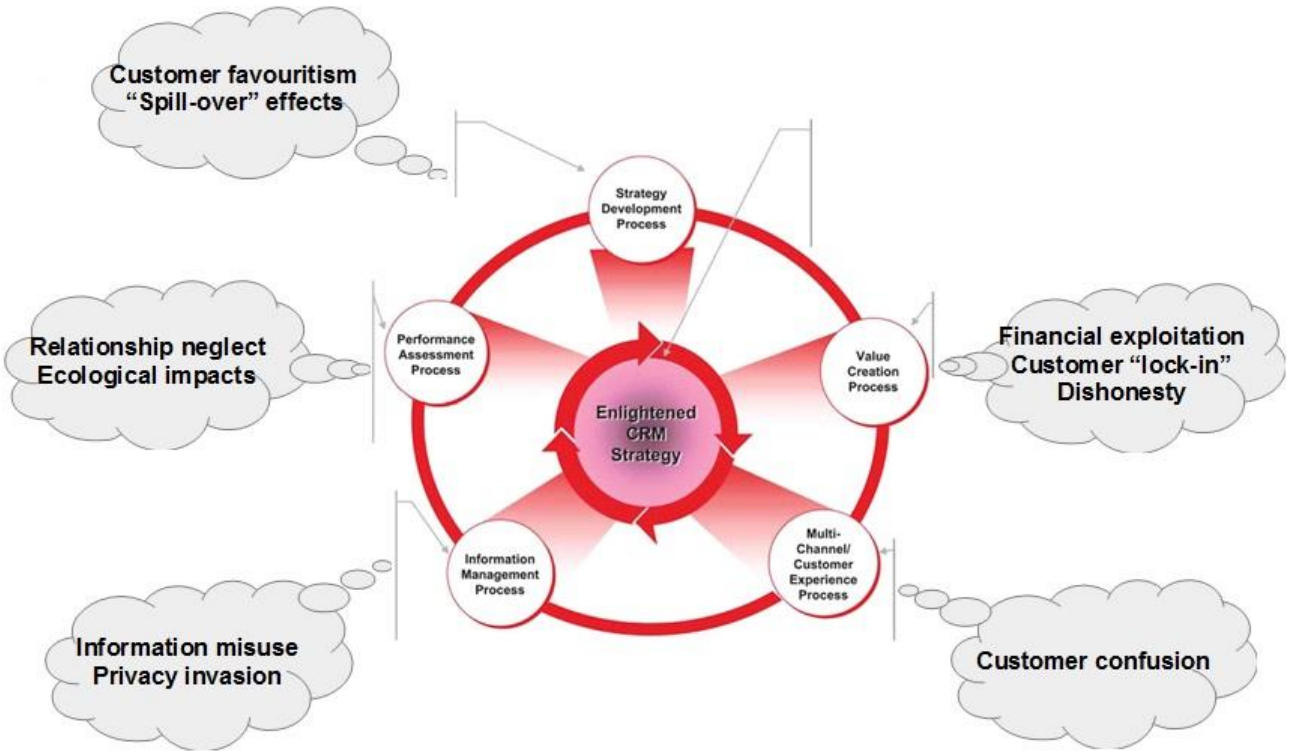
Exploring CRM systems and the Non-functional development aspects through ANT



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Preface

I would like to thank If Insurance and the employees for the opportunity to be a part of their workspace during this project, everywhere I was met with cooperation, professionalism, honesty, trust and kindness.

And a special thanks to a very patient supervisor.

COPENHAGEN INSTITUTE OF TECHNOLOGY

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Title page

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Abstract - Danish

Specialet omhandler følgende dele

Indsigt i Kunderelation systemer bedre kendt som CRM (Customer relationship management) løsninger. Udgangspunktet er at udvikling af CRM systemer ofte fejler og koster meget på bundlinjen for organisationer verden over.

Indsigt i Non-funktionelle krav, bedre kendt som NFR (Non-functional requirement). Litteratur gennemgang har vist at der bliver ikke nævnt noget om NFR i forbindelse med CRM udvikling. Det kan vise sig at være en fejl, da fokus på NFR har medbragt gode resultater indenfor andre felter af ICT.

Specialet har til formål at fungere som bindeled mellem de to felter og derved opnå fordelene fra NFR metoder i CRM udvikling.

Endeligt præsenteres der også en hypotese omkring Skjulte NFR altså HNFR (Hidden non-functional requirements).

Aspekter af analysen bliver behandlet med Aktør-Netværks teori metoder.

Introduction

If you have never heard about the importance of Customer Relationship Management (CRM) consider this: Forbes, an American business magazine, refer to an enterprise software forecast from Gartner (one of the biggest technology analysts and consultant companies in the world) indicating that CRM will have the lead in growth in all enterprise software categories and furthermore they predict a worldwide spending of 36.5 billion dollars in 2017 into CRM technologies (Gartner, 2013). CRM is growing at fast pace, carried forward with the rise of new communication technologies. The methods and possibilities for collecting consumer data have risen exponentially during the last decades and allows for the possibility to analyze and in some instances even predict the behavior of individuals. Gathering information about the customers is one of the means for modern organizations to adjust their products to better suit their customer's needs. This can in terms result in a successful partnership between the company and the customer, in which case the benefit is mutual and can result in better products that are customized for the individual customer. The core idea of a CRM system is to incorporate a culture in organizations that creates better relations with customers.

However as with any other information and communications technology, the development and implementation can differentiate from the expected results. In correlation to CRM literature the term failure rate is addressed commonly. An example of this is from the Harvard Business Review, the article 'Avoid the four perils of CRM': *…but when CRM doesn't work – which is often – it can lead to Monster-like (and monster-sized) debacles. Consider this 55% of all CRM projects do not produce results, according to Gartner Group, a research and advisory firm* (Rigby, Reichheld, & Schefter, 2002). These numbers signify a potential massive loss of investment because CRM is growing rapidly in the private sector. A high failure rate can turn CRM investments into a potential nightmare for the industry. The risk of failure in CRM development appears to be real and generally accepted among peers, both in the industry and by academics and researchers, since it is referred to repeatedly throughout the literature. More specifically it is numbers from the analytics company Gartner, which seems to be the 'go to' authority in the matter. The numbers from Gartner has been the focal point of concerns for failure rate of CRM. Gartner does seem to be prevalent in this domain, but the material and the numbers behind the reports are not all accessible, and the costs to gain access to the rapports are also a hindrance. However their rapports are widely accepted in the field as the leading analytical numbers concerning CRM development, based on the fact that so many researchers point towards the numbers from Gartner (More on this later).

Analytical tools such as CRM solutions are yet a fairly new phenomenon, so naturally there are organizations having trouble harvesting the results of their endeavours. Thomas H. Davenport, an American author specializing in analytics and business process innovation, points out in 'Analytics at work', that an organizations level of maturity in analytics will eventually increase, but it takes

time, sometimes many years, to go from being analytically impaired to become an analytical competitor (Davenport, Harris, & Morison, 2010). In development there are still many decisions based on ‘gut feelings’ of the manager in charge of operations. Research suggest up to 40% of major business decisions are not based on facts (Davenport et al., 2010). This does not necessarily result in bad solutions, since experienced developers have done this for years, however it does seem beneficial to address this stigma in business and IT development, by moving gradually towards more analytical grounded and user experience-based decision making.

Hypotheses

Literature in CRM development points towards the emphasis of having the right strategic framework and expectations towards development, and there have been many case studies based around exploring CRM solutions, but the literature review reveals a knowledge gap in the cross section between CRM development and the user experience. Users have implicit expectations about how well the software will work. These characteristics include how easy the software is to use, how quickly it executes, how reliable it is, and how well it behaves when unexpected conditions arise. The non-functional requirements (NFRs) define these aspects about the system. Non-functional requirements express desired qualities of the system to be developed. They refer both to observable qualities such as system performance, availability and dependability, and also to internal characteristics concerning, e.g., maintainability and portability (Ameller, Ayala, Cabot, & Franch, 2012). NFRs are originally a term from systems engineering that specifies the criteria to judge the operation of a system. In software development the term refers to measurable criteria of a system, in contrast to functional requirements which determines the behaviour or functions of a system. NFRs are typically used in software development and planning but the attributes can also be used to analyse an existing system. There are research papers about identifying NFRs such as *Identifying Stakeholders and Their Preferences about NFR by Comparing Use Case Diagrams of Several Existing Systems* (Kaiya, Osada, & Kaijiri, 2008) and *How do software architects consider non-functional requirements: An exploratory study* (Ameller et al., 2012) yet there is a lack of case studies connecting CRM systems and NFRs in the academic field. This is based on several weeks of research and extensive reviews of existing literature in CRM development. The reason for this lack of correlation between CRM and NFRs has presumably something to do with the traditions in the respective fields. In software engineering there is an emphasis on the technical side and almost clinically careful planning of the systems requirements, while CRM solutions have focused more on holistic frameworks, based around establishing mutual beneficial relationships with the customers, and at the core of it, the emphasis is on the bigger picture and translating the philosophy of CRM into a successful methodology, thereby perhaps having stretched too thinly to have room for the emphasis on the user experience.

Another reason is that analytics in general is a fairly new phenomenon as mentioned before; there has simply not been enough research conducted across the two fields. We know from other fields that software requirements are crucial for development examples of this is modern iterative and agile software engineering methodologies such as SCRUM, or from the field of research in Human computer interaction, and from the field of software development, the modelling language UML they all focus on requirements including NFR's. Gathering software requirements and creating use cases is a big part of modern development, but even in the "old ways" of software engineering, such as the early adaptation of W. W. Royce's waterfall model eliciting requirements was heavily emphasised. Requirements are now, and have been for a long time, a big part of software

development however the methods develop and become more refined with time, and NFR's are one example of this. The emphasis on separating and categorizing the non-functional requirements brings another aspect into the development process.

There should be significant gains when combining the experience from other fields and adding them to CRM development. This is at least one part of the hypothesis suggested in this paper.

In a somewhat contrast to what has been stated earlier, the literature review reveals that there are other CRM researchers who, in their own right propose some level of Non-functional requirements for CRM development to some degree. The big difference however is that, they do not do so, in terms of Non-functional requirements. As presented in the literature review there are authors from the field of CRM, who express concerns about the lack of focus on qualities which can be equated to NFRs. There are clearly differences between the classic understanding of technical NFR's and the types of NFR's which are grounded in the holistic frameworks of CRM development literature made by researchers in the field of ICT, economics and management, however the premise is the same. Some CRM frameworks support the notion of qualities similar to non-functional requirements, yet the link towards non-functional requirements does not exist, it is hidden. These hidden non-functional requirements are evident throughout CRM literature, if you look for it although they have not been classified as such by the researchers. It seems that NFR's as a term, is overlooked in some ways and are not properly categorized which can be ineffective, since it is highly emphasized in other fields such as systems engineering and HCI. By creating a framework with these hidden non-functional requirements, based on the work of some of the most influential (in terms of the rate they have been cited in literature by others) the aim is to provide a template for hidden non-functional requirements or (HNFR's) for CRM development. The HNFR template will provide insights into and elaborate on the three levels of requirements specifically for CRM development: Functional requirements, Non-functional requirements and Hidden non-functional requirements.

The second part of the hypothesis is to present a HNFR framework, based on the combination of CRM and NFR literature to help guide developers in regards to CRM development and implementation.

Problem statement

The reports made by independent analysts primarily from the US, indicate that there is a huge financial problem within the field of CRM development. The industry spends billions on development and implementation of CRM systems and in many cases the results are not meeting the expectations (Gartner, 2013).

Existing literature on CRM systems is massive, but the industry is still relatively new. Identifying the somewhat overlooked hidden non-functional requirements within existing CRM literature and creating a HNFR template will serve as another method for optimizing CRM solutions, by creating a framework to identify the needs for a system and the shareholders involved within and around the organization.

Related domains indicate that identifying NFR's can help to define the overall qualities or attributes of the resulting system. NFR's place restrictions on the system, the development process, and specify external constraints that the product must meet, or at least to a certain degree. The HNFR template includes a refined array of requirements on a high level, by combining experience from the fields of CRM and NFR.

By identifying the HNFR’s for the CRM systems in relation to the employees, the customer and the software systems, the purpose is to offer an educated proposition for what to take in consideration for a CRM solution.

The purpose of the thesis is to explore, analyse and make account for the different levels of requirements, in relation to customer relationship management systems development, based on a case study in an enterprise, on the verge of CRM replacement. To sum up: (1) Present an extensive literature review focusing on what other researchers have concluded as necessary to cope with the problems concerning CRM development. (2) Embrace the experience from other related fields. (3) Create a template which combines past findings, from the field of CRM with the experience from related fields of ICT. (4) Generate empirical data from an organization, based on their CRM needs and hold it up against the HNFR template.

Research questions

What does the CRM development and implementation literature state about successful development?

What are Non-functional requirements - and how can they be implemented into CRM solutions?

What are the effects of emphasizing the use of Hidden non-functional requirements and in which way does it contribute to potential lower failure rates in Customer relationship management development, if any?

Constraints

In regards to personal finances for the researcher, there is a loss of revenue due to the nature of time spent on the research i.e. amount of time spent during observation and interviews. All in all it is considered a normal part of studying in a master's program, so no real expenses were necessary during the study.

The organizations costs however have to be minimized when considering the field work, as to not hinder the employees too much. These costs and the amount of observation hours were negotiated with the organization. They were very open and cooperative, but naturally this placed some constraints on the amount of hours accessible to the organizations employees during work hours. The observation period of the research stretched over a period of 3 months, in total hours it was close to roughly 30 effective hours based on the amount of time spent on observations, not including meals, formal visits, arrangements, meetings, and other general non-observing hours. The interviews were arranged with four leaders from four different departments: Customer service, Home insurance claims, Health insurance claims and Auto insurance claims. The Claims departments provided 15 employees made available for interviews of approximately 15 minute each, during work hours. The Customer service department were especially overwhelmed due to high pressure of busyness, so they could only offer volunteers outside of work hours. This resulted in two volunteers, who took the time to speak outside of work hours. The end result was roughly 3½ hours of interview in total, with 17 employees.

There are countless of other indications that CRM development is on a rise and yet encounters high failure rates. The challenge is to find trustworthy and peer reviewed material other than from English sources. This creates a limitation of sorts and will be a factor when concerning the validity of the resources in contrast to the whole picture of CRM development worldwide. This distinction must be mentioned since it does affect the scope of the research, which primarily focus on analytics from the western world and research papers written in, or translated to English.

Another important aspect is to define the target audience within the problem area. This area was slightly touched during the introduction, by mentioning that 40% of decisions regarding development are based on a hunch by the managers in charge of operation. The target recipient of the thesis is exactly those who conduct these types of decisions. The template or framework is issued towards project leaders, such as business developers, managers, product owners, and others in charge of projects. This allows for a high level explanation, in the sense that there is a certain "sweet spot" level of submersion. The template might fail to be useful for those who perform the nitty-gritty part such as the actual programmers, since the idea is to structure what happens before the programming. At the same time, it does require a certain understanding of the field and might be unserviceable to someone strange to the general field of ICT.

CRM is a massive field. There are many aspects e.g. Complaint Management, Relationship Marketing, Operational CRM, Collaborative CRM it. The intention of this paper is to touch on one part of CRM. The key aspect of this research paper is to look into CRM failure. Literature review reveals that CRM failure is often related to strategic decisions on development and implementation. Therefor the attention and efforts will go into this part of CRM, including the relationship between the customers, the organization and the systems specifically in relation to communication and information flow. Since this is particularly within the scope of Information sciences, i.e. the field of this paper and the correlated researcher. Furthermore the limitation of access to the organization, as mentioned before, dictates the type and amount of data to work with.

Methodology

Case study

If P&C Insurance is a leading property and casualty insurance company in the Nordic regions including Sweden, Norway, Finland, Denmark, Estonia, Latvia, Lithuania and Russia, with a total customer base of around 3.6 million and with around 6.200 employees , which is a reasonably large insurance company portfolio. These numbers become considerably smaller when only focusing on If Denmark, where there are around 450 employees. The organization is going through a centralization process where more and more small and local systems are being scrapped in favour of larger investments into IT solutions that penetrate the whole organization. Instead of paying license fees and maintaining hundreds of IT systems throughout the different Nordic countries, the organization is making efforts to have the fewer system implemented in their respective divisions. One of the new IT solutions is a new centralized CRM system that will work throughout the whole organization across the different countries. The development of the new joint CRM system has just begun. The organization has accepted to cooperate to provide data, and to put up some of their employees for empiric data collection, such as interviews and observations for the research of this thesis.

Purpose of the case study

The case study will provide information about the relationship of the employees, the customers and the current customer management solutions. The data will be representative of their systems, but this can possible allow for a basic understanding of the use of ICT regarding customer relationship management in this line of business, which can hopefully add some general applicable and valid data that can be used to improve CRM development for others. The case study will involve looking into the HNFRs of their current IT systems and customer management efforts, with the purpose of researching and developing a comprehensive solution for a user friendly and longevity CRM solution. The reasoning behind researching in a single case study, in just one organization, in contrast to several organizations is to develop an in-depth understanding of the needs and requirements for a CRM solution in this line of business. This seems to be the better choice because of logistical and pragmatic limitations, such as time and access to the field.

Research design

Literature review of relevant existing works in the field of CRM development, more specifically on how to avoid CRM failure combined with literature review of NFR will be the base of the research. This will be supplemented with empirical data gathering drawn from a period of observations of the users and the current customer management solution in the organization. Combining this with interviews of the users should provide an understanding of the organizations CRM needs. By performing an explorative case study in the organization it should be possible to find and identify NFRs that are specifically important for CRM solutions. The HNFR template will provide a list of requirements which has to be met as well, identifying these will be equally important. It should thereby be possible to provide insights that can be used in the field of CRM development and to help close the knowledge gap between customer relationship management solutions and non-functional requirements.

There are many methods available for gathering empirical data, considering the access and the constraints to the organization and the data needed, it seems effective and rewarding to perform observations of the users and the systems they use, since the purpose of the research is to comprehend the relationship between the necessary NFR's of a CRM solution. There is one methodology which combines the emphasis on observations while also providing tools for analysing the relationship between users and systems, this methodology is Actor-Network Theory (ANT). ANT can be described as a research method focusing on the connections between human and non-human entities. This focus can be used to reveal the true structure of the organization by looking into the different entities and their roles involved in the information and knowledge management of the organization, through their connectivity and interaction. The inspiration for the approach is from the early work of the French anthropologist Bruno Latour, up until the later work of others inspired by Actor-Network Theory, such as Annemarie Mol with a more modern approach to ANT, post-ANT or after ANT. ANT is rooted in Science and Technology Studies (STS), which is the study of technological innovations but with an emphasis on the social and cultural aspects. There is no clear cut definition of what STS is exactly, because of the diversity of the field. The students of the field comprise of anthropologists, philosophers, sociologists, economists, historians, social psychologists and many more. The strength of STS lies within the diversity because it enables flexible and effective responses towards the issues in the field of research as well as in society in general (Jensen, Lauritzen, & Olesen, 2007). Latour started out with Laboratory Life where he introduced the ethnographic approach in laboratory settings, which was the first ethnographic laboratory research of the kind, where he actually went in to the field and observed the scientist throughout their everyday life (Jensen, Lauritzen, & Olesen, 2007). Latour was not the only contributor to ANT and during the eighties, and nineties other scientist immerged with their contribution to ANT, two of which is Michel Callon and John Law who both formed ANT. John Law describes ANT as a >>reckless application of semiotics<< (Lauritsen, Jensen, & Olesen,

2007, p. 95) defining the ANT approach which is that: …everything is what it is – in relation to other things and not because of inherent attributes (Lauritsen, Jensen, & Olesen, 2007). This is the basis of generalized symmetry in ANT sense, which is one of the key definitions of ANT, because this explains the ANT view on technology and sociology where the dualism cease existing, the difference between human and non-humans the difference between micro and macro becomes irrelevant, the only thing that matters is how everything is connected and interacts with everything else. ANT research has been done in various surroundings from Law and Latour study of the development of diesel engine, to the pasteurization of France to the more modern researches done by Annemarie Mol (Mol, 2002) where she research atherosclerosis patients and the different treatment methods by using the emphasis on multiplicity and enactment of atherosclerosis. Another modern ANT research is also done by Annemarie Mol with Marianne de Laet, where the research is based on a bush pump in Zimbabwe 'B' Type. The researchers follow the pump and look into the interaction between the pump and the communities around the pump, how the fluidity of the pump can change the behaviour of small communities and thereby in extension the whole country to a certain degree (de Laet & Mol, 2000). ANT is a method more than a theory and it is never completely defined because that would defeat the purpose as being a provocative statement about the social constructivist approach in the field of social sciences. ANT is a socio-technical method, and the purpose of using ANT in this research is to research both the social, cultural behaviour of the employees at If Insurance as well as to understand the technology and how the technology and the users interact and shape each other. By using ANT the researcher can model the interaction between the different actants involved and truly understand their process. A similar but in many ways different approach to this study could have been the use of Activity theory, where the emphasis is on the interaction between the subject and object as well, and in later works by Yrjö Engeström the inclusion of community as well. However the emphasis on observation and to understand the differences between the cultures in the organization - compared with the interaction with the technology - combined with the physical boundaries of access, to the employees makes the choice of ethnographic approach seem more viable than workshops and surveys, which further confirms the ANT approach.

Aims

The research aims for:

- A qualitative scientifically conducted research.
- Literature review of relevant CRM research.
- A thoroughly planned course of research.
- Partnership with a major service provider with lots of customers.
- ANT methodology for gathering of empirical data – through observation and interview.
- Ethical considerations – Including:
    - Respecting the organizations boundaries.
    - Non-disclosure agreement.
    - Handling of sensitive data about the organization the employees and customers.
    - Legal considerations.
- STS as theory of science.
- Providing a template of HNFR (Hidden non-functional requirements).

Intro to analysis methodology

The analysis method will be typical ANT research based on empirical data gathering through qualitative data. The basis for the data gathering will be an ethnographic approach supplied with interviews to fill any holes in the understanding of the field work. The interview will be based on general ethnographic principals such as facilitating relationships, observations, interviews (Atkinson, 2007) combined with classical interview methods such as semi-structured interviews (Kvale & Brinkmann, 2009). The analysis will consist of classical ANT tools, such as opening black boxes, generalized symmetry, translation processes, observing the heterogonous actants and their interaction with each other, studying the Actor-Networks, and the meaning of those. The analysis should provide insight into the culture of the employees, the different department cultures and their social and technological interactions.

Problem area

How do we know that CRM development suffer from high failure rates?

CRM systems had a bumpy beginning. As mentioned before, the Gartner group (later changed name to Gartner in 2001) is one of the biggest technology analysts and consultant companies in the world and they reported: That CRM sales plummeted shortly after had risen 28% between 1999 and 2000 to a drop of 5% in 2001, 25% in 2002, and 17% in 2003 (Rigby & Ledingham, 2004) due to lack of trust in the technology, because of the underwhelming results, not meeting expectations. Furthermore Gartner Group reported in 2003 through their commercial market research studies that approximately 70% of CRM projects result in either losses or no bottom-line improvements in company performance (Reinartz, Krafft, & Hoyer, 2004). There are various sources other than Gartner Group who suggest an extremely high failure rate of CRM systems throughout the 2000's. According to AMR Research (An independent research and industry analysis firm, later bought up by Gartner Group)[1] in 2005 the failure rate among new CRM solutions was 18%. In 2006 according to AMR Research it was 31%. In 2007 according to AMR Research it was 29%. In 2007 the Economist Intelligence Unit (An independent research and analysis company) concluded it was 56% (EIU, 2007). In 2008 Forrester Research (An independent technology and market research company) concluded the failure rate to be 47% (Leaver & Magarie, 2008). The latest numbers available comes from Merkle Group Inc. (A privately held performance marketing agency, specializing in data-based marketing solutions) who reports a staggering 63% failure rate on CRM initiatives (Merkle, 2014). Merkle Group Inc. surveyed 350 leaders within large US enterprises and asked them, among other things, about their view on their CRM initiatives (Merkle, 2014). The reported failure rates seem alarming although the numbers are biased because of various conditions: What is the exact definition of failure? This can vary in different reports, some reports look into the bottom-line improvements over a certain period of time, others take account for the organization culture and how the CRM system lacks to meet the expectations. CRM systems development is a huge industry and has the attention of enterprises as well as the researchers within the field of ICT, business and development, marketing and management. There is no exact scientific term for failure rate, but what is apparent is that many organizations consider their efforts in CRM development / implementation to be a failure, at least this is what the numbers show from the IT analysts who has done interviews and polls in the industry.

[1] Due to the sales of AMR research: The report is no longer available. Confirmation from secondary sources: Journal of Marketing Management Volume 29, Issue 3-4, 2013 online link: http://dx.doi.org/10.1080/0267257X.2012.732598 & http://www.zdnet.com/article/crm-failure-rates-2001-2009/ & http://www.destinationcrm.com/Articles/Web-Exclusives/Viewpoints/The-Business-Intelligence-Advantage-52300.aspx

With the risk of joining the crowd in a somewhat 'the emperor's new clothes' manners, there is really limited alternatives, because of the very definition of failure rates. Failure rates is not a scientific term, it is an assessment, often made by leading managers in the industry who wrestled with CRM development. The method to determine whether CRM solutions have been a success or failure is by interviewing those involved, and Gartner is exceptionally good at this, because they have done it for years and have established a reputation and thereby have access to the business leaders of many organizations. Most CRM studies, as the literature review will point out in a later chapter, seem to be targeting the strategic side of the development and implementation, and thereby placing CRM in a separated development category. The reason seems to be that in early CRM development the emphasis on strategic planning and use of CRM was not sufficiently mastered and thus the organizations suffered heavily, because the industry had not matured and lacked experience, resulting in half-baked solutions with unrealistic expectations. Based on research from the literature review, it seems that more recent CRM projects emphasizes heavily on the strategic use of CRM systems, in a more holistic framework, but there are still indications pointing towards high failure rates. In general, organizations have to adapt and learn to use the generated data from analytics efficiently.

Although the above mentioned numbers are primarily concerning CRM development within US companies there has been a boom of CRM development all across the world. For instance according to CRMSearch (An online community focused on Customer Relationship Management strategies, software, processes and complimentary solutions) In Southeast Asia (SEA) consisting of Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam the region has seen an uptake in middle market since the turn of the century. These enterprise companies are moving to more modern business software applications to improve their business processes and enrich the customer experience. E-commerce, Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) applications have all been at the forefront of this software technology adoption. The region lacks stability in functional requirements and a variety of governance and compliance rules makes it harder than in the western world, yet there is still a rise in CRM development (Schaeffer, 2015). According to Technavio, a global technology research and advisory company, their analysts forecast the CRM market in China to grow at a Compound[2] annual growth rate (a business and investing specific term for the geometric progression ratio that provides a constant rate of return over the time period) of 16.54% over the period 2014-2019 (Technavio, 2015).

So what does it mean? We know now that CRM is becoming increasingly popular all over the world, and we have stated that the concerns with high failure rates are justifiable. So the question remains - how do we take on this issue? A good place to start is looking into what researchers in

[2] The ability of an asset to generate earnings, which are then reinvested in order to generate their own earnings. In other words, compounding refers to generating earnings from previous earnings.

the field of CRM have to say about it. To know more about possible solutions it is necessary to look at the literature on CRM failure and how to prevent it.

Literature review

The literature review was done by using some simple models for search, combined with access through Aalborg University Database and suppliers. Methods to narrow the scope of search was with a combination of Boolean operators such as AND/OR, truncation of words and exact operators. The point of origin for the research was CRM, from there, including +failure, NFR or Non-functional requirements, nonfunctional, requirements etc. This would lead on to some specific researchers. The researchers would be rated by peer reviews, combined with the amount of citations from their papers. In some databases like SCOPUS, and SAGE journals it is an imbedded function within the database to search for relevance based on citations and peer review which made the process very automated. Furthermore the use of Keywords, subjects and terms, made it easier to scope in on the relevant material. Essentially the main focus was to present peer reviewed material, the most essential works in regards to the subject of CRM failure, and also to simply follow the trail made by researchers citing the same papers, this would in essence represent the most esteemed works and weed out the indifferent papers. Internet searches and Wikipedia was furthermore used for defining a lot of terms, which could later be combined with further searches. The key for this process was critical thinking and only applying material that could withstand scrutiny.

Background of CRM

Around two decades ago a fundamental shift occurred in the relationship between customer and supplier. Research showed that lowering the customer defection rates (customers defect or stop the usage of products of a company), could be even more profitable to companies than gaining market share or reducing costs. In an empirical study linking customer satisfaction to profits, Fomell and Wererfelt (1987, 1988) examined the impact of complaint-handling programs on customer retention and concluded that marketing resources are better spent keeping existing customers than attracting new ones (Zeithaml, Berry, & Parasuraman, 1996). During the 1990s, external customers began to acquire a certain characteristic they had never had before – one of being sought after by suppliers of products and services. The paradigm of buyer and supplier had shifted, and they were no longer just buyers; they now needed to be treated with respect (Nikolova, 2005). The customers' expectations to the supplier would begin to change as they wanted more individualization towards their specific needs and to be met with more flexibility from the companies. Those organizations that were capable of making the transition into being organizations that transcends the barriers of common trade, and instead establish a relationship with the customer would reap the benefits of the new type of customer. The need for customer relationship management (CRM) became apparent and the industry began to invest costly into information systems to track and strengthen the customer relationship.

What is CRM?

CRM is the abbreviation for customer relationship management and has been defined by numerous people and by numerous descriptions. CRM is referred to as two things in literature: First and foremost it is a customer-centric management philosophy; which is based around individualization or categorization of customers, for identification and satisfaction of the customers' stated and unstated wants and needs. Secondly when referring to CRM many are in fact referring to the tools that enables the customer relationship management, such as the software system, or collaboration of systems, which can help target, identify, acquire, and retain customers. The two seem interchangeable at times, and more often than not, it is the context stating the connotation. Essentially many writers, researchers, journalists, business people and others in the sphere of CRM blend the philosophy with the methodology when writing about CRM. Sometimes the writer adds the word 'solution' or 'system' in extension to the term for clarification, but in general when reading about CRM, the reader has to consider and differentiate between the two. The following is different descriptions of what CRM is to different writers: One way to define CRM is the art of acquiring customers and having a long-lasting relationship with them (Faed, 2013). CRM technologies or CRM systems is described as a link between front office

and back office functions with the company's customer touch points. A company's touch points can include the Internet, e-mail, sales, direct mail, telemarketing operations, call centers, advertising, fax, pagers, stores and kiosks (Chen, I. J., & Popovich, 2003). Duane E. Sharp the author of 'Customer relationship management handbook' points at three areas which are highlighted for development of CRM solutions:

- Modification of customer behaviour over a period of time to enhance the relationship between supplier and customer.
- Relating to customers on an individual basis.
- Establishing a mutually beneficial environment where customers provide information in return for services that meet their individual needs. (Sharp, 2002, p. 5)

These three areas reflect on: firstly the relationship between customer and supplier, secondly on the individualization of customers and finally the benefits of CRM for both customer and supplier. The end goal of a successful CRM is mutual gains. Not only does it have to be beneficial for the organization but also for the customer for CRM to create value. Different authors express the same key point of CRM. When CRM works, it allows companies to gather customer data swiftly, identifying the most valuable customers over time, and increase customer loyalty by providing customized products and services (Rigby et al., 2002). CRM is a combination of people, processes and technology that seeks to understand a company's customers. It is an integrated approach to managing relationships by focusing on customer retention and relationship development (Chen, I. J., & Popovich, 2003). To benefit fully from the implementation of CRM, companies must have efficient CRM programs to secure the loyalty of the customers (Faed, 2013). The above mentioned is CRM at its core however the interpretation of CRM systems can vary from organization to organization. For some the primary target of their CRM solution is to keep track of information about customers. This could be non-profit organizations and the information could be about the organization's donors, supporters, members, volunteers, and other constituents. For others the focus is on customer service, and matching the right customer with the right product, this could be typically the case for insurance companies or banks, but really any type of organization with a large customer base, in any shape or form can potentially benefit from CRM.

What makes CRM difficult

As revealed earlier, there are problems in regards to high failure rate of CRM development and implementation. The high failure rate of CRM development, combined with the more obvious and positive reason, being the increase in use of CRM over the past years, has resulted in a similar increase in studies and research in the field. There are many different views on CRM, some are shared and generally accepted and some try to focus on more unique aspects. The purpose of the

literature review will be to explain some of the key aspects into CRM development in broader strokes, while displaying some of the reasons why CRM development is such a challenge for the industry. Bohling, Bowman and LaValle write: "Successful implementation of CRM initiatives rests on successful cross-functional integration of processes, people, operations, and marketing capabilities that is enabled through information, technology, and applications" (Bohling et al., 2006, p. 185). Having a strategy which encompasses these various elements, should therefore be incremental to success in CRM. Bohling et al. focus on the strategic side of CRM implementation in their paper 'CRM Implementation Effectiveness Issues and Insights'. The strategic perspective of CRM usage has been emphasized throughout the history of CRM countless times, it is far from a unique view by Bohling et al. Faed, Alireza states similarly in the thesis '*An Intelligent Customer Complaint Management System with Application to the Transport and Logistics Industry* ': that companies install a CRM application in the belief that it is capable of delivering what they need. The most common fault is that companies focus on the CRM's implementation technology and exclude the people, process and organizational changes required for it to be useful (Faed, 2013, p. 4 Introduction). This critique is generally encountered when speaking about CRM, but the vast majority of failed IT development / implementations can arguable share the same issues, so what makes it specifically a CRM issue? CRM is de facto an integration of different practices, systems, and people, so consequently it never exists in vacuum. Because of this, the development and implementation of CRM, needs to encompass a wide range of interfaces between different systems, people and stakeholders, and this makes everything more difficult, although it is not unique for CRM, it is exclusively without exceptions a part of CRM.

CRM failure and how to avoid it from a strategic perspective

To create a framework that combines Non-functional requirements with CRM, there is a need to consider existing CRM frameworks. Darryl K. Rigby, Frederick F. Reichheld, and Phil Schefter wrote a paper on how to avoid the four perils of CRM. They focus on four specific areas that need improvement, from a strategic point of view, both in the mind of executives in charge of organizations, as well as during the course of development. The central part of their analysis is based on their findings which points towards one essential problem. They state it as such:

Each of these pitfalls is a consequence of a single flawed assumption – that CRM is a software tool that will manage customer relationships for you. It isn't. CRM is the bundling of customer strategy and processes, supported by the relevant software, for the purpose of improving customer loyalty and, eventually, corporate profitability. This is a subtle yet critical distinction that weaves itself through the four sections of this article (Rigby et al., 2002, p. 102).

Peril 1 - Implementing CRM before creating a strategy. With promises of automating the process of repelling low-margin customers and luring the high margin customers many CRM ventures start

of at the wrong point. They expect changes to occur by implementing a CRM before having a strategy of how exactly to acquire the right customers. Rigby et al. refers to classic analytical processes before implementation. The first step will be to conceive and implement a traditional customer-acquisition and retention strategy (Rigby et al., 2002, p. 102). Furthermore they exemplify the issue by comparing the implementation of CRM, before having conducted segmentation analysis and determining marketing goals, as being equal to: trying to build a house, without engineering measures or an architectural plan. In some instances organization even tries to retrofit a customer strategy to match the CRM technology they have purchased(Rigby et al., 2002, p. 102). This need to be avoided at any instance, the correct approach is to figure out the needs before integrating a CRM.

Peril 2 - Rolling out CRM before changing the organization to match. Not to be confused with the example mentioned earlier, there is a big difference between retrofitting a customer strategy and to prepare the organization to match a new CRM endeavour. Rigby et al. points towards lot of interfaces and touch points that have to be considered, some are more obvious changes, such as different processes and training programs, but some go much further than that. Other changes require a change in perspective – job descriptions, performance measures, and compensation systems, even changing products and evaluating geographic structures (Rigby et al., 2002, p. 104). The authors advocate to a certain degree a complete re-evaluation of the organizational model to match the CRM, and emphasize that this step might be the most important.

Peril 3 – Assuming that more CRM technology is better. Contrary to what can be expected, by this the authors do not discourage the use of technology. Instead they encourage executives to opt for the best fit from case to case, may it be technology heavy solutions or perhaps changes in other aspects of the organization. They mention an organization where one of the executives found out that a tour operator would always send hand written thank you notes to clients, the day after their excursions ended. It turned out that clients loved this personal touch. The executive realized this was a simple and effective way, that the whole company could strengthen relationships, in an industry where customer-acquisition costs are high (Rigby et al., 2002, p. 106). This model would then be implemented throughout the organization and become a part of the organizations approach to customer handling, and later supported by their CRM system. In other instances tech-heavy approaches can be the answer, but the key aspect is to derive to the needs of the organization through practices and then back those practices up with technology, instead of starting out by implementing technologies that are new to the organization, without knowing what to expect as results.

Peril 4 – Stalking, not wooing, customers. Rigby et al. warns against the dangers of annoying potential customers or perhaps equally dangerous to annoy disinterested customers, by trying to build relations with them. The key aspect of this peril is to realize that, just because it is possible to contact a large number of potential customers, enabled by a CRM system, it is not necessarily advisable. The customer strategy has to narrow down the potential customers, by the process of

pre-assessed segmentation into various groups of potential customers (Rigby et al., 2002, p. 108). Furthermore it is important to focus on retention. One way of doing so, is to make sure to keep good relations with existing customers by reaching out and offer some sort of value they did not necessarily expect. An example of this is the Dallas Morning News who discovered that their telemarketing program was annoying customers instead of winning them over. In fact the only positive aspect of their entire program was that it was cheap. Instead they shifted their customer relationship resources away from calling all potential customers to a program that build "wantedness". The new program focused on 12 customer segments that had been pre-assessed for growth potential, they also began to call existing customers to check on satisfaction and offer them the convenience of automatic payments. This in return made good results in the numbers of customers but furthermore strengthened the company's image as one of being a household partner instead of a pest (Rigby et al., 2002, p. 108).

CRM and Dark side behaviour

Pennie Frow, Adrian Payne, Ian F. Wilkinson and Louise Young wrote a paper on customer management and CRM addressing the dark side. The purpose of the paper is to address the neglected area of CRM, namely the dark side behaviour. Their findings are based on an extensive literature review combined with an on-going longitudinal study of CRM. Their study can help to create an overview of what to avoid and what to pay particularly much attention towards, when developing and implementing a CRM. They identify two key reasons for poor customer management, which may result in dark side service provider behaviour. The first reason is based on poor understanding of the strategic focus of CRM leading to inappropriate exploitation of customers, especially when service providers use intrusive technology. The second reason is when maliciously motivated service providers can abuse customers as CRM technology can provide them with powerful recourses to do so (Frow, Payne, Wilkinson, & Young, 2011, p. 80). These two key reasons result into three categories of dark side behaviours witch are identified as: *Communication-based dark side behaviour*, *Dark side behaviour through manipulating alternatives*, and finally *Side effects and dark side behaviour*.

Communication-based dark side behaviour

Communication-based dark side behaviour is primarily based on information flow. The authors identify information flow as the means by which buyers and sellers identify each other and also the means by which relationships are established and developed. Timely and reliable information flows can help customers make better marketing decisions, but poorly timed, confusing and

biased information can distort decision-making and lead to mismatches in the market place and dissatisfaction(Frow et al., 2011, p. 82).

Information misuse – Service providers are able to collect and integrate information from different sources including the web. Service provider's access information purchased from data brokers, as in third party firms who specialize in selling data about users, sometimes without the knowledge of the users. The resulting information provides the basis for targeting the users with promotional campaigns based on detailed knowledge of a customer's behaviour (Frow et al., 2011, p. 82). The problem is that the users have no chance of knowing that their information is being used against them. In some sense the ethics of data use without the customer's knowledge and acceptance expose the customer, leaving them feeling vulnerable.

Customer confusion – Misleading or confusing information and/or hiding relevant information from customers can affect their behaviour and encourage customers to make disadvantaged decisions. An example of this is mobile phone services that based on complex pricings, generated by CRM systems make it impossible for the users to see through and make rational comparisons. According to Sheth and Sisodia, 2006, there are particularly vulnerable groups such as the young, the poor and the elderly who are susceptible towards these kinds of dark side behaviours.

Dishonesty – While aforementioned reasons can certainly also classify as dishonesty, the authors distinctly present dishonesty as the type of decisions that more or less results in scamming the users. Example of this is CRM systems that frequently place pressure on staff to up-sell and cross-sell. Management pressure, CRM performance measurement systems and employee rewards structures that all may result in customers being sold products or services that they do not need (Frow et al., 2011, p. 83). This category also includes direct scams, such as car servicing firms charging for repairs the car does not need, or bars and restaurants illicitly overcharging customers.

Privacy invasion – This category touches on something that has been mentioned earlier, however the authors separate between the three earlier types as: based on information flowing - towards customers. This category represents information from customers, unknowingly, and unexpectedly. Transaction records and observation on users, without the user's knowledge can be made, in profound ways. Frow et al. mentions a specifically disreputable example, of a hotel checking the guest's room and even waste bin for clues as to the customers likes and dislikes, furthermore gathering sensitive data such as whether pornographic movies was watched (Frow et al., 2011, p. 83). The reason behind it may be in the name of better serving the customer for future visits however they touch on areas the customer, likely would not desire nor appreciate.

Dark side behaviour through manipulating alternatives

The second variation of dark side behaviours touches upon inferior products and/or services being provided to the customers deliberately. It is also about constraining or misdirecting customers in some way. These types of dark side behaviour can be done by restricting the alternatives available or offering customer's products and services with hidden and unexpected costs and conditions or even ignoring customer needs.

Customer favouritism – CRM involves in many instances the segmentation of customers based on characteristics of their buying behaviour and their economic attractiveness. In many instances this is the primary reason for adopting CRM for some organizations. Nevertheless Frow et al. warns against this kind of behaviour. If done wrong the results can be customers turning against the service provider. High priority customers are offered additional or superior services. This can have adverse effects on other customers who have not been prioritised and who observe the ways other customers are treated better, for example with priority service lines or dedicated personnel (Frow et al., 2011, p. 83). The authors include this as a dark side behaviour, however although it certainly is something to consider, in many ways this is an intricate part of CRM, so the advice must be to proceed with caution and thoughtfulness when prioritizing customers over others.

Customer "lock-in" – In some instances service providers can make it difficult and costly for customers to change their service provider. This tendency can be considered as "hooking" customers into captive relationships and punishing their escape with high switching costs (Frow et al., 2011, p. 83). There are even some CRM predictive models that can help identify where firms can profit from such behaviour.

Relationship neglect – Long term relationship with customers can result in service providers becoming too stale to add further value to the customer. Customers can also come to the believe that the service provider may take advantage of the trust between the two parties and act opportunistically against their interests (Frow et al., 2011, p. 83).

Financial exploitation – Deliberate financial exploitation of the customers and the use of unfair financial penalties must be avoided as well. One example of this is when customers neglect to make payment in time and are as a result fined with a disproportionate penalty. The penalties are often buried in the small prints because the service provider stands to make significant revenue from them.

Side effects and dark side behaviour

The dark side behaviours which have been represented so far by the authors are concerning the interaction between a service provider and the customer. Frow et al. also looks into what the results of these behaviours can be on other, third parties and the environment more generally.

"Spill-over" effects – In CRM as well as in other marketing activities a service providers focus on certain targeted groups can have undesirable "Spill-over" effect such as annoying or invasive promotion (Frow et al., 2011, p. 84). The authors exemplify this with the following: Broadcast advertising targeted at particular groups reaches non-targeted groups as well, becoming an unwanted intrusion (Frow et al., 2011, p. 84). Another example would be internet pop-up ads and unsolicited e-mail offerings. The result of this kind of practises can end up hurting other aspects of the service provider and even hurt the industry bodies, by making an unwanted behaviour synonymous with the field.

Ecological impacts – This last dark side behaviour seems to be less in touch with the rest of the so far mentioned behaviours. It is still in tune with the overall critique that the authors raise, in the way that it is something that is neglected and seldom associated with organizations use of CRM. Customer management and other marketing activates may have an impact on the environment. These activities include deliberate waste and pollution that sometimes are shifted to other countries with more lax regulations (Frow et al., 2011, p. 84). Furthermore the authors state that organizations should be aware of not encouraging undesirable behaviours among particular susceptible customers. Examples of this could be promoting poor dietary habits through sale and promotion of junk food and/or equally bad products.

The dark side behaviours introduced are all represented in figure 1. The discovery of the dark side behaviours leads to a CRM strategy framework made by Frow et al. for guiding service providers away from dark side behaviours into more enlightened practise of CRM see figure 2.

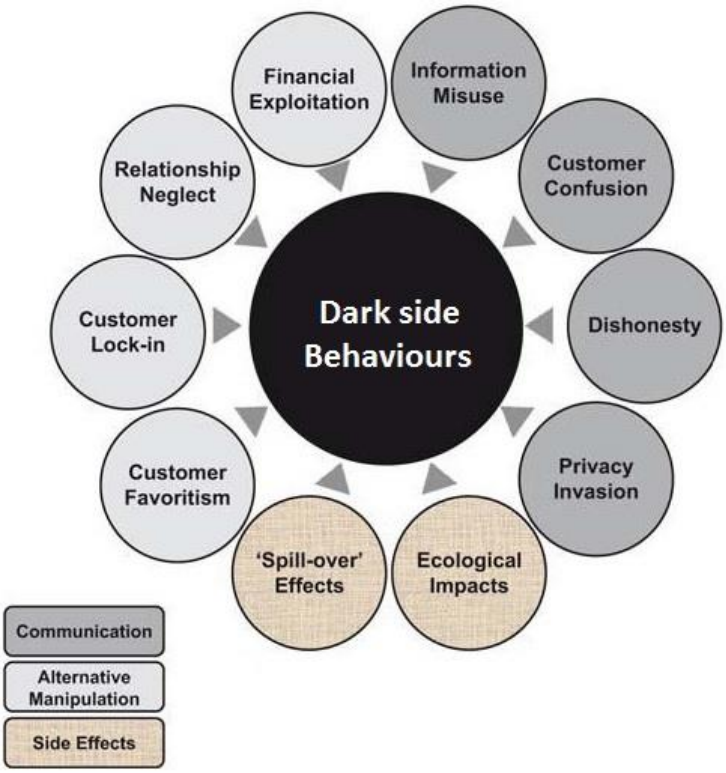

Figure 1 - Dark side Behaviours

Addressing dark side behaviours – A strategic CRM framework

Frow et al. presents five key strategies to handle the dark side behaviours: The Strategy development process, the value creation process, the multi-channel/customer experience process, the information management process, the final process, the performance assessment process.

The strategy development process – The key aspect of this process is the goal of matching the needs of the customer with the resources and capabilities of the service provider (Frow et al., 2011, p. 84). The impact of this process is to take care of customer favouritism and spill-over effect. Furthermore this process should lead the value creation process (Frow et al., 2011, p. 84).

The value creation process – The focus area of this process is to create mutual beneficial and rewarding relationship by co-creating value. The aim is to address the dark side behaviours of financial exploitation, customer lock-in and dishonesty as it is in both parties' mutual interest to co-create a mutual beneficial exchange of value over the duration of the relationship (Frow et al., 2011, p. 84).

The multi-channel/customer experience process – The purpose of the process is to ensure an integration of customer touch points and communication channels to give a single view of the service provider for the customer, and the customer for the service provider. Additionally the service provider aims to interact with customers in the channels the customer prefers (Frow et al., 2011, p. 85). The process should ensure clarity and less confusion for the customers resulting in a better customer experience.

The information management process – This process addresses the information misuse, customer confusion, dishonesty and privacy invasion by using a strategic approach. The approach is based around using information acquired, with the permission of the customers to enhance value creation. It involves seeking to have the same or better memory of previous transactions as that held by the customer, and to use it proactively during customer interactions to deliver high levels of service quality (Frow et al., 2011, p. 85).

The performance assessment process – The final process involves monitoring all relevant touch points to ensure all relationships are managed for mutual value creation. One of the aspects towards doing so is assess the organizations performance across a broad range of stakeholders, beyond just the customers. The process addresses issues of relationship neglect and ecological impacts on both customers as well as other relevant stakeholders (Frow et al., 2011, p. 85).

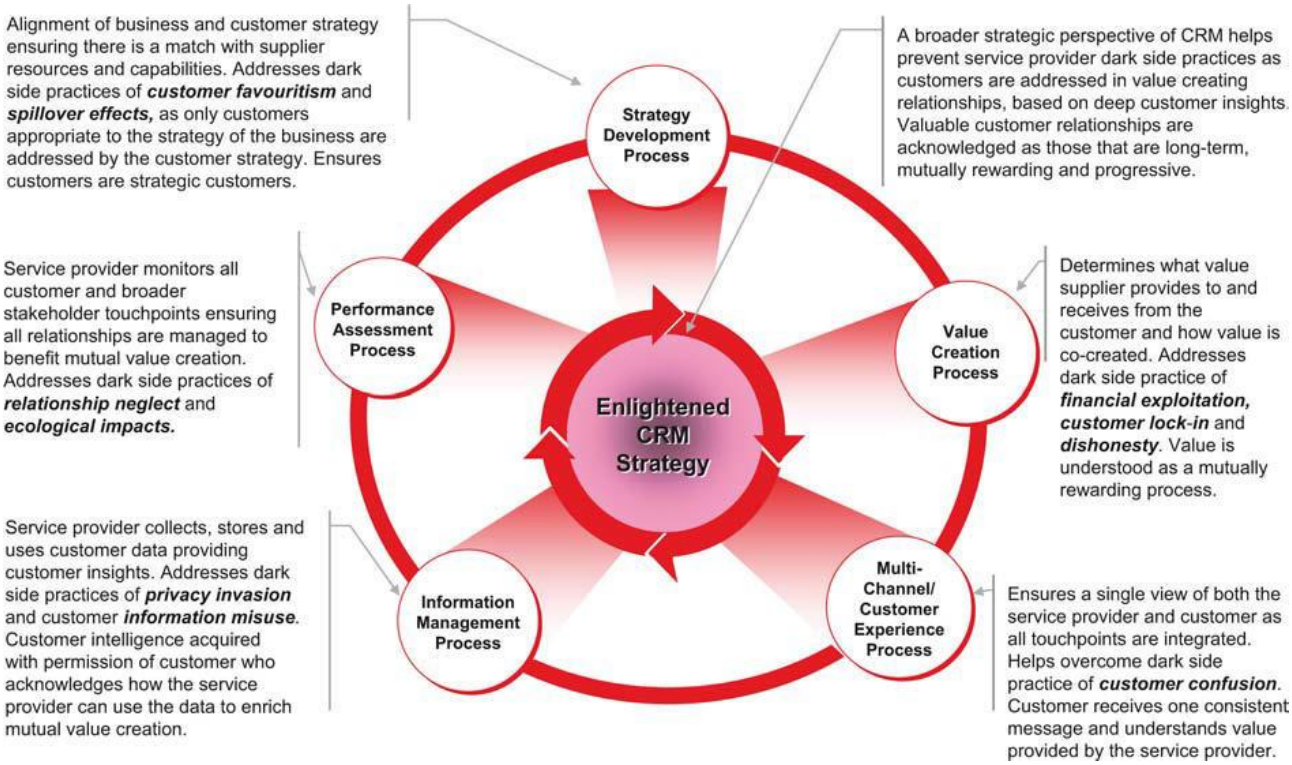

Figure 2 – Addressing "dark side" service provider practices – towards "enlightened" CRM

Non-functional requirements

Background of Non-functional requirements

Origins of non-functional requirements do not stem from a single impactful theoretical source; there is no equivalent of Bruno Latour to Actor-Network theory or Mihály Csíkszentmihályi to Flow theory or Etienne Wenger to Community of practices. NFR's is not a strong theoretical methodology. Instead it is simply one part of old traditions within systems engineering, which have spread out into modern development and among others through research fields such as Human-computer interaction (HCI). It is easy to imagine why the term non-functional requirement seems fitting in modern development. Terms such as ease of use, user-friendliness, security, and reliability are becoming more popular as the field of ICT matures. Generally speaking, functional requirements define what a system is supposed to do, and non-functional requirements define how a system is supposed to be. This however is a very important part of systems development and the complexity of NFR's can range from usability in a system design to much more advanced positions about routines and processes around the use of a software system in an organization. The nature of Non-functional requirements makes it hard to utilize it as a methodology, because it is more a concept of development. There is however one exception in the field of conceptual modeling (spelled with a single l in US). In the field of conceptual modeling there is a NFR framework, which operates as a methodology. This is an interesting approach to handling Non-functional requirements.

NFR in Conceptual modeling

One of the fields that have embraced the practice non-functional requirements during development is Conceptual modeling (CM). As described by practitioners from the field: CM acts as a starting point for understanding, and forming the basis for developers and users, for the benefit of stakeholders (Chung & Do Prado Leite, 2009). An example of a conceptual model is to describe abstractly — in terms of tasks, not keystrokes, mouse-actions, or screen graphics — what users can do with a system and what concepts they need to be aware of. The authors L. Chung and J.C.S. do Prado Leite follow the traditions of John P. Mylopoulos, an acclaimed expert in the field of conceptual modeling. Mylopoulos describes CM as 'the activity of formally describing some aspects of the physical and social world around us for purposes of understanding and communication (Chung & Do Prado Leite, 2009, p. 139). Over the last decades *it* (CM) has found applications in a variety of fields, including: Information system design, knowledge representation

for Artificial Intelligence, modeling of organizational environments, business processes, software development processes, software requirements, or just plain modeling some part of the world for purposes of human communication and understanding (Chung & Do Prado Leite, 2009).

Essentially a software system's utility is determined by both its functionality and its non-functional characteristics, such as usability, flexibility, performance, interoperability and security. Nonetheless, there has been a lop-sided emphasis in the functionality of the software, even though the functionality is not useful or usable without the necessary non-functional characteristics. (Chung & Do Prado Leite, 2009, p. 363)

The authors emphasize the importance of non-functional aspects of development. They state that the strong emphasis on functionality is partly due to the relative short history of software development and partly due to the classic issues with demands from stakeholders and businesses to create systems that fulfil the basic necessities, and more often than not, timeline and economics will play a decisive role. Furthermore the non-functional aspects of a system are being treated only as technical issues, often related to the detailed design or even just as a part of testing when implementing the system, in which case the actual quality of the system comes in second, next to functionality (Chung & Do Prado Leite, 2009). When put into practice this could very easily result in stretching both the timeline and economic boundaries of a project and in some cases the outcome could be failure. The main issue in regards to the lack of emphasis on quality, or what relates to quality being non-functional aspects, is the inadequacy in understanding the real-world problems. The authors state: "… real-world problems are more non-functionally oriented than they are functionally oriented, e.g., poor productivity, slow processing, high cost, low quality, and unhappy customer"(Chung & Do Prado Leite, 2009, p. 364).

In colloquially terms NFRs have been referred to as "-ilities" because a lot of quality attributes such as Usability, Reliability, Testability, Maintainability has the string ility at the end of the word (Chung & Do Prado Leite, 2009). The term "–ilities" has a strong idiomatic sense about it. It is not a scientific term nor is it all-encompassing since there are NFRs such as Performance, User-friendliness and Coherence which does not share the same ending string. For reasons mentioned - and to not cause any pollution in the terms, ilities will be laid to rest from here on.

The NFR Framework

The authors call attention to the NFR framework by John Mylopoulos, both in 'Representing and using non-functional requirements: A process-oriented approach' (Mylopoulos, Chung, & Nixon, 1992) and in 'Non-Functional Requirements in Software Engineering' (Chung, Nixon, Yu, & Mylopoulos, 1999) as an important piece of work on NFRs. Mylopoulos decouples the concept of functionality from other quality attributes and concerns for productivity, time and cost, by means

of a higher-level of abstraction with his NFR framework. Instead of focusing on expressing requirements in terms of detailed functions, constraints and attributes, the NFR Framework devised the distinction of NFRs by using the concepts of goal and softgoal (Chung & Do Prado Leite, 2009). The authors mention the term *softgoal* which is a big part of the later rendition of the NFR framework, it does however not appear in the NFR framework from 1992, yet the basic principles are the same, we will return to softgoals later on. Mylopoulos suggest a comprehensive framework for representing and using non-functional requirements during the development process. The framework consists of five basic components which provide for the representation of non-functional requirements in terms of interrelated goals (Mylopoulos et al., 1992). The interrelated goals can be used to evaluate the degree to which a set of non-functional requirements are supported by a particular design. The proposed framework consists of five components: (1) A set of *goals* for representing non-functional requirements, design decisions, and arguments in support of, or against other goals. (2) A set of *link* types for relating goals or goal relationship to other goals. (3) A set of generic *methods* for refining goals into other goals. (4) A collection of *correlation rules* for inferring potential interactions among goals. (5) A *labeling procedure* which determines the degree to which any given non-functional requirement is being addressed by a set of design decisions (Mylopoulos et al., 1992, p.484). Mylopoulos proceeds to use the framework on a specific case, a hypothetical research project on developing an Expense Management System. The NFR framework places NFR in the forefront of development as with any other needs, however it represents a certain non-absolute approach towards NFR in the sense that the criteria's or 'goals' does not have to match exactly, but rather be satisfied to a certain extent.

A small detour

The NFR framework represents a new approach to handling NFR in contrast to the way NFRs have been proceeded before. A small detour in NFR history is required to clarify what NFR used to be: D. Ross and K. Schoman wrote a paper on 'Structured Analysis for Requirements Definition' (Ross & Schoman, 1977) in which they try to call attention towards requirement definitions that encompasses all aspects of system development. The abstract contains the following: "We see the lack of an adequate approach to requirements definition as the source of major difficulties in current systems work" (Ross & Schoman, 1977, p. 6). They point towards requirement definitions, which must encompass everything necessary to lay the groundwork for subsequent stages in system development. They proposed three levels of requirements namely Context analysis, Functional specification and finally Design constraints, or in other words: The Why, the What and the How (Ross & Schoman, 1977). Design constraints are what we know today as non-functional requirements, and in literature this distinction of 'How' a system works was equated to Design constraints.

The NFR framework by Mylopoulos does not treat non-functional requirements merely as constraints. Instead the premise is a goal oriented approach. As mentioned before the term *softgoal* does not appear in the NFR framework from 1992, however in 1999 in 'Non-Functional Requirements in Software Engineering'(Chung et al., 1999) defines the NFR framework as such:

The new NFR Framework

In the revised NFR Framework, non-functional requirements are treated as softgoals, i.e., goals that need to be addressed not absolutely but in a good enough sense. This is in recognition of the difficulties that are associated with both the problem and the corresponding solution(Chung & Do Prado Leite, 2009). So the authors accept that NFRs are hard to pinpoint during development phases, and although NFRs are treated as an almost vague entity, it is still as a concept, the cornerstone of the Framework. Softgoals represents a goal that has no clear-cut definition and/or criteria as to whether it is satisfied or not. Furthermore, about softgoals they state the following: it is often extremely difficult to explore a complete list of possible solutions and choose the best, or optimal, solution, due to various resource limitations such as the time, manpower and money available for such an exploration(Chung & Do Prado Leite, 2009, p. 371). Thus the NFR framework refers to NFR's not as absolutes, but instead it is about satisfying a goal, to a certain extent. The Framework aims to put non-functional requirements foremost in the developer's mind, even though they do not have all the answers at hand. There are several major steps in the design process of the revised framework:

- Acquiring or accessing knowledge about:
    - the particular domain and the system which is being developed,
    - functional requirements for the particular system, and
    - particular kinds of NFRs, and associated development techniques,
- identifying particular NFRs for the domain,
- decomposing NFRs,
- identifying "operationalizations" (possible design alternatives for meeting NFRs in the target system),
- dealing with:
    - ambiguities,
    - tradeoffs and priorities, and
    - interdependencies among NFRs and operationalization's,
- selecting operationalizations,
- supporting decisions with design rationale, and
- evaluating the impact of decisions.

(Chung et al., 1999, p. 16)

It is worth noting that the steps are not necessarily sequential. Furthermore the author encourages iteration. A developer may choose refinements, having operationalizations* in mind; thus the development process may move up and down, rather than being strictly top-down (Chung et al., 1999, p. 17) (*Operationalizations is a term used in the NFR framework as different kinds of implementation and design techniques that can be selected to ensure a feasible outcome, more on this later). As mentioned before, there has been made some changes to the NFR framework from 1992 to 1999. The framework is focused more on a qualitative goal oriented approach. The operation of the framework can be visualized by what is called a Softgoal Interdependency Graph (SIG). SIG is the visual representation of the NFR framework and offers visibility for all NFR elicitations and for their interdependencies.

Introduction to Softgoal Interdependency Graph (SIG)

SIG is a thorough methodology for Softgoals visualization. Softgoal is actually a non-functional requirement. The NFR framework and the correlated visual representation SIG, use terms, which have been tailored in small ways to fit the methodology. Examples of this are terms such as *operationalization*, and *satisficing*. Operationalization as a general term refers to a process of defining measurement of a phenomenon that is not directly measurable. The term is represented in different research design fields such as psychology, social sciences and physics (From Wikipedia, the free encyclopedia, 2015). In the NFR framework however operationalizations are bit different. A simplified explanation is that in the NFR framework the term operationalization is the representation of the “answers” towards the softgoal needs. When the developer moves from the very abstract softgoal, into a more concrete solution by implementing an “answer” to the softgoal that “answer” is an operationalization. The term satisficing was used by Herbert Simon in the 1950s, which roughly represents satisfying at some level, a variety of needs, without necessarily optimizing results (Chung et al., 1999, p. 37). In the NFR framework this term is used to describe the relationship between NFR softgoals. The authors state that softgoals requires a lighter (weak) qualitative form of reasoning, because as mentioned before, softgoals should not be treated in absolutes. When softgoals contribute, positively or negatively, to fulfilling other softgoals, the term is called *satisficing.*

SIG graph

Softgoals are shown as clouds see figure 3. There can be main Softgoals shown on the top of the chart, or softgoals decomposed into smaller, more specific subsets of softgoals. Furthermore softgoals are composed with a logical AND/OR composition to the parent softgoal. The AND composition is illustrated by a single horizontal connection line, while the OR composition is a double, connecting the interdependency links between softgoals. Softgoals are connected by interdependency links which are shown as mostly vertical lines, often with arrowheads indicating direction. In the NFR framework the evaluation of softgoals is represented by assigning labels, which are used to inform the status of softgoals and operationalizations, see table 1.

Table 1 – Label Catalogue

	Conflict	The softgoal has conflicting contributions. Some supporting, some against.
	Denied	The softgoal can not be realized and can not to be implemented.
	Weakly denied	The softgoal has indicators preventing it from being fulfilled.
	Undecided	The softgoal realization is neither confirmed nor denied.
	Weakly satisfied	The softgoal is to some extend fulfilled.
	Satisfied	The softgoal is fulfilled or chosen and can be implemented.

When decomposing a softgoal into smaller softgoals the results are what the author calls operationalizations, where the softgoal becomes more concrete. Operationalizations are shown as thick clouds. This term represents specifications needed to satisfy the softgoals and can be considered as specifications for the system in a more traditional sense. In the example from figure 3 showing the SIG for an information system for managing credit card accounts, there are several operationalizations happening. The first softgoal is *Good performance for accounts*, leading in to the operationalizations of *Space for accounts*, *Response time for accounts*. The operationalizing softgoal of *Use uncompressed format* makes a negative contribution towards the NFR softgoal *Space for accounts*. The negative contribution is represented by the SIG contribution symbol (-) (HURT) See table 2 the Contribution catalogue.

Table 2 – Contribution Catalogue

--	BREAK	Child label is strongly negated and propagated to parent.
-	HURT	Child label is somewhat propagating to parent.
?	UNKNOWN	Child label has no affect to parent.
+	HELP	Child label is somewhat propagating to parent.
++	MAKE	Child label is strongly propagated to parent.

It does however satisfy and thereby fulfil the softgoal *Response time for accounts* with the contribution of other operationalizations such as *Use indexing*. The process forces developers to relate to, and consider non-functional requirements, while prioritizing constantly, for better decisions. Since the process is graphical it helps to create an overview which ultimately makes decision making very transparent. The framework also forces developers to operate within a set of

rules, which makes the process reusable or even to a certain degree reliable for different projects and developments. It serves as a platform, based on simple yet effective notations. The combination of thought processes during the making of an SIG within the set of rules, help to enforce a focus and dedication towards non-functional requirements, resulting in a more reason based decision making process and less gut feeling impulsive decisions.

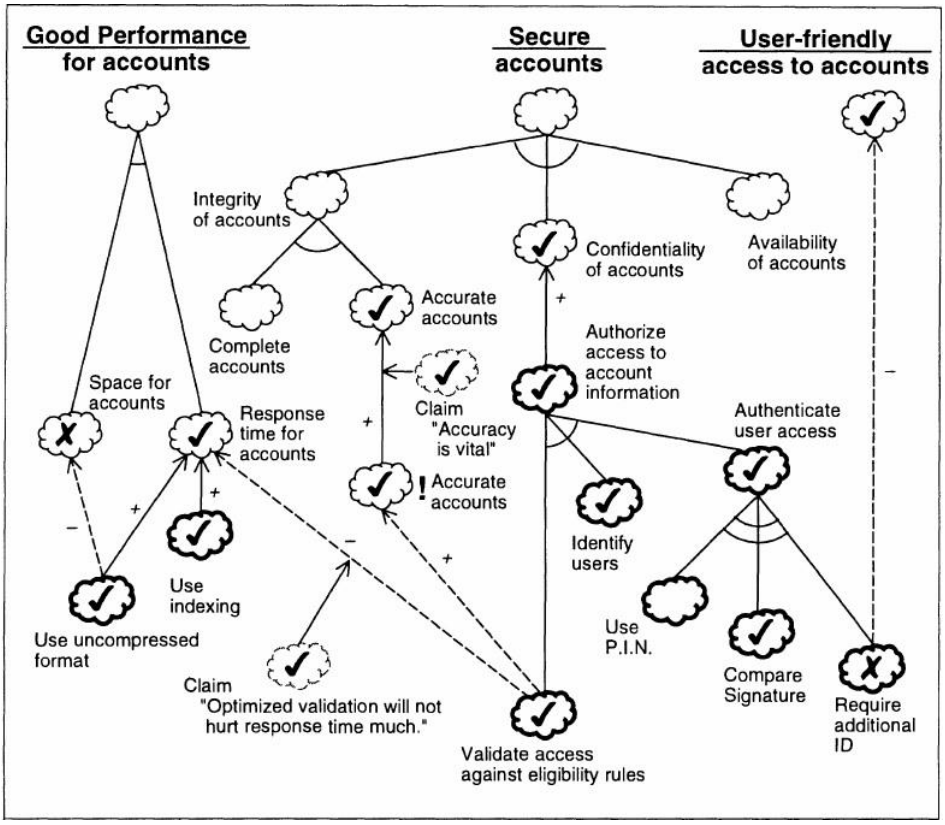

Figure 3 – SIG Model

NFR framework conclusion

The NFR framework is even more complex than what has been presented so far. Furthermore there was more iteration in the process of creating the NFR framework. Inspirations were drawn from other practitioners in the field. A large part of the logical build in the NFR framework is inspired by KAOS (Keep all objectives satisfied) which is a framework for goal oriented requirements engineering. Chung and Do Prado Leite describe the difference between KAOS and the NFR framework as such: Not unlike KAOS, the NFR Framework also promotes goal orientation, but with the main emphasis on NFRs. In the NFR Framework, non-functional requirements are treated as softgoals, i.e., goals that need to be addressed not absolutely but in a good enough

sense (Chung & Do Prado Leite, 2009, p. 372). KAOS interestingly treats functional requirements and non-functional requirements the same. The key point here is that within the KAOS framework they consider non-functional requirements as being similarly important, yet KAOS is more orientated towards goal *satisfaction* whereas the NFR framework is more oriented towards goal *satisficing* (Chung & Do Prado Leite, 2009, p. 381). The central difference being, the argument towards NFRs as being soft in nature in the NFR framework, and therefore should be treated as such, which really dictates the approach to handling NFRs in different ways. The NFR framework is also made towards practical application or as the authors put it: NFR exist in relation to functional things (Chung & Do Prado Leite, 2009, p. 374). Since UML is an Object oriented analysis and design language, it can serve as a functional platform for the NFR framework to attach to. This has been done by Cysneiros, L.M., Leite, J.C (the same JC. Leite, as the co-author of NFR framework) in Nonfunctional Requirements: From Elicitation to Conceptual Models, p. 328–350 (2004). The central idea is to qualitatively realize softgoals in the UML models by linking NFR graphs with UML models to help attain better or more complete UML models. So the practicality of a NFR framework seems more impactful than merely advising towards the use of NFRs, as it has been done in other fields, when the subject is NFR.

Constructing the HNFR template

The basis of the HNFR template is to draw upon the experiences from the presented NFR framework from Mylopoulos. Instead of creating a SIG for a specific system development, we use the CRM framework to represent the translation of the generally applicable CRM needs into softgoals. The first process is to represent the discovered CRM Dark side behaviours.

Table 3 – CRM Dark side behaviours

Communication-based dark side behaviour	Dark side behaviour through manipulating alternatives	Side effects and dark side behaviour
Information misuse	Customer favouritism	"Spill-over" effects
Customer confusion	Customer "lock-in"	Ecological impacts
Dishonesty	Relationship neglect	
Privacy invasion	Financial exploitation	

The Dark side behaviours can be considered as inverted softgoals, since it is the opposite of what we want to add to a CRM solution. So the first inverted softgoal in the HNFR framework will be *Information misuse*. In a classic SIG model we would put in the softgoal of what counters Information misuse, we could call it *Clear Information*, represented as a soft cloud in figure 4.

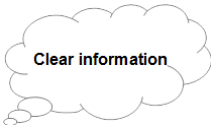

Figure 4

When we have our softgoals the next approach is to analyse what needs to be operationalized for the softgoal to become satisficed. Luckily the NFR framework of Frow et al. on figure 2 has already done this, without ever considering it as a NFR operationalization, see figure 5. The clouds on the figure 5 are grey, symbolising the *inverted* softgoals.

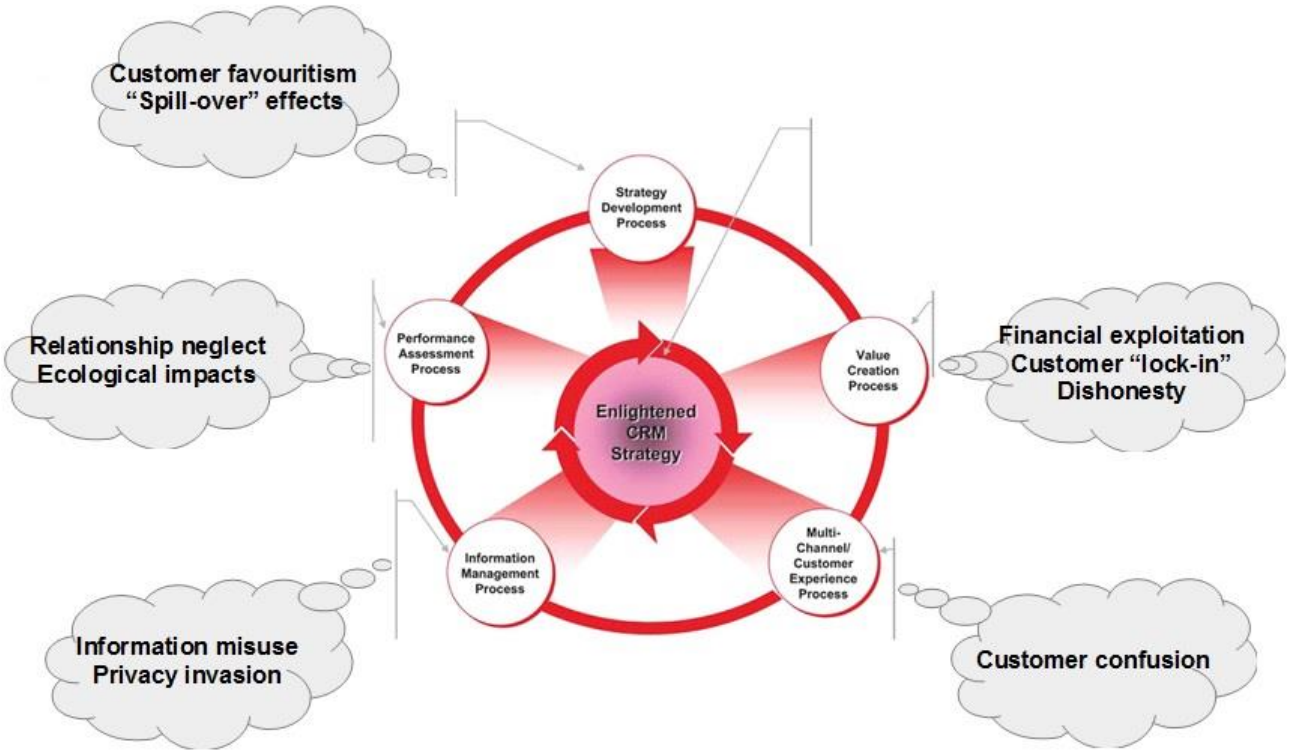

Figure 5 – Combining CRM strategy with Softgoals from SIG

The purpose of figure 5 is to exemplify that the process which went on for Frow et al. in the CRM framework, is very similar to what we know from the NFR framework, it is simply inverted. The Strategy Development Process is the opposite operationalization of the softgoals *Customer favouritism* and *"Spill-over" effect*. The Performance assessment process is an opposite operationalization of the softgoals *Relationship neglect* and *Ecological impacts*. The Information Management Process is the opposite operationalization of the softgoals *Information misuse* and *Privacy invasion*. The Multi-Channel Customer Experience Process is the opposite operationalization of the softgoal *Customer confusion*. Finally the Value Creation Process is the

opposite operationalization of the softgoals *Financial exploitation*, *Customer "lock-in"* and *Dishonesty*.

Next step is to consider the value of knowing the relationship between the CRM framework and the NFR framework. The point of creating a SIG model is to use it during early steps of development, very similarly to use case scenarios from UML (Mathiassen, Munk-Madsen, Axel Nielsen, & Stage, 2001), where one of the early processes is to draw the system to create an overview. Since the HNFR template is supposed to be a generally applicable model, instead of having a specific system in mind, the template only consists of the first part of the framework. The rest of the framework has to be done by the process owners, business developers, executives and whoever else that are involved in the planning of a CRM system.

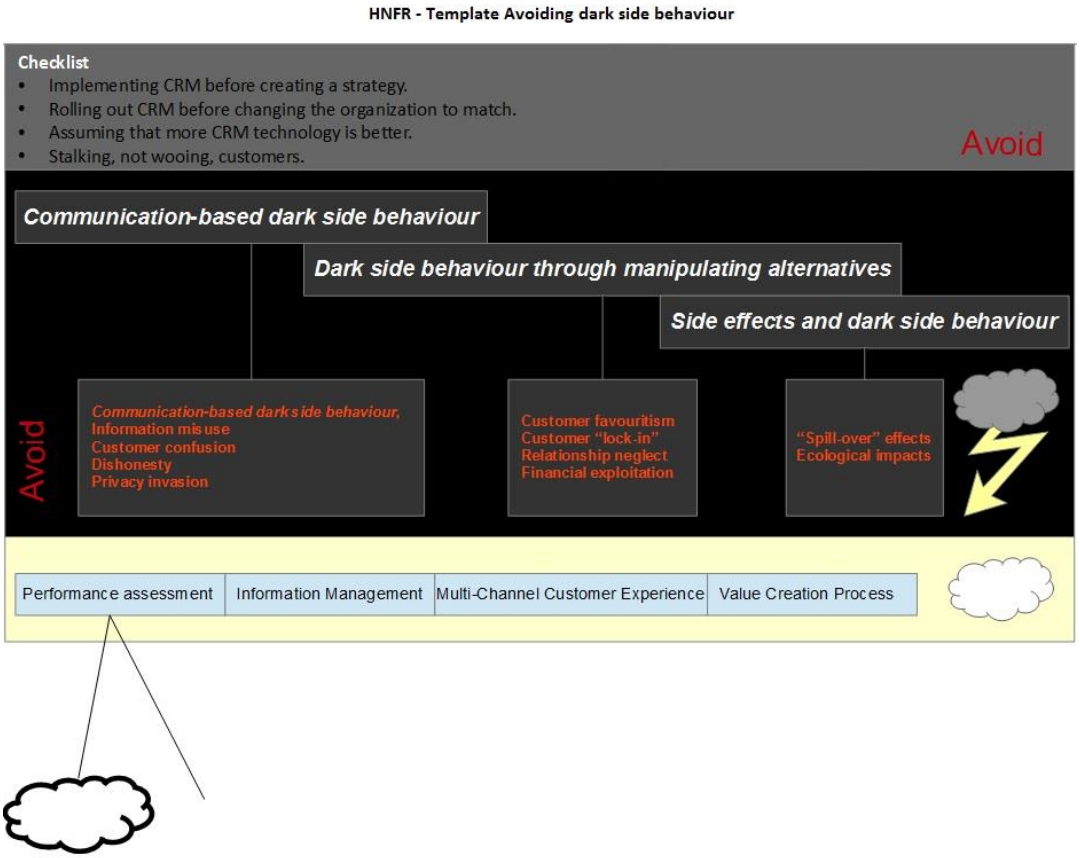

Figure 6 – A HNFR template for CRM development

Figure 6 is an example of a HNFR template, based on recommendations from CRM researchers, with the purpose of ensuring key aspects of enlightened CRM and avoiding dark side behaviours. This is one of many potential HNFR templates. The idea is to use this as the basis for a SIG model. But specifically the developers have to build their system around these values. In other instances the values may change, or there are added some others. This HNFR template includes a checklist of what to avoid. So every time a new operationalization is added, it has to avoid the featured

checklist. The checklist is based on recommendations from Rigby et al. The four perils of CRM. It is something to keep in mind during development.

If these methods are put to use either as a development methodology, or an overall strategy in development of CRM solutions, developers will have focus on HNFRs. But as with every other Non-functional requirement HNFR are also meant to be softgoals, so the degree of implementation has to match with every other consideration during the process of development. One way of testing the HNFR framework is to hold it up against the data from the case study.

Data collection and findings

The first part of data collection was gaining access to the field. In ethnography principles in practise the author states, that access to the field starts with the *gatekeepers* (Hammersley & Atkinson, 2007). The gatekeeper in this case was initially through the responsible for business development for all of private claims. After a face to face meeting, and the negotiated terms was settled, the next step was to contact the next level of gatekeepers. The initial gatekeeper in form of head of business development for private claims addressed concerns for sensitive information about the organization structure. In accordance to his requirements an arrangement was made, which will add a sense of further constraint to the paper, because certain sensitive details about the organization will not appear during the presentation of collected data. This is not to say that it had a big impact on the research, since the organization was very open and forward about what they do. The next level of gatekeepers which can also be considered as genuine stakeholders was the leaders of the claims departments. For whom the results of the research papers could have interest. They co-operated fully as much as they could, given the limitation of man hours. However one key aspect of the negotiations was to keep things simple and try to get as much access as possible without pushing the limits of the gatekeepers.

People's actions and accounts are studied in everyday contexts, rather than under conditions created by the researcher… In other words research takes place 'in the field' (Atkinson, 2007, p. 3).

During the observation period at If insurance, the main focus was to get as detailed insights into their customer management system, their customers and employees as possible.

Ethics of data collection

Some of the ethical considerations that went into the data gathering were: Informed consent, privacy and consequences for future research.

Informed consent – "Anything you say or do may be taken down and used as data." – (Bell 1977) is a reference from principles in practise (Hammersley et. al, 2007, p. 210). Certainly this was not the approach during the data gathering for this research. Even when the fact that research is taking place is made explicit, it is not uncommon for participants to quickly forget this once they come to know the ethnographer (Hammersley et. al, 2007, p. 210). Although the participants are used to working with sensitive information, and have been made aware of the fact that the research will include their name and what they say, the researcher must protect his or her sources. The purpose of the research is not to cover a hidden truth or shady business made in the dark. It is after all just data needed for the research paper to test the hypothesis.

Privacy – Privacy seems to be defined in terms of specific audience that are or are not regarded as having legitimate access to information of particular kinds (Hammersley et. al, 2007, p. 212). Information from an employee might be harmful if represented in certain manners. There could be misunderstandings or even deliberate critique to a supervisor in which case the employee might be in trouble. There is difference between what is being said to the researcher directly, and what has been said on a mobile phone or difference between whispers and shouting. During the presentation of data these concerns are being taken under consideration.

Consequences for future research – Social researchers, and especially ethnographers, rely on being allowed access to settings. Research that is subsequently found objectionable by the people studied and/or by gatekeepers may have the effect that these and other people refuse access in the future (Hammersley et. al, 2007, p. 218). This is something to consider in general. Hopefully the research will prove to be accepted by the organization and considered as a contribution towards their goals as well.

Data presentation based on observation

The observations will be presented as cleanly as possible. This in term means that the reader will be spared for the struggles of reading bad notes, early on misunderstandings and other nitti-gritty details. Furthermore the results will be presented as best possible, as a guide into the works and every day life of the employees including their interaction with customers and their customer management systems.

Systems

Kogen – The employees in the claims departments use different systems in their work. First and foremost they have a system in which they can search for customers, read detailed information about the customer's insurance policies, add claims, and many other vital operations for claims handling. This system is called Kogen see figure 7. Kogen is a mainframe system that is capable of handling all the Insurance Company's customer information. Every single customer data is put into Kogen. This includes all the personal information: social security number, address, telephone number, email address, information about the cohabitant. Kogen also contains all the information about the customer products, in this case insurance policies. When an employee wished to register a new claims incident, they input this information to Kogen. An example of this could be a car claims incident. The information needed for the employee to register the claim is the following: The cars registration number, the cars insurance policy number, place of accident

(preferably an address or as close a description as possible), the registration number of the counterpart, a thorough description of the accident and information about potential witnesses (such as phone number, name, address). All of these information's will be manually put in to the system from the employee. The information varies depending on the type of accident.

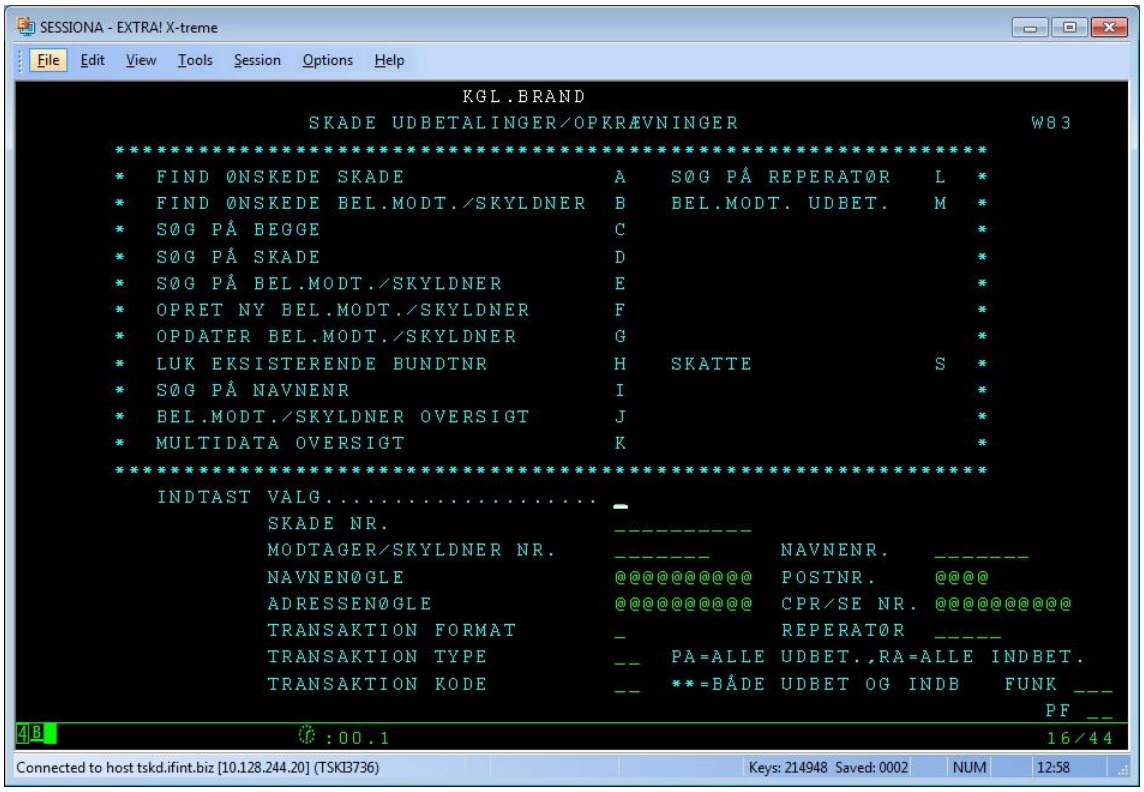

Figure 6 – Kogen the mainframe system

Sif – Sif is a front-end, read-only system see figure 7. Sif is a relatively new system, implemented around 6 years ago. It was developed by If insurance with the purpose of giving the employees better and easier overview over their customers. Sif reads the data from the Kogen database and presents the data. An employee can make a search request in Sif and will be presented with the data.

ScanSka – Scanska is 'Scanning af Skade' abbreviated, it translates to 'Claims scanning', see figure 8. When a customer sends a physical letter to If Insurance, the in house postal department will scan the documents, and the scanned documents will be presented to the claims handlers in ScanSka. The process is fully automated, the scanner is equipped with an optic sensor that looks for claim numbers, registration number, any Meta data it knows, and then a file is created and presented in ScanSka. ScanSka is a simple content management system, which gives access to the files, for the different claims handlers, and only claims handlers can access it.

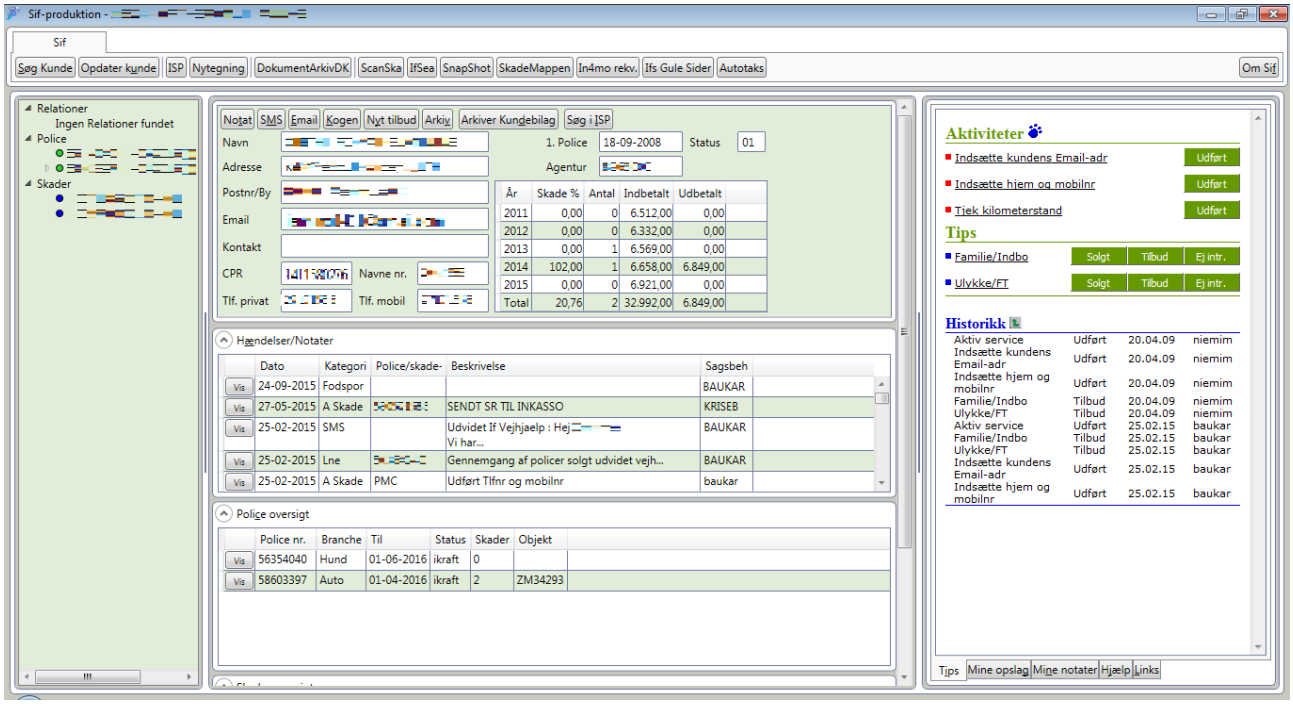

Figure 7 – Sif a read-only front-end system

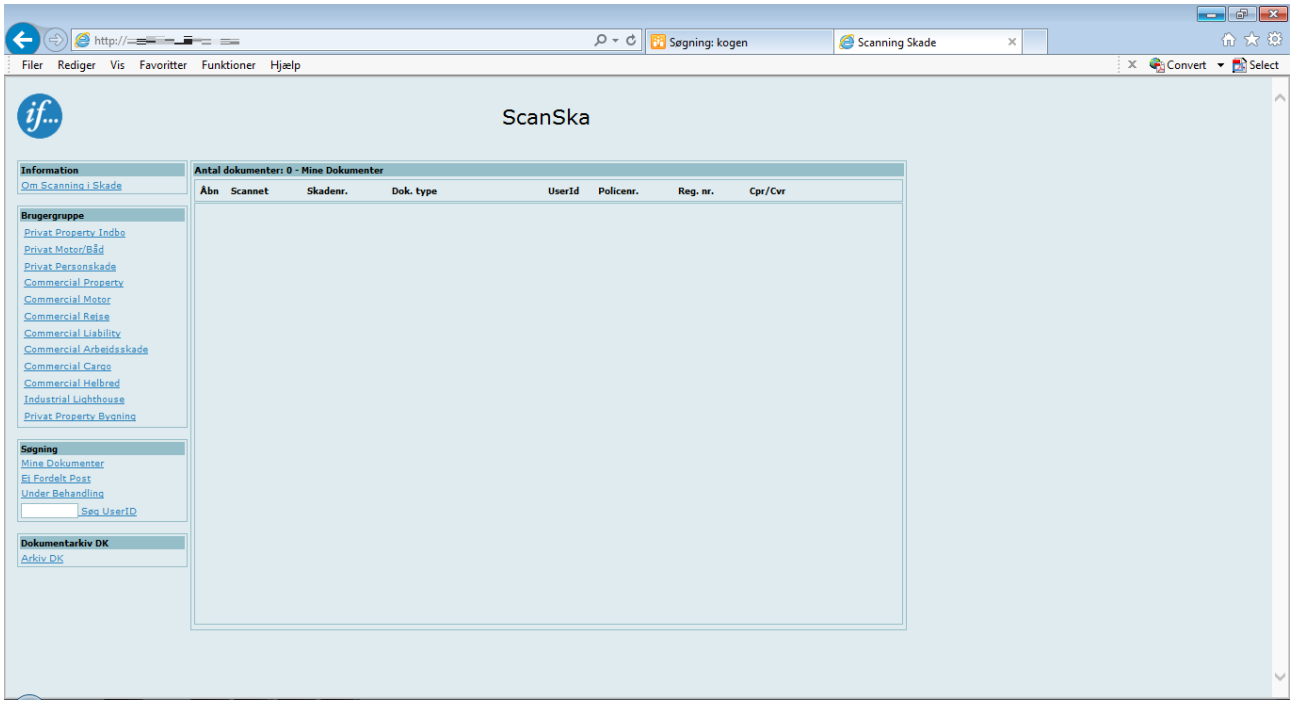

Figure 8 – ScanSka a system to handle physical letters and claims from customers

People

Organization – The organization is divided into several different sub groups. There is a private section and a business section. Furthermore the private and business section is divided into Customer service and Claims departments. The claims departments are divided into different by different domains depending on the type of claims. The domains are: Home Insurance, Auto Insurance, Health Insurance and Auto Insurance.

Data presentation based on Interviews

The chosen method for the interview strays away from the ethnographic approach. The ethnographic approach is a somewhat semi-structured one, although ethnographers often look at it as pre-structured or reflexive interviewing (Hammersley et. al, 2007, p. 117). However the structured interview form allows for easier data comparison. The goal of the interviews was two-folded, firstly to gain insights into the employees, their relation to their customers and the systems they use in their line of business. The second reason was to verify if the information gathered from the employees was representable for all of the employees. If there was no way of comparing the interview results, it would be hard to describe the process around the use of their systems.

The validity of the answers – There are few variables to consider. The answers represented in Appendix 1, have been translated from Danish to English, this will inevitable result in some kind of pollution of the data, because of two factors: (1) the human factor, how good was the translator? (2) Language is not the same, no matter what there will always be some differences in expressions and certain idioms and phrases do not translate very well.

In addition to the risk of accidental data pollution, the data represented have undergone a manual sentiment enrichment process. This means that, if the interviewee was asked to answer a question leading up to a (If yes – then or If no – then) type of question, and the answer does indisputably represents one or the other, but neglects to mention the actual word Yes or No, the answer has been altered to contain the word Yes or No at the start of the sentence. The reason for the sentiment enrichment process is to represent the data through colour sentiments. This method was inspired by the journal article Our Sentiments, Exactly (Wright, 2009).

Combining qualitative methodology with quantitative questions is not without risks. If the questions had been answered by survey, the results would be more conclusive and easier to use. The results of this method had its flaws, for instance some of the questions did not get answered, which is represented by a not available tag (N/A).

The questions

Name, how many years they have been employed and which department they work in - The purpose of the general questions is to establish patterns and also of course to know about the interviewee.

What type of customer information is the employee looking for initially? – This question is supposed to give indication of the relationship between the employee and the customer. It should also provide insights to the information flow from customer to employee, through the customer management system.

What tools and systems do the employees use to get information about the customer? – The question is pretty self-explanatory. The purpose is to find out about which systems the employee use.

Do they want more information, than what is available? – Do the employees want more information about the customer, than they have available? This will help to determine requirements for their upcoming CRM system. Sentiment analysis see figure 9.

Will more information about the customer be useful for the claims handling from the customers point of view? The question will help to determinate potential added value for the customer. Sentiment analysis see figure 10.

Can it be a problem if we sometimes know too much about the customer? – The purpose of the question is to determine if the organization invades the customer's privacy unnecessary. Sentiment analysis see figure 11.

Is it expected of you to put yourself into the customer history every time? – This question determines the relationship management between customer and organization. If the employee or organization does nothing to know more about their customers through interaction, this could be a possible area to improve. Furthermore this question was addressed to the interviewees as a question about the organization. Sentiment analysis see figure 12.

Are you encouraged to save information about the customer or the conversation to share with other departments? – If further customer information is saved it can potentially help to add value to the customer or help the organization to better know their customers. This question was also addressed as a question related to what the organization expects from the employee. Sentiment analysis see figure 13.

Sentiment analysis – An overview

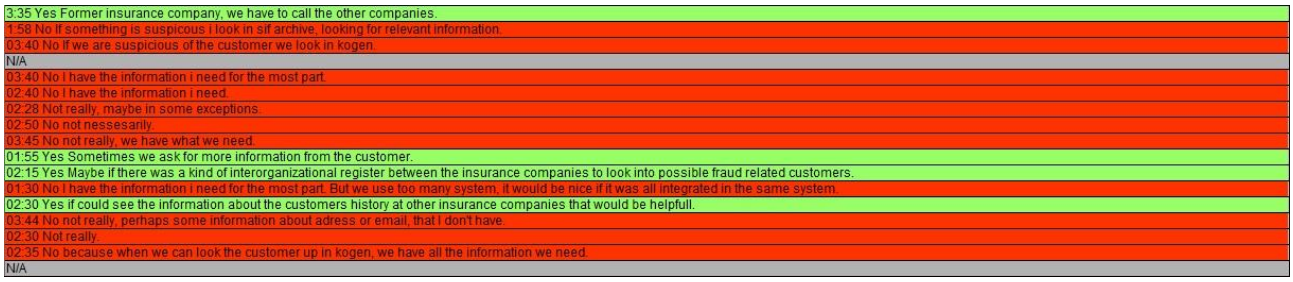

Figure 9 - Do they want more information, than what is available?

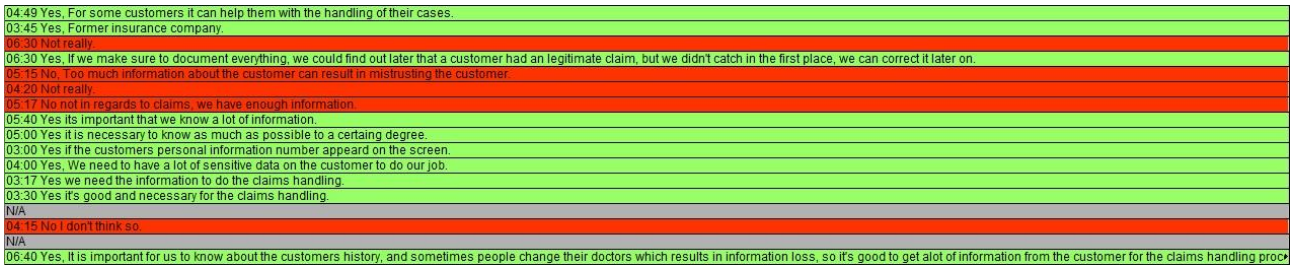

Figure 10 - Will more information about the customer be useful for the claims handling from the customers point of view?

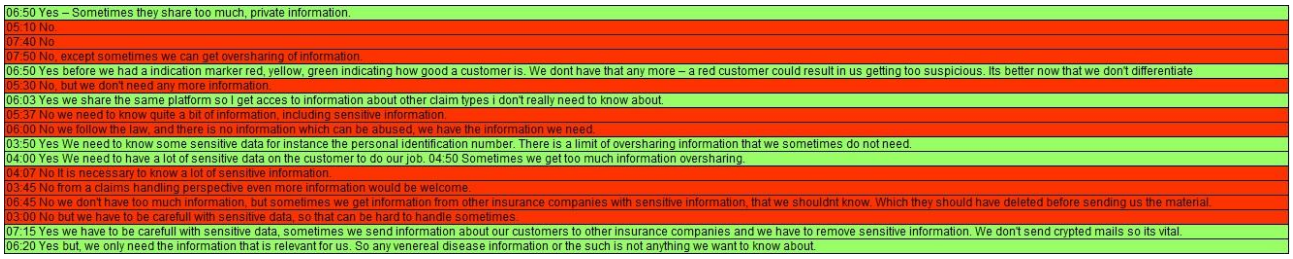

Figure 11 - Can it be a problem if we sometimes know too much about the customer?

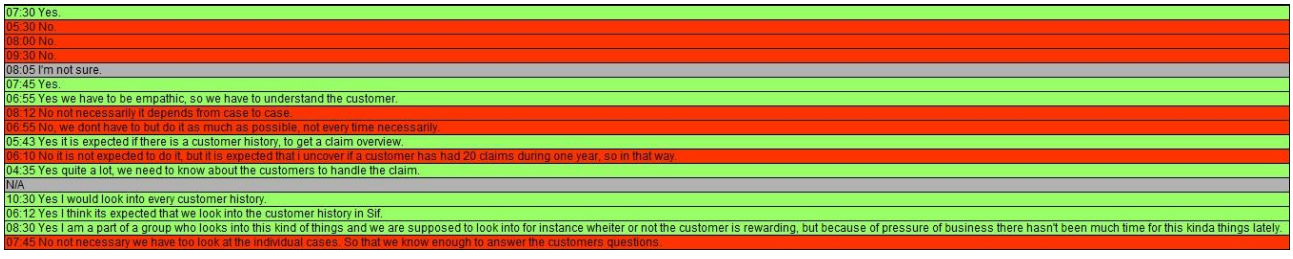

Figure 12 - Is it expected of you to put yourself into the customer history every time?

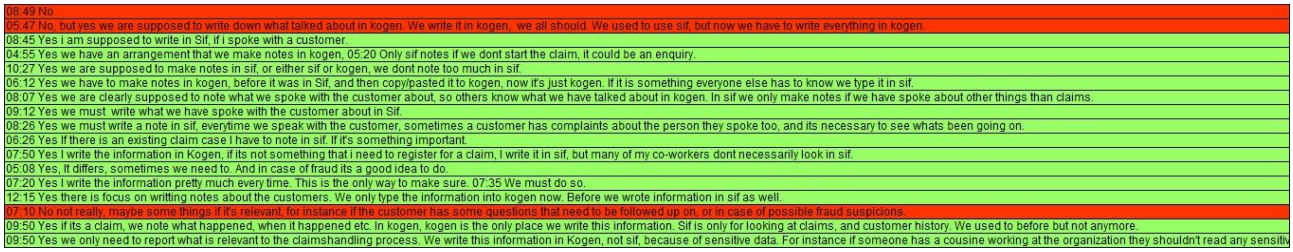

Figure 13 - Are you encouraged to save information about the customer or the conversation to share with other departments?

Analysis of interview answers using ANT

The relationship between the Actor/Actant (whichever because per definition it, is the same) can be almost anything in ANT. It is a representation of that which causes the movement of others into a direction of its own will. This could be an artefact a human, a group of humans or even a text (Jensen, Lauritzen, & Olesen, 2007). This is the part which is necessary to understand when talking about actants in ANT it can be humans or systems, ANT does not distinguish, between human or non-human entities, the dichotomy is non-existing. With this in mind we can begin to look into the data from the interviews. The first questions asked was - **What type of customer information is the employee looking for initially?** Do the employees look for anything specific? Most answers, almost every answer, were General information (Appendix 1, p. 1). What makes the employees or actants look for general information? The actants in this case the employee goes through a translation process, trying to enlist other actants and bend their will in order to achieve its own goals. Translation process is when an actant enlists new actants to establish an Actor-Network. In this case, the strongest actant, the employee enlists the system to gather information about the third actant the customer. **So what system do they use?** Or rather what actant is being enrolled as it is called in ANT terms. What tools and systems do the employees use to get information about the customer? – Almost every answer is Sif, then later Kogen, with only a few exceptions (Appendix 1, p. 2). So the actant employee enrols or enlists the actant Sif, to gather information about the actant customer, employee and Sif becomes the Actor-Network of Employee-able-to-view-customer history.

Latour use the example in Pandora's hope, Folding humans and nonhumans into each other (Latour, 1999). Latour describes the relations of how humans and nonhumans fold into each other. "Guns kill people" is the slogan of those who try to restrict the sale of guns. The National Rifle Association's pro-gun lobbyists respond with "Guns don't kill people; It's people who kill people." Latour says it is neither. If a man has been hurt by another man, he might want to get revenge by hurting the other man back. The problem is however that he is too weak physically to do so. The

hurt man however, has access to a gun and chooses to use the gun to get his revenge. Latour states that the gun alone is not dangerous, nor is it the man that is dangerous. The danger lies in when a man, that has been hurt, and enlists a gun, that is loaded with bullets, to do harm to others. This process is called translation. The result is that a new actant emerges in a new Actor-Network and that is hurt-man-with-loaded-gun, and this actant is dangerous. Another more modern example of this is the Gun lamp made by the company Flos. The designer Phillippe Starck created the Gun lamp with the philosophy that guns are not dangerous, they can be used as art or decoration see figure 14 (This is not in any way confirmed information, but for the sake of the argument). In this instance the gun is not loaded with bullets, instead it is covered in gold, and has electronics running through it. So the Actor-Network would be Gun-without-bullets-with-light-bulb, and that makes it non-dangerous. They key element to take away from this, is that the responsibility lies neither with the man or the gun. Latour says responsibility for action must be shared among the various actants.

Figure 14 – Gun Lamp by Phillippe Starck

When an actant enlists a new actant for a translation process, one part of the process is called a detour. The first actant needs to take a detour, to enrol a new actant to achieve its goals (Latour, 1999, p. 181).

The next question that was asked during the interview was - **Do they want more information, than what is available?** As seen on figure 9 in the sentiment analysis, this was not the case. So the employee does not need to go on a *detour* in order to achieve its goals. The information they have is enough. Meanwhile the actant Sif does not need to go on a detour either, since it can also achieve its goals, without further enlisted actants. ANT uses the concept of generalized symmetry, which is a deliberate absence of differentiating between human and nonhuman Actors. The interaction between heterogeneous elements should be described in the context of their functions (Jensen, Lauritzen, & Olesen, 2007, p.73). However there are some actants that desire more functions. Christina mentions at 02:15 Yes, Maybe if there was a kind of inter-organizational register between the insurance companies to look into possible fraud related customers (Appendix 1, p.3). The idea behind this, is that every time the actant employee has to research the

background of a new customer, it has to enlist several employees from other companies. If this could have been done with a single system, it would require much less of a detour for the translation process.

The next question asked was - **Will more information about the customer be useful for the claims handling from the customers point of view?** As can be seen on figure 10, in the sentiment analysis, there is common consensus among the employees that more information is usually helpful for the customer. So Sif would like to have as much information as possible, as well as the employee. The necessary detour for these types of translations is valued by all involved actants that we know of, perhaps with the exception of the customer, but we can only speculate.

Can it be a problem if we sometimes know too much about the customer? Figure 11 shows some incongruence in the opinions. However most agree that the amount of private information or sensitive data is necessary, the problem emerges when there is an oversharing of information. In which case the relationship of the actants become exposed. In ANT there is a term called Blackbox. This is a temporary state when the heterogeneous network of actors with same interests becomes stabilized. When this happens the Actor-Network will become invisible. But in reality it will never become a truly closed box (Jensen, Lauritzen, & Olesen, 2007, p.82). In this instance the privacy Blackbox is being opened. Usually the employees have to handle a lot of sensitive data, but when there is oversharing of information, the actant employee in the Actor-Network becomes aware of the situation of privacy and sensitive information. Carsten 06:20 Yes but, we only need the information that is relevant for us. So any venereal disease information or the like is not anything we want to know about (Appendix 1, p. 5).

Is it expected of you to put yourself into the customer history every time? – The answers as seen on figure 12 reveal that there is again incongruence in what the employees believe they have to do. This question however reveals the organizations wishes, because it is formulated in such manner that, the employee has to think about the Actor-Network of the actant Leader of department, as well as the actant the processes and procedures. So if the employees answer differently it means that the organization itself lacks a direction as to what the employees should do in such a situation.

Are you encouraged to save information about the customer or the conversation to share with other departments? - Figure 13 reveals that almost every employee is under the impression that they have to write down, or input rather, information about the customer in the system. So employee-information-about-customer Actor-Network is pretty much black boxed, and has become invisible or in other words, it has become routine, and the evidence shows.

Revisiting the HNFR template

As mentioned in earlier chapters when we have information about the organization it should be possible, to at least attempt, to use the HNFR template, to indicate what to take into consideration when developing a CRM. This task was completely impossible without knowledge about the organization. With the small amount of gathered information there are some aspects that can be analysed See figure 15.

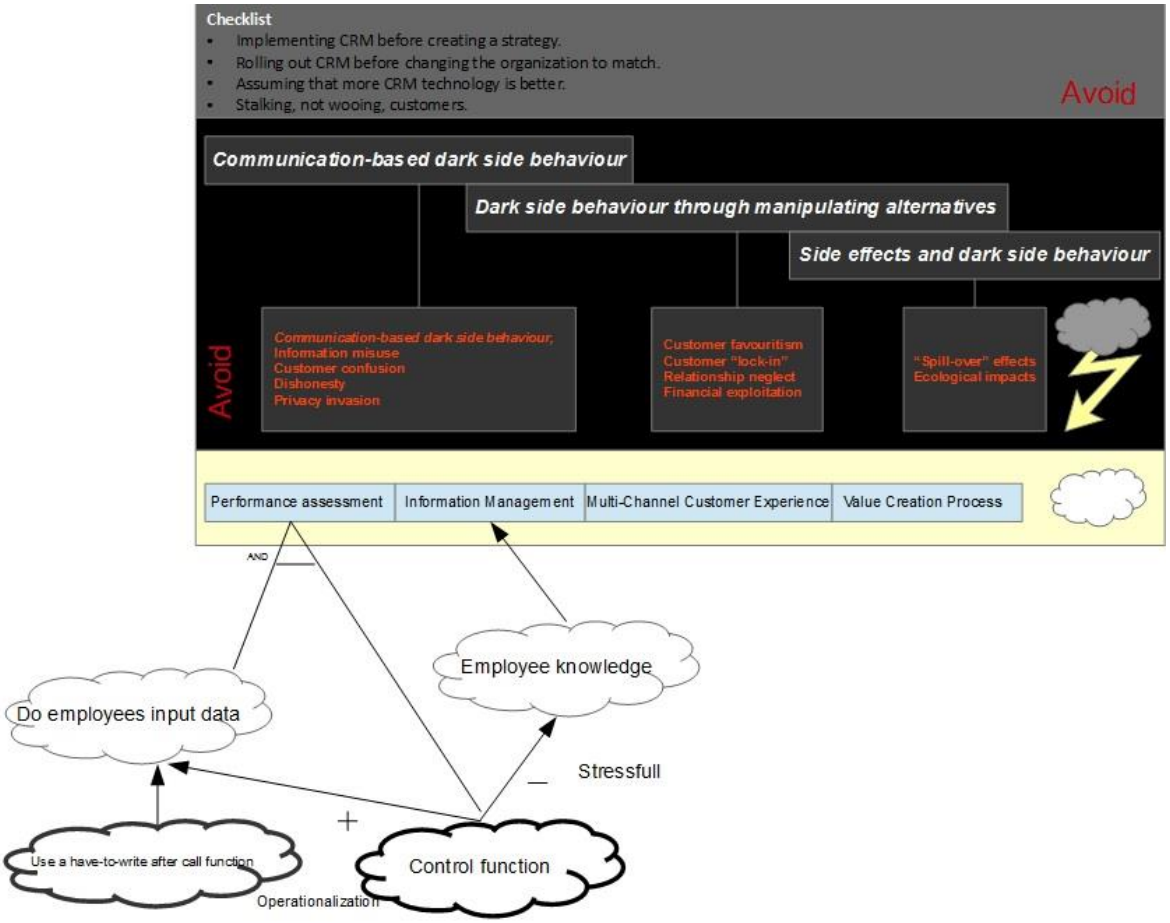

Figure 15 – Example of some issues being considered in a HNFR template

Here is an example of a potential HNFR template, with a SIG model for handling the Non-functional requirements. The information is about the users, not knowing when to write down information about the customer into the system. A softgoal appears as Do employees input data? The operationalization of this can be User have to write after call function. So if we have a function added that ensures that employees do so after every call, the solutions is good, the softgoal has been satisficed. Another example is about the Employee knowledge concerning information management. If a Control function was set up to “test” the employees they might experience it in

a negative way or even be stressed meaning the results would not be fruitful, and the softgoals has not been met.

Future research

The HNFR template is clearly in early stages, and furthermore it is very difficult to say anything tangible about the organization's needs, based on 17 interviews and some insights into the organizations customer management systems use. The subject needs more research. However the idea is to close the gap between CRM development and NFR methodology. This research paper has aimed to prove the relation between these often separated entities. To some degree this can be considered a contribution to the debate of why CRM's fail, and a suggestion for methodology to use during CRM development. Different CRM system will need different focus points, but the combination of research in CRM literature and developing CRM solutions, based on NFR methodologies, should help the development towards a better CRM solution for the organization. Furthermore the idea of HNFR should give some inspiration, towards which direction too look for, when eliciting Non-functional requirements, other than looking at a page full of "ilities…" The HNFR template development is not yet exhausted. There are a lot other things that can be added, such as more classifications, maybe some terms that are especially made for the HNFR template, moving further away from the SIG graph from the NFR framework. Another way to approach it would be to make a framework for the analysis as well, including ANT, as the method for data gathering.

A light version of the papers with the findings will be created and represented to the organization. The emphasis will be on CRM needs, according to the findings about the current information flow between the employees and the customers. Although If insurance already advocates transparency, and ethical decision making, there might be some information which can help them with their future investment in a CRM solution. They have to match their processes towards the new CRM solution and get it right from the beginning. As it stands today, there is some doubt among the employees towards the existing procedures. This is normal and can be expected in any organization. When they are presented with the knowledge they will probably act on it shortly after.

Although the HNFR template is far from done the seeds have been planted. The next remodel or iteration will be better and expectations are that the light version will be useful for the organization. HNFR version 2.0 perhaps.

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