Telecom Customer Service Information Model

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Acknowledgements:

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Abstract:

A customer service unit in the telecom industry is a stressful and difficult work environment. The information is spread throughout many systems and it is not always easy to keep track of or use it in the most efficient way. The telecom industry has an especially complex IT architecture with a lot of information constantly being transferred.

The main purpose of this thesis is to create a first version of a telecom customer service model. This model will describe what information a customer service unit at a telecom company needs. The model will also describe how IT should support the customer service unit with regards to what components are needed and how to use these components to deliver information efficiently.

To connect to the purpose we have performed a series of studies in the following areas:

- Questionnaire
- Observations
- Interviews

They have all been performed with selected personnel and experts at TeliaSonera Sundsvall. The results of these studies have been analyzed to answer their respective areas. What information the customer service unit need, what components they need and how to use these components.

In conclusion we have integrated all the results into a first version of a customer service information model. This model shows the relationships between each component and also what information they need at the customer service unit. Some major issues and technical aspects are also presented in this model.

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Sammanfattning:

Kundtjänst inom telekomindustrin är en stressig och svår miljö att arbeta inom. Information är spridd i många system och är inte alltid lätt att hålla reda på eller använda på det mest effektiva sätt. Telekomidustrin har en väldigt komplicerad IT-arkitektur med en stor mängd information som konstant överförs.

Huvudsyftet med denna uppsats är att skapa en första version av en telekom kundtjänstmodell. Denna modell kommer att beskriva vilken typ av information en kundtjänst på ett telekomföretag behöver, vilka IT-huvudbeståndsdelar som behövs och hur de ska leverera information effektivt.

För att svara på syftet har vi genomfört en serie av studier i följande områden:

- Enkäter
- Observationer
- Intervjuer

Dessa studier har alla genomförts på utvald personal och experter på TeliaSonera Sundsvall. Resultatet av dessa studier har analyserats för att svara på respektive område, vilken information vi behöver, vilka komponenter som krävs och hur dessa komponenter skall användas.

Sammanfattningsvis har vi integrerat alla resultat till en första version av en kundtjänst informationsmodell. Denna modell visar relationen mellan varje komponent och vilken information som behövs till kundtjänst. De huvudsakliga problemområden och tekniska aspekter är också beskrivna i denna modell.

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Table of Contents

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Image and figure list:

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1. Introduction

The following chapter is the result from a preliminary discussion in January 8, 2010 with Lage Eriksson Senior IT-Architect at TeliaSonera. In this discussion Lage presents a common problem in the Telecom industry and issues surrounding it.

Within the telecom industry there is a lot of close customer contact and customer sales representatives are used to dealing with a large amount of customer complaints, support and sales errands. Information becomes more and more important and it is imperative to use the information in a correct way and at the right time. But as the flow of information grows, it is also very difficult to sort out what information is beneficial for the task at hand.

Customer care and sales can be improved in many ways, one of which is providing better information to the person conducting a certain task. By providing relevant information at the right time efficiency, quality and customer relationship can be improved. We believe that there is room for improvement of the information being provided by IT support systems in a Telco (Telephone Company). This problem cannot be solved only by evaluating what type of information is needed, how IT supports and handles the information must also be considered.

1.1. Background

We have both worked at TeliaSonera in the past. Alexander is experienced in the field of Customer service as a former employee of second-line support. Fredric has worked with the Planning, product and efficiency department. When asked if he had any ideas for a master thesis Lage presented this common problem within the telecom industry. Because of our studies in Human computer interaction and past experiences in both Customer service and Telco IT structure we felt that this idea was a perfect match for us.

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1.2. Current Situation

Recurring customer contact is unique to the telecoms industry. The services offered are used by the customer on a daily basis, information and data are constantly being exchanged between the customer and the Telco. A Telco also has high demands on service, changing your operator is hardly any trouble and there are always lucrative offers from others. The amount of information and data that exists in this business puts a high demand on your companies IT resources.

1.2.1 Customer Service Representative

Alexander has worked in the telecom industry and this was a very stressful and demanding job. They often deal with customers that have been waiting a long time in a queue and aren't that friendly. They always need to make sure that the customer is satisfied with your services so the customer doesn't leave the company. At the same time they also have high demands on work requirements; many customer service units require their employees to handle a certain amount of calls each day. On top all of this they are also expected to sell new services and offers to the customer. Needless to say any help that can be offered is pretty much needed.

1.2.2 IT

The majority of the larger Telco's today has a very complex and tightly coupled IT architecture. Many small systems are in use in addition to old monolithic legacy system which has served their purpose. Information stored and used from these IT support systems are widely spread throughout the whole architecture. This easily creates an environment where information is hard to reach and errors occur. Redundant orders, double bookings, loss of information and wrong information are problems that a customer service representative experiences daily.

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2. Purpose

The main purpose of this thesis is to create a first version of a telecom customer service model. This model will describe what information a customer service unit at a telecom company needs. The model will also describe how IT should support the customer service unit with regards to what components are needed and how to use these components to deliver information efficiently.

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3. Limitations

The first limitation was that we only had resources from one Telecom Company. Some restrictions are added to the result of our interviews, especially from the interviews. This was due to the fact that some information is sensitive to TeliaSonera. The time we spent with the customer service was restricted.

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4. Theory

This chapter is a collection of all the theories we used in our master thesis. This chapter describes the various theories used in our studies, and provides the background to our analysis.

4.1 Data Warehouse

A data warehouse is a collection of technologies aimed at enabling the knowledge worker (executive, manager and analyst) to make better and faster decisions. It is expected to have the right information in the right time at the right place with the right costs in order to support the right decision. Data warehousing has become an important strategy to integrate heterogeneous data sources to enable online analytic processing (OLAP) (Jarke & Lenzerini & Vassiliou &Vassiliadis, 2003).

Data Warehouse Components

Many researches and practitioners share the understanding that data warehouse architecture can be understood as layers of materialized viewed on top of each other. Data warehouse architecture can exhibit various layers. Data sources, also called operational databases, form the lowest layer. They may consist of structured data stored in open database systems and legacy systems or unstructured or semi structured data stored in files. They are usually heterogeneous, which means that the same data can be represented differently, for instance through different database schemata, in the sources. (Jarke et al., 2003)

The central layer in the architecture is the "global" data warehouse, sometimes called "primary or corporate data warehouse." The global data warehouse keeps a historical record of data. Each time it is changed, a new integrated snapshot of the underlying data sources from which it is derived is placed in line with the previous snapshot. The data warehouse may contain data that can be many years old (A frequently cited average age is two years) (Jarke et al., 2003).

Next layer of views are the "local" warehouses, which contain highly aggregated data derived from the global warehouse, directly intended to support activities such as information processing management decisions, long term decisions, historical analysis, trend analysis, or integrated analysis. In some cases an intermediate layer, called an operation data store, is introduced between the operational data sources and the global data warehouse. (Jarke et al., 2003)

All data warehouse components, processes and data should at least be tracked and administrated from a metadata store. The metadata store serves as an aid both to administrator and the system designer of a data warehouse. Since the data warehouse is very complicated the volume of data is huge, and the processes employed for the extraction, transformation, cleaning, storage and aggregation of data are numerous, sensitive to changes, and vary in time. (Jarke et al., 2003)

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4.2 Operational Data Store

The ODS grew in popularity in the 1990s, this was in part as a result of companies in the midst of acquisitions and mergers. An operational data store can be described as a distribution center for current data. The ODS serves as a consolidation point for reporting and can give the business one location for viewing current data that crosses divisions or departments (Greenwald, Stackowiak and Stern 2004). A ODS may contain 30 to 60 days of information (Rasmussen, Goldy and Solli 2002). When a ODS is established the Warehouse server often extracts data from the ODS, when a ODS isn't present, data for the warehouse is directly extracted and transformed from operational sources. (Greenwald, Stackowiak and Stern 2004)

The founder of the expression Bill Inmon explains ODS as following:

"*An ODS is an integrated, subject- oriented, volatile (including update), current-valued structure designed to serve operational users as they do high performance integrated processing.*"

A ODS can deliver and achieve many things, some of the more known beneficial functionalities are:

- Enabling integrated and collective on-line processing.
- Delivering consistent high transaction performance.
- On-line update.
- It is integrated across many applications.
- It creates a foundation for collective, up-to- the-second views of the enterprise.
- A ODS also supports decision support processing.
  (Inmon 1998)

There are two main types of users that are attracted to the ODS, Farmers and Explorers. (Inmon 1998)

Farmers are the first user type. Users belonging to this type do the same tasks over and over again. *They already know what they want to find in the ODS*. They just look at small amounts of data each transaction. As a farmer you usually find what you want. Although when you find this it is usually a small flake of gold, not huge nuggets. Farmer operates in a world of structure--structured data, structured processing, structured procedures and so forth. (Inmon 1998)

The other type of user is the explorer. The explorer is the opposite of the farmer. *Explorers work in a more random manner then the farmer; they do not know what they are looking for at the outset of the analysis.* They operate in a heuristic mode. If you are an explorer you look at very large sets of data and associations between types of data. You try to find patterns that are useful and relationship that has not been discovered yet. More than often the explorer does not find anything as a result of his/hers analysis, but when they do they find huge nuggets of gold. Explorer is the user type that best fits the description for our purpose of using a ODS in this master thesis. (Inmon 1998)

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4.3 Stovepipe architecture and spider's web approach

A stovepipe architecture is an environment with information systems built with low or no consideration to the functionality that exists today. In other words, many systems were developed to complete one or several tasks, but not to share the functionality to other system that exists or may be developed. This creates a lot of redundant functionality within our IT architecture, a lot of functionality is rebuilt each time a new system is introduced or an old system is renewed.
(Inmon 2003)

This is quite obvious expensive in development and execution, but the highest costs comes from maintenance and in updates. Same functionality needs to be maintained and updated in several places. Another major problem that the stovepipe environment creates is data being shuffled from one system to another. The extraction approach, sometimes called the "spider's web" approach, addresses the problem of the integrity of the data being shuffled. Data will be sent when it is needed, but is this data reliable? Can the data from one system be compromised in another, if data is updated in one system will this data also update in all the others?
(Inmon 2003)

A root cause to this issue is that the budget cycle of a company and the career cycle of its top-level decision-makers decide and control the development of long term-life information system. The standpoint of this root cause can sound very reasonable, as Inmon expresses it:

"If I, as a manager, commit to this course of action, can the action be completed while I am still empowered? This seems like a reasonable stance. But from a budgetary standpoint is not just shortsighted, it is VERY shortsighted. The problem with this stance is that it looks ONLY at the development and deployment costs of the stovepipe being built. There are other entirely different sets of costs ignored by this stance" (Inmon 2003)

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4.4 Business process execution language

Business Process Execution Language shortened to BPEL. BPEL is an XML-based language, but BPEL is more specific and targeted. A programmer uses BPEL particularly to join disparate functions into an integrated process which results in a flexible way to use the internet to conduct business transactions ranging from simple money exchanges, to complex calculations and assets reallocation. (White 2003)

BPEL has been created by several people working for a number of companies, some worth mentioning are: Adobe, Avaya, BEA, Hewlett-Packard, IBM, Novell, Oracle, NEC, SAP, IBM and Microsoft. But it wasn't until IBM´s Web Service Flow Language and Microsoft´s Xlang, started back in 2002 things really started to happen, since then it has been full speed ahead. (White 2003)

Business process can be described in two ways. Executable business processes model actual behavior of a participant in a business interaction. Abstract business processes are partially specified processes that are not intended to be executed. Abstract Processes serve a descriptive role, with more than one possible use case, including observable behavior and process template. WS-BPEL (Web Service BPEL) is meant to be used to model the behavior of both Executable and Abstract Processes. (OASIS 2007)

WS-BPEL provides a language for the specification of Executable and Abstract business Processes. By doing so, it extends the Web Services interaction model and enables it to support business transactions. WS-BPEL defines an interoperable integration model that should facilitate the expansion of automated process integration in both the intra-corporate and the business-to-business spaces. (OASIS 2007)

4.5 Business rules engines

The term business rules means different things to different people, the term can be used so widely that it becomes meaningless.
A reasonable definition of a business rule comes from GUIDE, an industry user group. It states that a business rule is: "*A statement that define or constraints some aspects of business. It is intended to assert business structure or to control or influence the behavior of the business*." (Chisholm 2004)

Another example would be: *"A business rule is a simple statement of Boolean logic. IF the car is low on gas THEN turn on the low-fuel light."* (Woolston 2006)

Because of the wide spread meaning of *business rules* it makes it difficult to apply all business rules requirements to fit the rules engine. (Chisholm 2004)

Business rules engines are software applications that contain definitions of business rules. There are many business rules engines on the market today, and they fill different kind of needs. Broadly speaking they can be divided into two main groupings. The first are basically interference engines which can read information from a database and operate rules in order to find answers to questions that users ask. The second group is more concerned with obtaining results that can be stored in a database after the result has been calculated. (Chisholm 2004)

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4.6 Churn

Churn is a definition of customers that are likely to leave the company for another or better offering. (Middleton H, 2008)

When broadband is fast and doesn't break down, who cares what company it comes from. Because of the Internet, consumers can learn what the lowest available price is for broadband or phone service in their area. Result: churn – consumers are constantly taking advantage of better offers and switching providers. (Middleton H, 2008)

One way to avoid churn is by using mass marketing to persuade the public that your service is somehow better. That process is called product differentiation. Telecoms are using mass marketing today for telephone and broadband. But mass marketing is not doing enough to reduce churn. (Middleton H, 2008)

Churn is expensive, a typical Telco or cable TV company spends over $200 to acquire a new broadband or phone customer. When the customer switch, the company lose not only the acquisition cost, but the revenue that the customer would have provided for a year or more.

But the Telecoms have a significant advantage for marketing: they have customers' names and addresses, and that can lead Telecoms to use a more cost effective marketing, database marketing. (Middleton H, 2008)

Using database marketing, it is possible to build a relationship with the customers that will keep them from leaving. (Middleton H, 2008)

4.7 Semi structured interviews:

How to conduct semi structured interviews has been described by Stephen, Schensul, Schensul, LeCompete (Stephen, Schensul, Schensul, LeCompete, 1999). In summary they propose the following:

Semi structured interviews combine the flexibility of the unstructured, open-ended interview with the directionality and agenda of the survey instrument to produce focused, qualitative, textual data. The questions on a semi structured interview are pre-formulated, but the questions to those are open-ended, they can be fully expanded at the discretion of the interviewer and the interviewee, and can be enhanced by probes. Semi structured interviews plays an important role in the development of exploratory models and the preparation for the more systematic forms of investigation. A useful distinction between exploratory and explanatory research is that exploratory approaches are used to develop hypothesis and probes are for circumscription, description and interpretation of less well understood topics. Exploratory research can be the primary focus of a given design or just one of many components. Exploratory research, which includes semi structured interviewing, provide the basis for survey and other forms of explanatory research that can test theoretical hunches or propositions. Semi structured interviews are used to accomplish the following objects:

- Further clarify the central domains and factors in the study
- Operationalize preliminary hypotheses
- Develop a quantitative base for the construction of an ethnographic survey

Wengraf (Wengraf, 2001) also discusses this subject:

As regards such semi structured interviews, they are ones where research and planning produce a session in which most of the informant's responses can't be predicted in advanced and where you as interviewer therefore have to improvise (clarify) probably half - and maybe up to 80% or more - of responses to your initial questions.

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4.8 Interviews and observation techniques

The following is a list of interviews and observations techniques:

- By going into the interview / observation well prepared we will increase the credibility as professionals (Oates 2006, p 189).
- Anonymity is important to create an environment where the person doesn't have to fear later actions by superiors or be quoted in reports (Häger 2001, p 53).
- The contact is very important. For those people that will not participate can infect to other people. To prevent this, it is important to have good arguments to why they should participate (Andersson 1995, p 168).
- When doing interviews and observational questions it is recommended to use open questions (Oates 2006, p 192) this encourages the interviewee to explain and evolve their answers more accurately.
- By asking indirect questions as for example:
  "What would a customer service representative do in this situation" instead of "What would you do in this situation" will make the person being interviewed more open and honest (Häger 2001, p 74).
- There are two different way to conduct the observations, overt or covert. Covert is when the person being observed does not know of your presence as a researcher. Overt is when the person being observed knows of your presence as a researcher (Oates 2006, p 204). A problem that can occur when using overt observation is the Hawthorn effect. The Hawthorn effect is that people may act differently when being observed and can take a hostile stance (Häger 2001, p 204).
- Systematic observation is when you decide in advance what types of events you will observe (Häger 2001, p 204).

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4.9 Questionnaire techniques

This is a list of key techniques taken from Bell's (Bell, 2005) discussion on different questionnaire techniques:

- Bell writes that you should think a lot of what you want to gain from your questionnaire.

- According to Bell assumptions can lead to respondents being confused, irritated or even offended.

- Bell mentions how leading questions are hard to spot. Bell suggests not using emotive language when building a question because this might more easily end up as a leading question.

- Bell also writes about how presumptions in questions often are a source of error.

5. Method

We have divided our overall method into five studies, and performed them in a chronological order starting with chapter 6 Customer service representative observations and ending with chapter 10 Interview with Senior IT Architect. We used a questionnaire to gather information from the customer service representatives, we interviewed three experts in the telecom business and we performed observations on the customer service representatives.

After this we performed the analysis described below on the result from the interviews with Ole Larsson and Lage Eriksson.

Validation and reliability:

Long & Johnson discusses about the different views on reliability, they mention that there are more than one way to look at it but all relate to confidence in data collection (T.Long, M.Johnson, 2000). They continue to conclude that Reliability is recognized as being a part of the stability of data collection measures.

To ensure our reliability we have used recognized interview, observation and questionnaire techniques.

Long & Johnson also discusses the idea of validity. They argue that validity is normally established through consideration of three main aspects: Content validity, criterion-related validity and construct validity.

Content validity reefers too the validity of our samples and instruments in accordance to the context of the study we are conducting (T.Long, M.Johnson, 2000). We feel we have ensured content validity through choosing experts with solid expertise in their areas and also having a good position in a recognized business. The sample of customer service representative was not that good validated but as mentioned in our discussion we have to use the resource available in some cases. The instrument was validated through recognized techniques and the context of which the research was done is consistent throughout all the studies.

Criterion-related validity is concerned with comparison of the instrument and findings with an established standard to determine the correlation between measured performance and actual performance (T.Long, M.Johnson, 2000). This is ensured through comparing the analysis result to recognized theories created by known authors and experts within each area. We also sent the result to the people being interviewed so it could be approved to ensure that we have not misinterpreted any facts.

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Construct validity is associated with how good the instrument we chose is to generate the wanted result (T.Long, M.Johnson, 2000). By using the different instruments of interviewing, observation and conducting a questionnaire we feel we can ensure construct validity in our information gather study. Because of lack of resources, interviews was the only instrument we could use to collect data for our IT and business intelligence studies. Even so we feel we ensured the construct validity the best possible way.

Analysis method

In the book "Researching information systems and Computing" by Briony J Oates (Oates, 2006), she explains the difference between Qualitative and Quantitative data analysis. According to Oates Quantitative data means "data, or evidence, based on numbers. It is the main type of data generated by experiments and surveys, although it can be generated by other research strategies too." She continues explaining it by writing that it is primarily used and analyzed by positivist researchers, but is sometimes generated by interpretive and critical researchers too. Qualitative data on the other hand she explains as data that includes all non

numeric data. Mostly found in things like interviews, researchers' diaries, company documents. Interpretive and critical researchers have this data as their main data but positivist researcher may also use it. Since all of our data is qualitative we chose to use one of Oates approaches to Qualitative data analysis which is explained below. First of all the data needs to be prepared so it is ready for analysis. Duplicates will have to be made on our original data as well as our analyzed data. All the data have been read through at least once to get a general impression of the text. We segmented all the data into three different categories:

- Segments that have no relation to our current research topic and should be disregarded.
- Segments that provide general descriptive information needed in order to explain things like history of the interviewer, location and so on.
- Segment that appear to be relevant to our research questions.

After this we need to focus on the third bullet, segments that appear to be relevant. We will have to categorize each segment of this data; this by writing in the margin a label that describes the theme presented by that segment.

We have chosen to categorize according to existing theories.

Segments of text goes in here	Category according to existing theory
He first defines Operational data store (ODS) as the most operative level, this is what he usually defines as tactical reporting. He further explains it as creating data that becomes available in tactic, in other words how you act in different situations.	ODS
You can also manipulate the processes with BAM (Business Activity Monitor), in BAM you put measuring points in your BPEL flows.	BAM

Figure 1: Example of categorizing.

After this we continue to refine our categories. Some are too big and might need to be divided into sub categories. Oates also empathizes on the importance of keeping an up-to-date list of the categories.

Next we start to look for themes and connections between the segments and categories. We look for patterns that may be present over a whole category by pasting all the segmented categories together and then reading it again to look for these patterns.

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Oates continues with writing that the next step is trying to explain the patterns we've located in our categories. We should build up a theory about what our data "says" and then linking it to any other theories we have in our original framework or to what the literature says.

To test our emerging theory Oates writes that you can search for contradictory evidence within the data. Also go back in the field to look for things that may support or contradict the theory.

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6. Customer service representative observations

This chapter is where we present our work with observation on a customer service unit at TeliSonera Sundsvall.

6.1 Purpose

The main purpose of doing observations was to get a better insight in how the customer service representative works and what type of information they need.

We also wanted to gain some input for questions we could ask the business intelligence person and the senior IT-architect.

6.2 Method

We started off by joining the customer service representative in his/hers daily work for one day. This is to be well prepared when going into the next stage of observations and interviews (Oates 2006, p 189). But we also wanted to create a good contact with the customer service unit at an early stage as we previously explained and to show how their involvement could be of benefit to them in the future (Andersson 1995, p 168).

One month later we returned to the customer service unit. At this time we were each given a customer service representative to follow until lunch. After this we switched and were given another representative to observe. This continued for two days, during this time we took notes on what types of information parameters a customer service representative needs when dealing with assurance and sales problems. We also tried to notice any information that might be lacking today.

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6.3 Result

By going through our notes and discussing the information areas we came up with the following result. This result represents areas which the customer service representative needs information on.

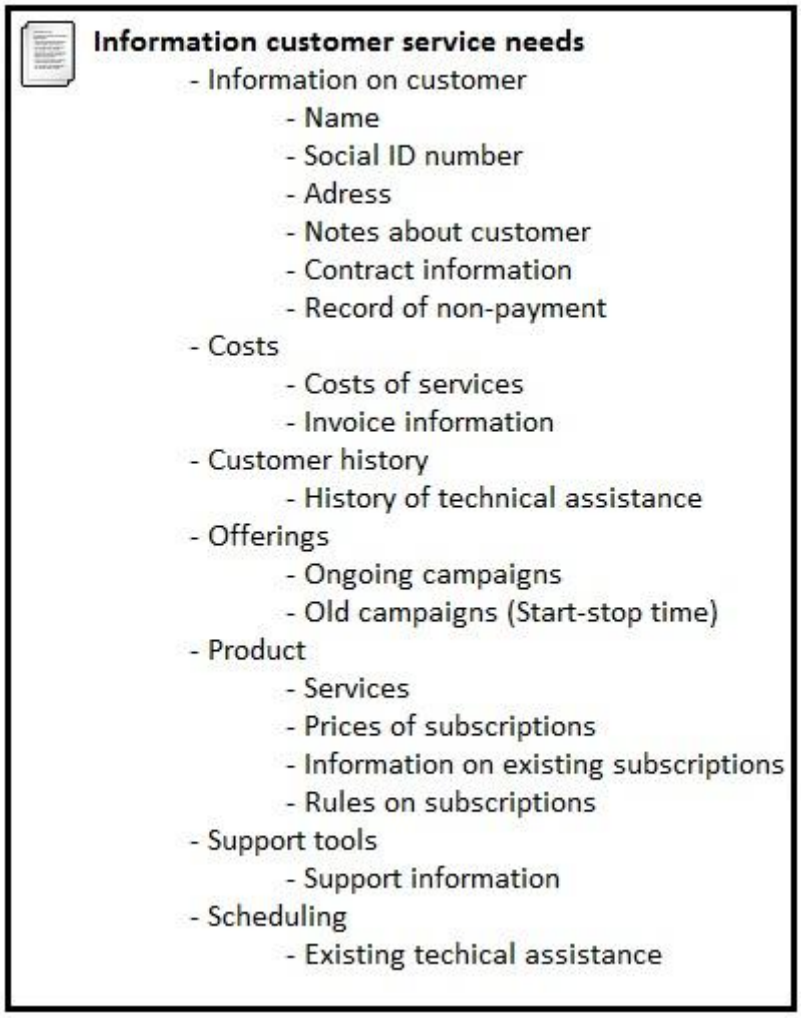

Figure 2: Result observations

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7. Questionnaire

This chapter is where we present the questionnaire we conducted on a customer service unit at TeliaSonera Sundsvall.

7.1 Purpose

The main purpose with the questionnaire was to get customer service representatives' views on the different information parameters that they use in their systems. We wanted to locate any specific areas that were especially troublesome but also areas that were exceptionally smooth. We also wanted their input and suggestions on new information parameters that they felt could be of use when handling customer issues and sales.

7.2 Method

Siv Svenshammar provided us with five skilled customer service representatives to answer the questionnaire. In our initial thoughts the goal was to perform this questionnaire in a much larger scale. The lack of resources made us change the questionnaire to more open ended questions. They all had four days to answer the questionnaire, and they answered it in front of their computer, as it is easier to answer the questionnaire when the person could write the answer directly when an issue appears. But also because we did not want to interfere too much with their daily work. A questionnaire can be either self-administrated or researcher administrated (Oates 2006, p 219), we chose to use a self-administrated questionnaire. The respondents were given two full days of completing their questionnaire in their natural working environment.

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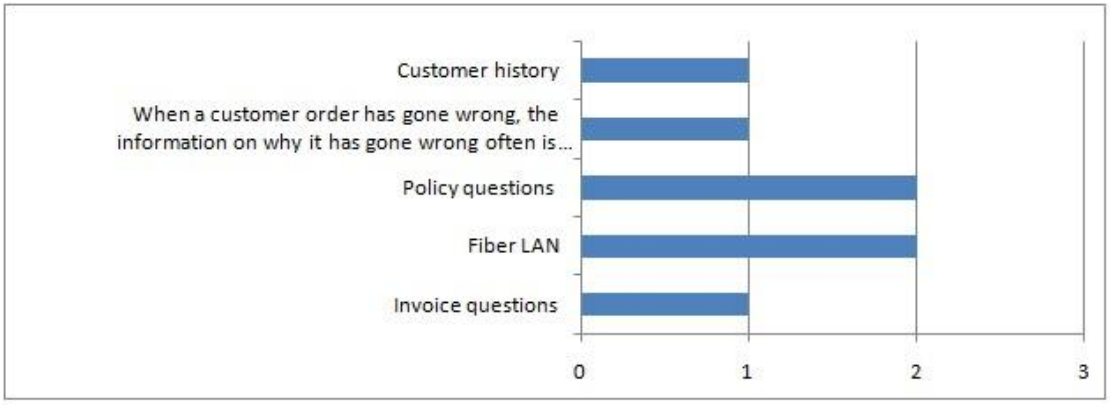
7.3 Result

First part of the questioner consists of checkbox answers. The number after each answer represents how many of the participants chose that answer.

How long have you worked at the customer service representative?

- More than two years (5)

Which area is hardest to answer/find information to? (Many alternatives can be marked)



Regardless matters, which information do you believe as a customer service representative should be presented on incoming calls from the customer? (Many alternatives can be marked)

Here are a set of open ended questions, first comes the question, followed by the answers. The answers are presented in bullets where each bullet represents one answer. The answer are directly translated from Swedish

1. Which information area do you believe have inadequate information to a customer service representative to perform the work in a good way (effectively/efficiently)?

- Customer history (1)
- Changes in Apollo (1)
- Fiber LAN area (2)
- Nothing is wrong with the information, but the time to learn the information is too short (1)

1.1 In what ways was the information inadequate? Is it hard to interoperate, hard to find, or is the information just not there? Please expand your answer:

- LOTS for order handling and how you should do different things in different systems should be easier to locate. (1)
- Different procedure every time (Fiber LAN) (1)
- Hard to interpret and it differ from case to case (Fiber LAN) (1)
- Missing important information on i.e. which campaign, binding period and speed the customer have had before (Changes in Apollo) (1)
- Information of a customer that have called logs manually in a notification by the representative, it does not log automatically. (Customer history) (1)

2. Which information area do you believe are irrelevant or not useful? Is there something that is often displayed but ignored/disregarded?

- Absolutely don't think there is a waste in any information area (4)
- Regular telephone (1)

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3. Which information area do you believe is most related to problems for a customer service representative? Is there for example information that isn't consistent, or isn't updated?

- Biggest problem is all addresses that are not standing correct in the system (1)
- Fiber LAN (1)
- Converting ADSL to fiber and in reverse (1)
- Invoice changes can often be complex, especially broadband invoice. (1)
- Costs and invoice. (1)

Which information area do you feel most comfortable with? Is there something that almost never creates problem and often shows the right place at the right time?

- Information about the customer (1)
- Customers current engagement (1)
- Landline (2)

Which information do you think is missing today? Do you have any proposals on information that would help but not exist today? History that is missing, information about disturbance, information about any move, etc.

- Information about disturbance in the area would help. When disturbances occur this would help us to inform the customer instead of redirection to technical assistance. (1)
- Fiber, routines on converting (2)
- A good approach for converting between ADSL and fiber and in reverse. (1)
- Orders that have been done disappears to fast from the system, for ex moves (Order history) (1)
- Much information about fiber is missing (1)

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We extracted what we think is the most valuable results from the questionnaire:

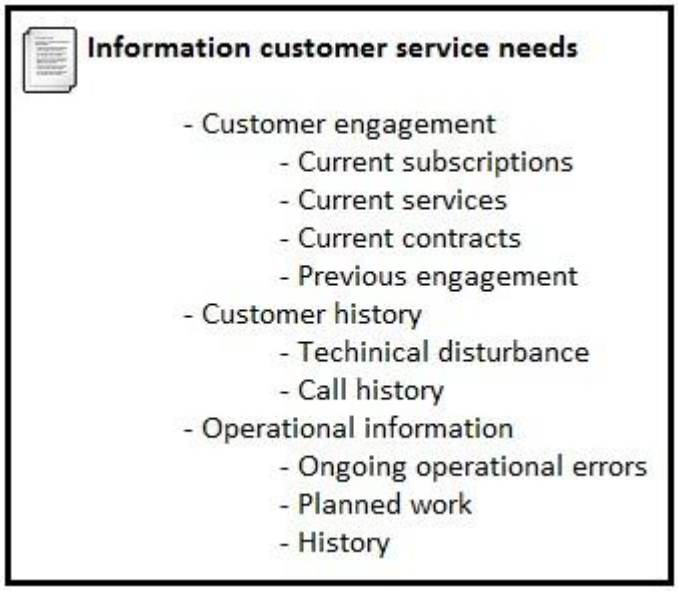

Figure 3: Result questionnaire

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8. Interview with chief of a customer service unit

This chapter is where we present the interview with Siv Svenshammar, chief of a customer service unit at TeliaSonera Sundsvall.

8.1 Purpose

The main purpose with this interview was to get ideas and suggestions on how to improve and add new parameters to the existing information areas. We also wanted to have an experts view on what types of problems a customer service unit experience today, especially within IT.

8.2 Method

The interview was held in a small conference room, and performed by Lage Eriksson, Alexander Henriksson and Fredric Vallin. We used a semi-structured interview technique because we wanted to ask open-ended questions, we also used all the techniques presented in 4.8 Interview and Observation techniques. Before we posted the result, we send our written answers to Siv Svenshammar to avoid any misinterpretations.

8.3 Result

Discussion area one

We wanted to know what Siv see as the biggest potential improvement area in IT. Siv saw big problems in error reporting and trouble shooting. When an error is discovered a lot of people do not report it, and if they do there are very little tools to help them describe the situation in which the error occurred.

When information is scattered and isn't easily available for the task at hand the service offered by the customer service representative will be reduced. The customer service representative cannot concentrate on being service minded but must instead put focus on locating information.

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Discussion area two:

We wanted to get Siv's input on business rules and how she experiences them.

Siv explained that there are a relative low amount of decision support rules, or "business rules" enforced to help the customer service representative make decisions in sales, assurance and fulfillment.

Discussion area three:

We wanted to know if there are any problems that have been noticed for a long time at the customer service unit.

Siv tells us about how they suffer a lot from the information that is presented to the customer. A lot of calls concerning bills are often not errors, but misinterpretations by the customer.

Discussion area four:

We wanted to give Siv the opportunity to give any feedback on areas in which we wanted IT to improve.

- More information concerning the customer was requested, for example:

"If we know that the customer hasn't plugged in its new TV package, we could call them and offer them support in how to install this. This has been proven to be greatly appreciated in the past."

Let's call the customer for assurance before they call us?

Analysis:

We discussed the documentation from this interview and produced the following results:

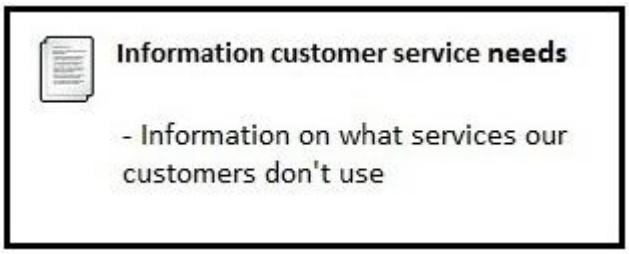

Figure 4: Result interview Siv

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Outside the raw documentation of this result it will also create new routines in customer service unit. By knowing what services our customers don't use we can reach out and make contact with them, asking if they would like assistance on how to use or install the service not used. This would increase the customer quality offered and also decrease the amount of calls incoming.

In example:

A customer calls in to check if they can upgrade their internet connection, the customer service representative notices that the customer hasn't installed the digital TV box ordered two months ago. After assisting the customer with help on upgrading its internet connection the customer service representative offers help on how to install and use the digital TV box.

This can increase the quality experienced from the customer and also prevent any future calls from this customer concerning the unused service.

9. Interview with business intelligence expert

This Chapter is where we present our interview with Ole Larsson.

9.1 Purpose

The main purpose with this interview was to get an experts view on business intelligence in the telecom industry. We wanted to know what problems are most common, how to solve them and how to use each component the most efficient way.

We also wanted to ask the expert questions we had after conducting the observations, interview and questionnaire at the customer service unit.

9.2 Method

We interviewed Ole Larsson as our expert in the business intelligence field. Ole has almost 43 years experience within the telecom industry, and has worked with almost every known technology in the telecom area. At 1999 he finished his architectural course and has been working with architecture problems since then. Ole is currently working at Solution architecture definition for business intelligence and data warehouse for enterprise data warehouse at TeliaSonera.

This interview was conducted via phone from a small conference room at TeliaSonera Sundsvall. We used a semi structured interview with all the techniques explained in 4.8 Interview and observation techniques.

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9.3 Result

Ole started with presenting the Business intelligence area. He starts off by dividing the data warehouse flows in different levels:

He first defines Operational data store (ODS) as the most operative level, this is what he usually defines as tactical reporting. He further explains it as creating data that becomes available in tactic, in other words how you act in different situations.

Next layer is traditional data warehouse, strategic reporting where you follow up and improve over time.

Next layers is simulation and data mining, or advanced analyzing this is where you can do profiling and search for unknown patterns in the large quantities of data. The data is used for profiling here, which is when you categorize objects like customers.

Ole continues and explains that some people also structures data warehouse in sourcing, managing and using. Data sourcing is when you load data from a number of sources or export data. Worst case scenario here is when you just want some data from a source but get handed a dump of the whole database. In these cases you will have to extract from that dump.

Ole then talks about data mart, and how it is like a model that is optimized for the reports, where data is stored in an efficient way. Ole talks about Inmons structure where process neutral data layers are used, business rules can later be applied to these data layer to make them understandable to the business. This is the structure that Ole has chosen to go with since he thinks that the data becomes more useful because of the option to use it for both tactics and

strategy but also profiling and simulations you would like to do on the data.

Ole continues and tells us that when data is bought from external services he wants it to be brought into the warehouse environment through the operative systems, as all the other data would be taken in. Business object is a general updating tool that can be used for both operative and tactical export of data. This data can also be exported to other receivers, like other systems or another customer.

Ole tells us that in their systems you can send a message to a server over a transport. This message gets then converted to questions that goes into an Oracle database and calls a Stall Procedure. This Stall procedure then does a database query and fetches the data that gets sent back to the JBOSS server, which in turn sends it back the way it came. If the data is too big or to complex so that it efficiently can be sent in a message the answer gets uploaded into a file and a message is sent to the system that it may retrieve the file.

We proceeded with discussing around and asking questions concerning different areas in the Business intelligence area.

Discussion area one:

We talk about profiling of customers and demography.

Ole can't see any problems concerning profiling and demography in BI but only possibilities. He believes that profiling data that support for example Churn is very suitable to do in a warehouse environment; the tools are practically made for those services.

Ole also tells us about the possibility to outsource the profiling part of the data to an external company; these companies can be specialized on just profiling. They might have more efficient databases that are column oriented.

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Discussion area two:

We talk about resources and how demanding BI is.

Ole tells us that BI definitely is heavy on the resources and that you can't profile "on-demand". Profiling will have to be done before the customer have called, the only thing that can be done on demand is the profile that is already done.

Discussion area three:

We talk about how the situation with widely spread information throughout many systems affects BI. When information is scattered all around the IT architecture is it hard to get a 360 degree customer view?

Ole explains that it is not the fetching of data that is problematic; it is easy to just fetch the data from a specific part of the architecture. There is also no problem to load that data into a normalized general model. A big problem is to work with a requirement base that where you have to consider requirements that are 15 years and at the same time building an enterprise warehouse with a modern thought in mind. To be able to store data from different systems they keep track of the origin of the data. This way they can store the same data many times. This is something that separates the operative systems from the data warehouse; a data warehouse handles a lot more of Meta data.

Another part of the problem is when you are merging two different areas into one data mart; making the data in the two areas coherent can easily cause problems. Ole tells us that the challenge lies in the data mart layer. You can easily retrieve data with the help of Meta data but it's the way out that is tricky, when applying business rules to the data taking it back into the business.

Discussion area four:

We talked about the possibility to check if the customer uses the services they are paying for. Like the channels they are subscribing to or internet connection they have.

Ole explains that you can't give a direct answer to this question. You first have to know what information you want to know from the business side. When this is known you just check if the data exists in the model we currently have. If this data already exists in the model, that being if the operative systems feed the BI with this information according to the model, then it is relatively easy to get the information. On the other hand if the information isn't in our current model we'll have to change the extract of the operative system. The development cycles of the systems are fairly long and you'll have to wait for quarterly releases and so on.

Ole also tells us that a separate data mart for this kind of information is possible. He also suggests that you could see other type of information like what services are available / unavailable and if there are any chokes. Collecting information from the different operative systems to present a collected view to the part of the business that needs the information.

Discussion area five:

We talked about how to solve the issue of creating a mutual bill for all the customers' engagement in TeliaSonera. We wanted to get Oles perspective on how to solve this.

Ole agrees that this is a big issue, but he continues to tell us that he does not believe it is a problem that should be solved in data warehouse. This is, according to Ole, a problem that should be solved by the billing systems. Ole tells us that the structure of a billing system and data warehouse is quite the same. This causes problems because people often do "quick fixes" in the data warehouse to solve a billing system issue. These "quick fixes" often becomes permanent and are the root of many problems.

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Discussion area six:

We talked about using BI as a solution to help the customer service representative with error reporting. To be able to send error reports containing web logs automatically when a error occurs instead of manually explaining it and sending.

This is what Ole calls portal and web logging. He explains that this is a area he haven't done much work himself but have been in contact with a lot of people working in this area. Ole continues and tells us that ODS was partly started because of the customer contact was becoming increasingly low; instead people were conducting their errands online. They were losing the possibility to supervise patterns and to follow the customers' reactions. This is where ODS came in and you could create requirements on what to log in the portals and web applications used. Ole tells us that web logging like this is not easy, especially not when trying to do it as close to real time as you can, but it is possible.

Discussion area seven:

We ask about the process from a idea of new information to it actually being used in i.e. a customer service unit.

Ole tells us that there is a organizational unit that has a forum for exchange of requirements. If they reach the conclusion that there should be some new information included they register this as a errand. The errands get prioritized and if they are big enough a project leader gets assigned.

Discussion area eight:

We want to know what the hardest part of BI is.

Ole starts by telling us that working with requirements is often quite difficult. This is because of the environment that their warehouse is in today, with a lot of warehouses overlapping and integrating with each other. He also tells us that the underlying structure isn't that easy to work with. Ole continues by telling us that the most time is lost when you are receiving new data from the operative systems. Ole tells us that the attention from the different areas isn't what you could wish for. This often results in quick fixes that increase the complexity. Many times you are offered a "dump" from the technical administrator because that is something they always can deliver. These "dumps" are often very difficult to interpret, how does the data relate to each other? If you ask the technical administrator they do have supporting this "dump" in their plans. This is something Ole would like to change from the start.

Discussion area nine:

We continue on the last subject and ask how the data really should be delivered?

Ole starts by pointing out that all the transactions should be logged in the extraction. He'd like to see the data arriving in a message, preferably a JMS queue that gets read. If this isn't possible Ole suggests that you should get a file with the data through a file clearing house. This is that you have a secure file transfer with transaction history and so on. The "dumps" should definitely be avoided.

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Discussion area eleven:

Finally we ask Ole if he can see any need for new information at customer service that doesn't exist today.

Ole starts by pointing out that there are very much information that is unused today. He thinks that we can combine data in the normalized database. Ole tells us that storing process neutral information is always possible to do for a lot of goals, but storing business data that is data with business rules attached we always do it for a purpose. If we want to plan for the future we should look at the operative systems. You should look on what is going to stay and which requirements are going to be added.

Analysis:

We analyzed the result from this interview according to the analysis method explained in 5. Method. The following model on Business intelligence was created.

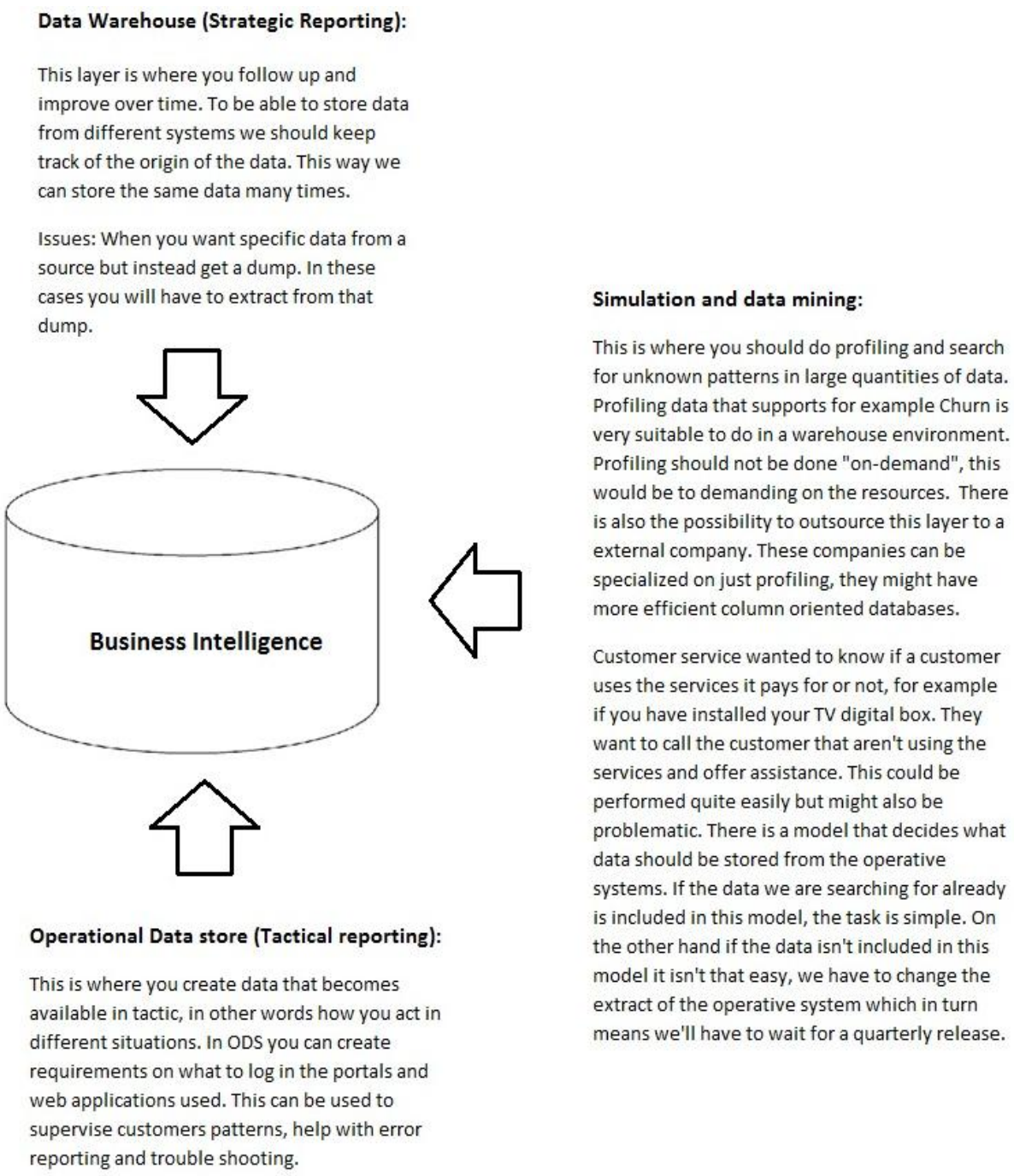

Figure 5: Result interview Ole

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This analysis also resulted in some guidelines that explain how to communicate and what issues to look out for.

How to communicate:

To communicate with the warehouse environment we want the operational system to send a XML message to a server over a JMS transport. This message then gets converted to questions that go into a database. Within the database we do a database query and fetch the data that gets sent back to the server, which in turn sends it back the way it came. If the data is too big or too complex to efficiently be sent in a message the answer gets uploaded into a file and a message is sent to the system that it may retrieve the file.

If data is bought from external services it should be imported into the data warehouse environment the same way as all the other data.

Issues:

A big problem is to work with legacy requirements and at the same time consider building a modern enterprise warehouse.

Merging two different areas into one data mart is a problem and making the data coherent can easily cause problems.

Retrieving data with the help of metadata isn't that hard, but a challenge lies in applying business rules to the data and taking it back into the business.

Quite obvious "quick fixes" causes a lot of problems in the warehouse environment. "Quick fixes" are made to help solve problems in the operational systems but often becomes permanent and increases the complexity. These fixes are the root of many problems.

A lot of time is lost when receiving new data from the operational systems. If you ask for specific data you often get offered a "dump", because this is something the operational systems always can deliver. These "dumps" are often very difficult to interpret and the technical administrator does not have supporting these dumps on their schedule.

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10. Interview with Senior IT Architect

This chapter presents our interview with Lage Eriksson.

10.1 Purpose

The main purpose with this interview was to get an experts view on IT in the telecom industry. We wanted to know what problems are most common, how to solve them and how to use each component the most efficient way.

10.2 Method

We interviewed Lage Eriksson as our expert in IT within the telecom industry. Lage has 26 years experience within the telecom industry. He started at a company called Datacom 1984 where he joined a project for establishing a drift and data network to replace the old magnetic band for collecting call records and traffic measurements. 1994 he became region chief, 1996 he started to work in a network architecture unit their tasks was to look at new techniques, like VoIP and other things. After that he worked in a project that established ADSL solutions. And now he work as Chief Architect for business broadband Sweden.

The interview was conducted via phone from Alexander's resident in Uppsala. We used a semi structured interview with all the techniques explained in 4.8 Interview and observation techniques.

10.3 Result

Discussion area one:

We asked Lage to do a general presentation over his thoughts on the main subjects in our thesis, BPEL, BI, Information at a customer service unit and business rules.

Lage starts off by saying that BPEL isn't something you can use everywhere. The place where it isn't usable is where you have existing legacy systems where we cannot go in and change. Though you can use it at modern solutions, usually portal application where we can create a couple of composite SOA services from underlying services. These can we later expose with for example IDS Sheers ARIS.

The biggest advantage is when you can combine a BPEL motor with a process tool and start to describe your processes. Then you can connect this with a business rules engine where the business themselves can set rules and requirements for our processes without assistance of technical support. These rules can be for example how you treat a customer depending if its gold or silver. But it can also be rules that look if the customer has had a lot of complaints or its current engagement and what types of offerings we currently have. The offerings shown to the customer service representative is only offerings that the customer technically can use and also offerings that fit this customer's profile.

You can also manipulate the processes with BAM (Business Activity Monitor), in BAM you put measuring points in your BPEL flows.

This sums up in two big areas that a customer service unit can benefit from, first of the customers engagement alongside with offerings, churn and patterns. Secondly to be a support to the error analysis in which case the customer themselves could apply test to their hardware

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and connectivity. Also the area of ODS to be able to create more information about the customer, combining it with the operative data that exists in CRM and billing systems.

Discussion area two:

We talked about the structuring of the components we currently have, how to see them and make use of them. As we saw it we had information at the customer service unit, business intelligence, ODS and BPEL with business rules.

Lage explains that his view on the components we are exploring is that we should not see them as layers but rather see them as tools to use at specific places in our IT environment. Certain part of our main process flows may be eligible to use this technology with BPEL, business rules and so on. More like looking for customer close service oriented processes which we can renew and use this idea on.

Lage continues and says that BPEL can be used in more low processes close to the resource layers but in this project we look at the higher levels with customer contact.

We sum it up by saying that we would like to use these components together on selected areas in our IT architecture to improve customer contact and experience.

Discussion area three:

We continue with asking Lage if this model would be a good solution to apply on a larger architecture.

Lage absolutely believes so, even the big player's works like this, SAP and Oracle uses ARIS to describe their business view and the whole way down to BPEL as the system view on the business processes and how a process activity in BPEL calls a SOA service.

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Discussion area four:

We want Lage to further elaborate on BPEL.

Lage starts by explaining that first of all we must define and describe our processes. Different notations can be used depending if you're closer to the resource layer or more business oriented. After you define your processes one thing that is good when using BPEL is that you can convert your processes and get them into your development environment. Components in the visual processes thereby become executable. Further you can put down measuring points in these processes. Lage also points out that more and more standard systems on the market today can handle these kind of technologies.

Discussion area five:

We asked Lage how the problem with a common invoice should be solved

Lage says that there are different methods to solve this problem. One of these solutions would be to have only one billing system, Lage continues by explaining that this is not a realistic scenario. Even though we should try to have as few billing systems possible, one is not realistic. Another solution could be to have one billing distribution layer that handles other billing systems and put the different formats into one physical invoice. You can also have one billing system that consults many other billing systems, that is also one strategy to use, but he would prefer anyone of the two later ones.

Analysis:

We analyzed the result from this interview according to the analysis method explained in 5. Method. The following model on Business rules, Business activity monitor and Business process execution language was created.

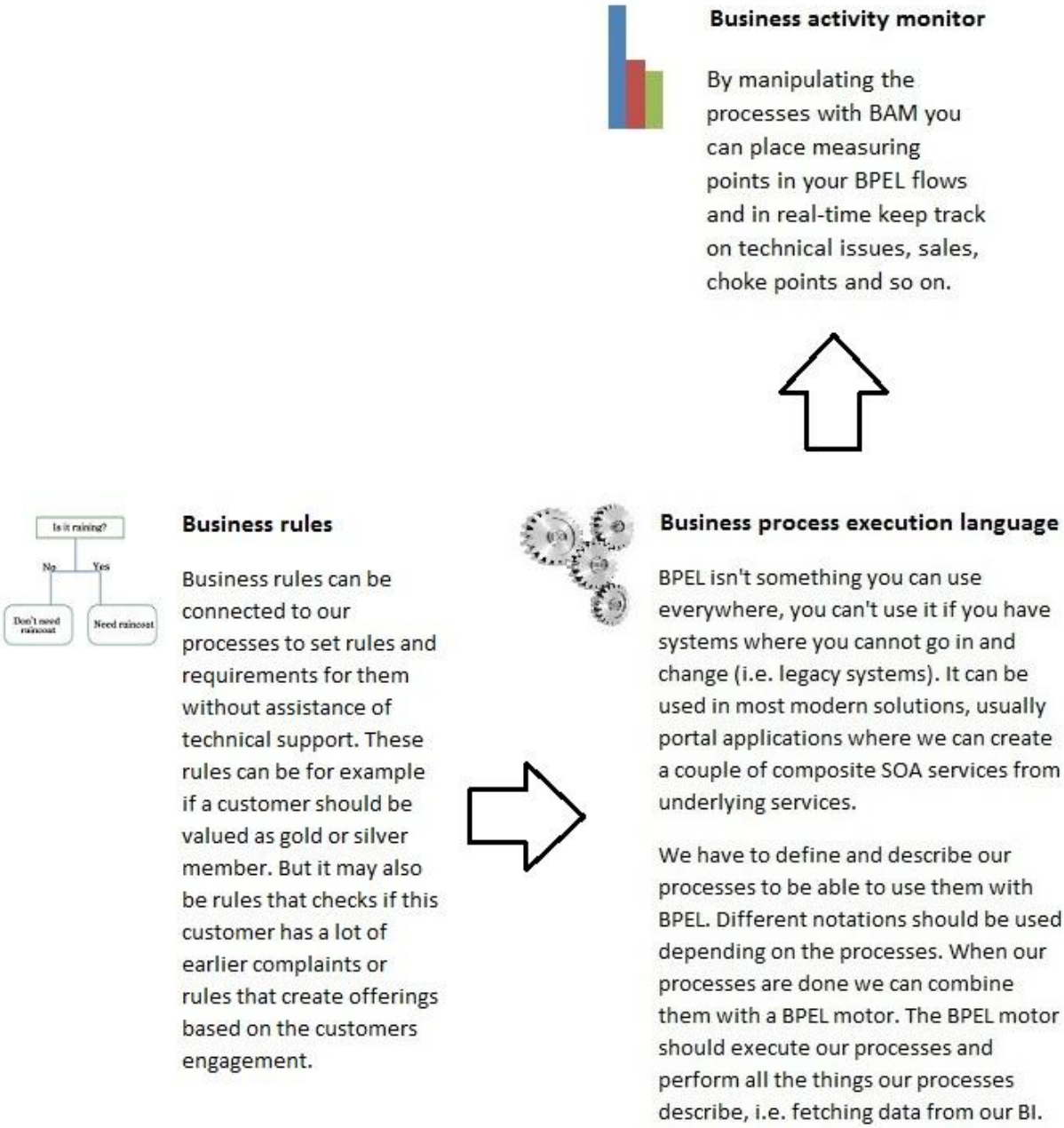

Figure 6: Result interview Lage

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This analysis also resulted in some guidelines that explain how this model should be viewed.

Model View:

This model can be used on specific places in your IT environment. Certain sections of your main process flows may be eligible to use this model. Modern solution areas with close customer service oriented processes are more likely to be able to use this model.

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11. Conclusion

To conclude we have combined all the components into a customer service information model. This model describes the relationship between all the components. Each component is described in more detail under corresponding chapter in the thesis.

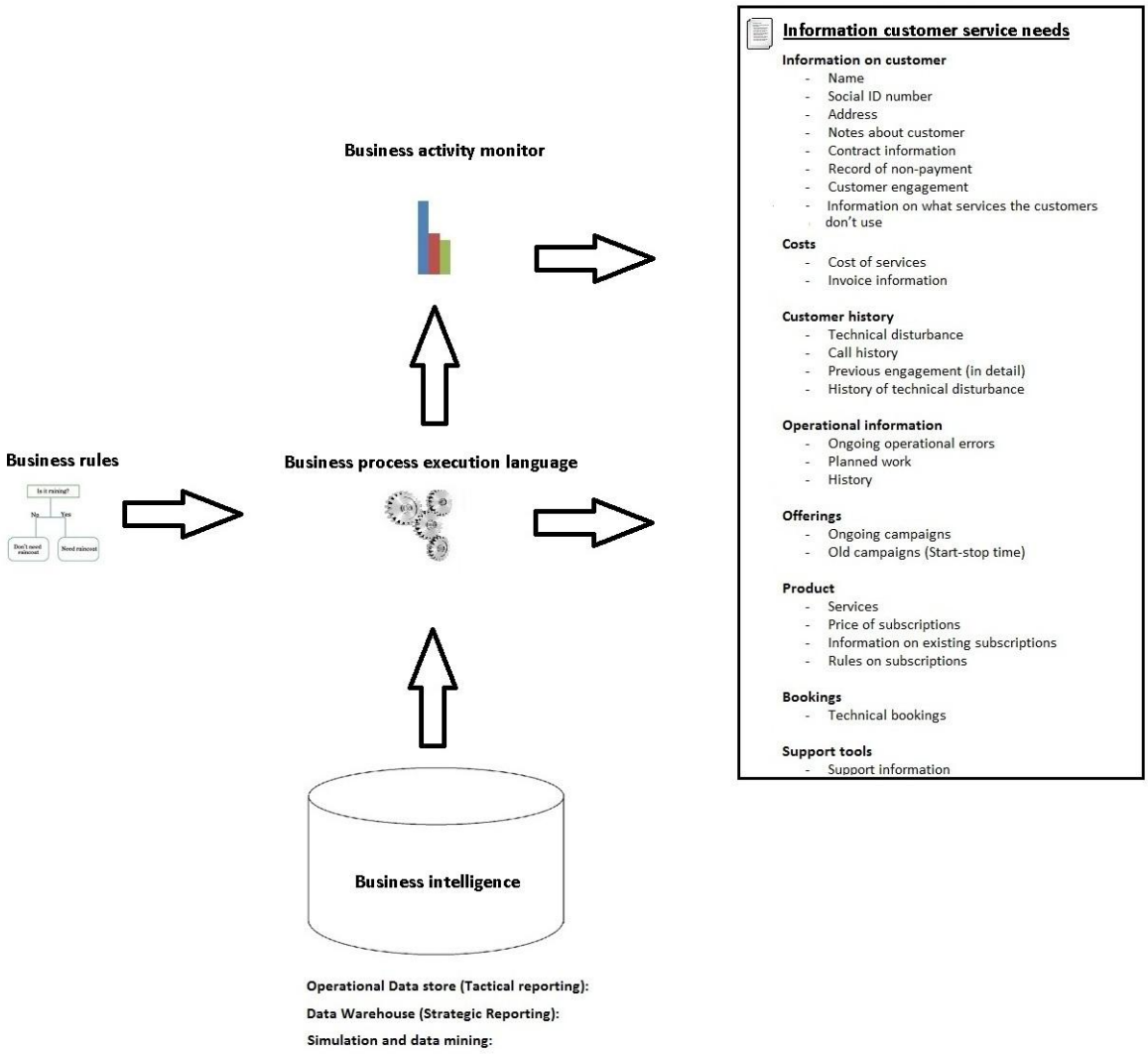

Figure 7: Conclusion results

The BPEL engine is the core of this model. It executes processes and keeps the information flow going. By using business rules it is easy to change requirements on the data. Through business intelligence we gain insight into customers' profiles, demographic information, support on error handling and close real time customer behavioral patterns. The BAM uses measuring points in our BPEL processes and feeds the operative systems with real time information on technical disturbances, choke points and sales figures.

By using business rules and business intelligence the BPEL engine can optimally adapt to customer behavioral patterns, to make sure the customer service representative gets the most efficient help and information possible.

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An advantage of this model is that it can be implemented in specific parts of the IT architecture, and does not have to be used in a large scale. Dynamic service oriented processes with close customer service relations can be pin pointed and tested to ensure its efficiency.

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12. Discussion

In this chapter we will reflect on the choice of studies, how it was performed and its result. We want to share experiences we've gained and thoughts on how any future work in this area could be helped by our gained knowledge.

Customer service observation

We chose to use observations because we wanted to get the users perspective and insight. We feel that if improvements are to be made in a customer service unit we have to work closely with the customer service representative to get a good end result.

This study gave us a great insight on how a customer service representative works. For future reference we want to point out the importance of being well prepared when conducting observations. Making sure the group being observed knows what we're trying to achieve is vital. Taking a lot of time in advance to structure your observations, maintain good communication with the selected group will in the end give you a much better result. We realized this when doing our observations and came to the conclusion that our planning was somewhat inconclusive. We should have made sure that they really knew what our purpose was and that they feel that the work being conducted is meaningful.

Our result from this study was satisfying, we feel that we achieved what we set out to do. The most valuable result is not the one documented but the one we gained from getting insight into how they work and their routines. This insight helped us when dealing with the information parameters and suggestions on how to improve their information flow.

Questionnaire

The questionnaire was more of a complementary study, we felt that the time we got for observing the customer service representative and interacting with him/her was not enough to get a 360 degree view on their work.

We gained more knowledge on problem areas in their work. When reflecting on it we feel that it might have been a good idea not to have such open ended questions, and using a more structured questionnaire. We feel that some answers drifted off topic and is too closely integrated with TeliaSonera's specific system view. We should have spent more time planning that the result will match the purpose and making sure the questionnaire is easy to understand.

The result became quite divided, some of it was not used at all, some of it did not correspond correctly to our purpose and some was documented and used in the final model. This could be improved by better planning.

Interview with chief of a customer service unit:

Senior staff usually have deeper understanding of the different part in the work. We wanted to get the chief of the service unit involved but also get her reflections and ideas.

This was the first interview we performed so mistakes made here was corrected on the upcoming interviews. Lack of experience and planning made the structure in this interview somewhat inadequate. Who should ask question and in what order was not structured in advance, the documentation suffered due to inadequacies in the recording.

This interview resulted in a suggestion on a new routine that would improve quality and decrease amount of incoming calls to the customer service unit. We also gained knowledge into the biggest challenges and problems they face in the customer service unit.

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Interview with business intelligence expert

Literature within areas on specific industries are limited, there are plenty of books and studies on business intelligence as a general component but not as much concerning business intelligence specific for the telecom industry. This is why we decided to interview a expert that has worked with business intelligence in this industry. To gain a unique perspective from a industry veteran.

After learning from the initial mistakes on our first interview this one went much better. Planning was extensive and the structure well executed. The interview was recorded and transcribed so we could perform a comprehensive analysis. When reflecting upon this we feel that we could've narrowed it down and asked some more specific questions so that the result wouldn't be so overwhelming.

The time spent on transcribing, translating and analyzing was much but well worth it. We feel that the result became very useful and we gained a great deal of knowledge. This was a very important piece of our end result and it also reflects the way to use business intelligence efficient in this particular industry.

Interview Senior IT-Architect

We wanted help with connecting all the component and to further explain BPEL, Business rules and BAM. This is why we chose to interview someone with a bird's eye perspective on the IT components.

As the last interview performed this was also the most efficient and well executed. We gained our result in less time and with more accurate questions. As the interview with business intelligence this interview was also recorded, transcribed, translated and analyzed but with less time spent on sorting out unnecessary information.

The result of this interview became the core of our model and also the piece that brings it all together. This gave us a greater understanding on how to integrate the different components which is turn helped us on creating our final model in the conclusion.

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Overall reflections on methods and result

What types of resources we were given was something that we had to consider and adjust to when we selected what studies to perform. The selection of studies was a collaboration between us, our mentor at TeliaSonera and our mentor at Uppsala University. We had an idea on what studies we wanted to perform, TeliaSonera gave us restriction in resources while Uppsala University gave us guidelines to make sure the studies was meaningful.

When executing our studies we suffered from our purpose not being clear enough. We would've been better off if we spent more time on developing our purpose and realizing what we want to achieve. Although this is also hard to know because the purpose gets clearer the further into the thesis you go.

Our results in general suffered from a somewhat unclear early purpose, we gained some results that haven't been used. Once our purpose became clear the result from the remaining studies was much more valuable.

In the end we feel that our result do connect to the purpose, the model created is a first version but solid. We found a good way to describe how the components should integrate and also what type of information they should deliver.

There is still a lot of work to do before this model is finished, testing needs to be done and more comprehensive studies should be performed to complete it. Technical aspects should be researched and explained in more detail, more IT-components could be added and more work in creating new information suggestions that helps the customer service unit is needed. Work on looking at the relationship between information and how this relationship could be of use in a customer service unit is important to look in to.

As mentioned in 11. Conclusion this model can be implemented in a small scale. Tests on a few processes that follows this model should be done and then depending on its results continue into a larger scale. Other industries besides telecom might also gain advantages from this model, some small changes can be made for it to be more of a general customer service model.

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14. Attachments

This chapter includes all our attached material.

14.1 Questionnaire

Hur länge har du arbetat på Kundtjänst?

☐ Under ett år.

☐ Ett år till två år.

☐ Mer än två år.

Vilket/vilka områden är svårast att besvara och finna svar/information till? (Flera alternativ kan markeras)

☐ Policyfrågor.

☐ Faktura frågor.

☐ Felsökning.

☐ Kundhistorik

☐ Eget alternativ:_____

_____

Oavsett ärendetyp, vilken information skulle du anse att en kundtjänstmedarbetare bör få presenterad vid inkommande samtal från kunden? (Flera alternativ kan markeras)

☐ Namn och personnummer.

☐ Aktuella abonnemang hos TeliaSonera.

☐ Historik om kunden (Fel kunden haft, hur länge personen varit kund hos TeliaSonera, m.m.)

☐ Fakturor (Senaste, obetalda, summa av alla fakturor)

☐ Om kunden har/haft driftstörningar senaste kvartalet.

☐ Eget förslag på information:

_____

_____

☐ Eget förslag på information som inte bör visas:

_____

_____

1. **Vilket informationsområde anser du har bristfällig information för att en kundtjänstmedarbetare ska kunna utföra sitt arbete på ett bra sätt?**

_____
_____
_____
_____

1.1. **På vilket sätt är informationen bristfällig? Är den t.ex. svårtolkad, svår att hitta eller helt enkelt inte finns där? Utveckla gärna kort på ditt svar:**

_____
_____
_____
_____

2. **Vilket informationsområde anser du har överflödig information? Finns det t.ex. något som ofta syns men har ett obefintligt användningsområde?**

_____
_____
_____
_____

3. **Vilket informationsområde anser du är mest relaterat till problem för en kundtjänstmedarbetare? Finns det t.ex. någon information som ofta inte stämmer eller ej är uppdaterad?**

_____
_____
_____
_____

4. **Vilket informationsområde känner du dig bekvämast med? Finns det något som nästan aldrig ger problem och ofta visas på rätt plats vid rätt tillfälle?**

_____
_____
_____
_____

5. **Vilken information saknar du idag? Har du förslag på information som skulle underlätta men inte finns med idag? Historik som saknas, information om störningar, information om flytt osv.**

_____
_____
_____

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14.2 Analysis categories from interviews

In this section we present how we categorized the data from our interviews.

14.2.1 Interview with Ole Larsson

He first defines Operational data store (ODS) as the most operative level, this is what he usually defines as tactical reporting. He further explains it as creating data that becomes available in tactic, in other words how you act in different situations. ********** This is what Ole calls portal and web logging. He explains that this is a area he haven't done much work himself but have been in contact with a lot of people working in this area. Ole continues and tells us that ODS was partly started because of the customer contact was becoming increasingly low; instead people were conducting their errands online. They were losing the possibility to supervise patterns and to follow the customers' reactions. This is where ODS came in and you could create requirements on what to log in the portals and web applications used. Ole tells us that web logging like this is not easy, especially not when trying to do it as close to real time as you can, but it is possible.	Tactical reporting (ODS)
Next layer is traditional data warehouse, strategic reporting where you follow up and improve over time. ********** Ole continues and explains that some people also structures data warehouse in sourcing, managing and using. Data sourcing is when you load data from a number of sources or export data. Worst case scenario here is when you just want some data from a source but get handed a dump of the whole database. In these cases you will have to extract from that dump.	Strategic Reporting (Data warehouse)
Next layers is simulation and data mining, or advanced analyzing this is where you can do profiling and search for unknown patterns in the large quantities of data. The data is used for profiling here, which is when you categorize objects like customers. ********** Ole can't see any problems concerning profiling and demography in BI but only possibilities. He believes that profiling data that support for example Churn is very suitable to do in a warehouse environment; the tools are practically made for those services. ********** Ole tells us that BI definitely is heavy on the resources and that you can't profile "on-demand". Profiling will have to be done before the customer have called, the only thing that can be done on demand is the profile that is already done. ********** Ole also tells us about the possibility to outsource the profiling part of the data to an external company; these companies can be specialized on just profiling. They might have more efficient databases that are column oriented.	Simulation and data mining
Ole continues and tells us that when data is bought from external services he wants it to be brought into the warehouse environment through the operative systems, as all the other data would be taken in. Business object is a general updating tool that	How to communicate

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can be used for both operative and tactical export of data. This data can also be exported to other receivers, like other systems or another customer. ********** Ole tells us that in their systems you can send a XML message to a JBOSS server over a JMS transport. This message gets then converted to questions that goes into an Oracle database and calls a Stall Procedure. This Stall procedure then does a database query and fetches the data that gets sent back to the JBOSS server, which in turn sends it back the way it came. If the data is too big or to complex so that it efficiently can be sent in a message the answer gets uploaded into a file and a message is sent to the system that it may retrieve the file. ********** Ole explains that you can't give a direct answer question about callback assurance. You first have to know what information you want to know from the business side. When this is known you just check if the data exists in the model we currently have. If this data already exists in the model, that being if the operative systems feed the BI with this information according to the model, then it is relatively easy to get the information. On the other hand if the information isn't in our current model we'll have to change the extract of the operative system. The development cycles of the systems are fairly long and you'll have to wait for quarterly releases and so on. ********** Ole starts by pointing out that all the transactions should be logged in the extraction. He'd like to see the data arriving in a message, preferably a JMS queue that gets read. If this isn't possible Ole suggests that you should get a file with the data through a file clearing house. This is that you have a secure file transfer with transaction history and so on. The "dumps" should definitely be avoided.	
Ole explains that it is not the fetching of data that is problematic; it is easy to just fetch the data from a specific part of the architecture. There is also no problem to load that data into a normalized general model. A big problem is to work with a requirement base that where you have to consider requirements that are 15 years and at the same time building an enterprise warehouse with a modern thought in mind. To be able to store data from different systems they keep track of the origin of the data. This way they can store the same data many times. This is something that separates the operative systems from the data warehouse; a data warehouse handles a lot more of Meta data. ********** Another part of the problem is when you are merging two different areas into one data mart; making the data in the two areas coherent can easily cause problems. Ole tells us that the challenge lies in the data mart layer. You can easily retrieve data with the help of Meta data but it's the way out that is tricky, when applying business rules to the data taking it back into the business. ********** Ole agrees that this is a big issue (common invoice), but he continues to tell us that he does not believe it is a problem that should be solved in data warehouse. This is, according to Ole, a problem that should be solved by the billing systems. Ole tells us that the structure of a billing system and data warehouse is quite the same. This causes problems because people often do "quick fixes" in the data warehouse to solve a billing system issue. These "quick fixes" often becomes permanent and are the root of many problems.	Issues

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********** Ole starts by telling us that working with requirements is often quite difficult. This is because of the environment that their warehouse is in today, with a lot of warehouses overlapping and integrating with each other. He also tells us that the underlying structure isn't that easy to work with. Ole continues by telling us that the most time is lost when you are receiving new data from the operative systems. Ole tells us that the attention from the different areas isn't what you could wish for. This often results in quick fixes that increase the complexity. Many times you are offered a "dump" from the technical administrator because that is something they always can deliver. These "dumps" are often very difficult to interpret, how does the data relate to each other? If you ask the technical administrator they do have supporting this "dump" in their plans. This is something Ole would like to change from the start.	

14.2.2 Interview Lage Eriksson

Lage starts off by saying that BPEL isn't something you can use everywhere. The place where it isn't usable is where you have existing legacy systems where we cannot go in and change. Though you can use it at modern solutions, usually portal application where we can create a couple of composite SOA services from underlying services. These can we later expose with for example IDS Sheers ARIS. The biggest advantage is when you can combine a BPEL motor with a process tool and start to describe your processes. Lage continues and says that BPEL can be used in more low processes close to the resource layers but in this project we look at the higher levels with customer contact. Lage starts by explaining that first of all we must define and describe our processes. Different notations can be used depending if you're closer to the resource layer or more business oriented. After you define your processes one thing that is good when using BPEL is that you can convert your processes and get them into your development environment. Components in the visual processes thereby become executable. Further you can put down measuring points in these processes. Lage also points out that more and more standard systems on the market today can handle these kind of technologies.	BPEL
Then you can connect this with a business rules engine where the business themselves can set rules and requirements for our processes without assistance of technical support. These rules can be for example how you treat a customer depending if its gold or silver. But it can also be rules that look if the customer has had a lot of complaints or its current engagement and what types of offerings we currently	Business rules

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have. The offerings shown to the CSR is only offerings that the customer technically can use and also offerings that fit this customer's profile.	
You can also manipulate the processes with BAM (Business Activity Monitor), in BAM you put measuring points in your BPEL flows.	BAM
Lage explains that his view on the components we are exploring is that we should not see them as layers but rather see them as tools to use at specific places in our IT environment. Certain part of our main process flows may be eligible to use this technology with BPEL, business rules and so on. More like looking for customer close service oriented processes which we can renew and use this idea on.	Model View

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