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Improvement of Service Invoicing Process

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The target of this Master´s Thesis was to improve the service invoicing process in the target company and to create preliminary definitions for the upcoming IT project. The target organization is an international company that operates mainly in Scandinavia. Development in the service invoicing process was needed in order to strengthen the process especially what comes to control points. The research was action research where investigation was conducted by making a survey, having conversations and observations. The researcher took part in planning and implementing changes.

The framework of this master´s thesis was composed of processes and process improvement and projects, concentrating on IT projects because the key in the current development work was to improve a process and to prepare preliminary definitions for an IT project. One part of the framework was change management as it is present in working life almost in all cases.

The analysis of the current status of the service invoicing process gave a starting point for improvement. This stage also helped in creating requirements for the IT project. The improvement actions had no funding so all improvement actions were chosen based on this fact and done with existing resources. As the IT project that would aim at automatizing service invoicing process would be launched soon, any major changes to the process were not seen possible nor reasonable at this point.

The results show that in general the opinions of the service invoicing process are lower than before changes. On the other hand, the changes are quite small and the challenges that were paid most attention to (correctness of invoicing data and strengthening control points) during the improvement actions were not brought up in the answers of a follow-up survey. The control points also satisfied the internal auditor. The sent invoices have been correct after implementing the changes. It should be noted that the follow-up time was left short considering the cycle of possible errors.

As a result of the research invoicing process was strengthen by introducing a change process and by adding control points to the process. Upcoming IT project was prepared with a description of data sources in the service invoicing process as well as updated process flow chart. Also preliminary definitions and requirements were formed.

Keywords	Process Improvement, IT Project, Change Management

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Opinnäytetyön tavoitteena oli parantaa kohdeyrityksen palvelulaskutusprosessia ja luoda laskutusprosessin alustavat vaatimukset tulevalle IT-projektille. Kohdeyritys on kansainvälinen, pääasiassa Pohjoismaissa toimiva yritys. Prosessin parantaminen koettiin tärkeäksi erityisesti kontrollipisteiden osalta, joiden lisäämisellä vahvistettiin prosessia. Tutkimus toteutettiin toimintatutkimuksena, jossa käytettiin menetelminä kyselyä, haastatteluita ja havainnointia. Tutkija osallistui toimenpiteiden suunnitteluun ja käyttöönottoon.

Opinnäytetyön viitekehys muodostuu prosesseista ja prosessien parantamisesta sekä projekteista keskittyen IT-projekteihin, koska kehittämistehtävänä oli parantaa prosessia sekä luoda alustavat vaatimukset IT-projektille. Osana viitekehystä on myös muutos, joka on osa työelämää lähes aina.

Palvelulaskutusprosessin nykytilan analyysi antoi lähtökohdat kehittämiselle, sillä kehittämistarpeet tulivat esille tässä vaiheessa. Tämä vaihe auttoi myös vaatimusten luomisessa IT-projektille. Kehittämistoimenpiteille ei ollut rahoitusta, joten kaikki kehittämistoimenpiteet valittiin perustuen tähän tietoon ja toteutettiin olemassa olevilla resursseilla. Palvelulaskutuksen automatisointiin tähtäävä IT-projekti tullaan aloittamaan pian, joten mittavien muutosten tekeminen prosessiin nähtiin turhaksi tässä vaiheessa.

Tulokset osoittavat, että yleinen mielipide palvelulaskutusprosessiin on alempi kuin ennen muutoksia. Toisaalta tehdyt muutokset olivat melko pieniä ja ne haasteet, joihin eniten kiinnitettiin huomiota (laskutustietojen oikeellisuus ja kontrollipisteet) kehittämistoimenpiteissä, eivät nousseet esille seurantakyselyssä, joka toteutettiin muutosten jälkeen. Kontrollipisteet tyydyttivät myös sisäistä tarkastusta. Asiakkaille lähetetyt laskut ovat olleet oikein muutosten käyttöönoton jälkeen. On kuitenkin otettava huomioon, että seuranta-aika jäi melko lyhyeksi ottaen huomioon mahdollisten virheiden esiintymistiheyden.

Tutkimuksen lopputuloksena laskutusprosessia vahvistettiin lisäämällä siihen kuvaus muutosten kulusta laskutuksen tietoon sekä lisäämällä prosessiin kontrollipisteitä. Tulossa olevalle IT-projektille luotiin valmius lähteä etsimään sopivaa laskutusratkaisua prosessikuvauksen päivittämisen lisäksi kuvaamalla palvelulaskutuksen tietolähteet sekä kirjaamalla ylös muut alustavat vaatimukset.

Avainsanat	Prosessien parantaminen, IT-projekti, muutos

Contents

1 Introduction

Well described and implemented, clear process ensures that people working in the process know their role in it and understand what responsibilities that the role holds. Cooperation is an essential part of well working process especially if the process crosses several functions in the organization. A well working process also ensures that it delivers the results it is meant to deliver in correct time.

This master´s thesis concentrates on examining and improving service invoicing process in Finland on short term. In addition to that the goal is to form definitions of Finland´s service invoicing for the upcoming project that aims at developing service invoicing on a company level.

1.1 Target organization and background

The target company is an international enterprise which offers services to customers mainly in Scandinavia. The company has formed to its present state after several mergers and takeovers in last few years. It has currently about 2700 employees and offices in Copenhagen, Stockholm, Helsinki and Tallinn.

These mergers and takeovers have meant changes in organizational structures, changes in employees, their job descriptions, ways of working and changes in processes. The challenge among employees has been that structures have changed fairly often so that people haven´t had time to absorb even the last change before the arrival of new changes. Also changes in responsibilities have caused some confusion in executing processes. In current state it is also unclear if the company wishes to use processes in its operations or is it desirable to talk only about the ways of doing things. Formal walkthroughs have not been done in years and there is no unify way of doing process descriptions. Process owners are at business unit or team level.

1.2 Business problem

Service invoicing process in Finland is currently highly manual. Basically all invoicing calculations are done by using excel macros and manual input to data sheets. In

addition there are several customers whose agreements are different and therefore invoicing is not similar in each customer´s invoicing.

At the moment in Finland there are several source systems for reporting which service invoicing takes place. All source systems have their own data marts and due to this it is difficult to combine data from different systems to same report. This means that invoicing team has to search many reports to get needed data for invoicing. The company doesn´t use yet data warehouse in company level due to history of mergers. There is also some uncertainty of data correctness on the source reports.

After mergers and takeovers the volumes of Nordic customers have been calculated together in a Nordic level to get average price to a certain service. At present stage this is done manually.

Because of changes in organization and employees it is also felt that communication in service invoicing process should be improved. The information of changes that affect service invoicing does not come or it comes too soon to make needed changes on time without rushing things. The change process has not been described in service invoicing process nor has it been thought much. All service invoices are done by one expert. This has also a risk as all knowledge and know-how is on one hands and there actually is no back-up.

Other countries found out that they have errors on their service invoices. This raised a question if service invoicing has errors also in Finland. This was a starting point to the organizational work that investigated correctness of service invoicing in all countries.

Correctness of data on reports and invoices adds customer satisfaction. Errors on invoices evidently lower satisfaction. In addition to this, customers would like to receive especially reports quicker than the company currently can deliver.

Service invoicing process also had a remark that was made during an internal audit in 2015. The target company does not have quality management system or handbook as itself but the company obeys its own security standard that includes basically controls that are in ISO27001 standard. The company´s own internal security audit unit executes internal audits based on this own security standard. (N.N 2016.)

To summarize the current challenges in service invoicing process in Finland, problems are:

- Manual process has a risk of errors.
- Manual process is not efficient.
- Source data is not always up to date (communication in case of changes or failure of information system) and uncertainty of correctness.
- Strong dependency of one person.
- Uncertainty of correctness of service invoices.
- Customer satisfaction.

1.3 Objectives and research questions

It was known already in the beginning of work that service invoicing process would get a project that would aim at improving service invoicing process in what comes to level of automatization, quality and time consumption in the process. This was the reason why any major changes would not be done to existing process during the development work of this master´s thesis. The work of this master´s thesis was limited to Finland as the work of investigating current situation was already going on in other countries and the amount of work would also have increased to be too big if all countries would have belong to the scope.

The goal of this master´s thesis was to find out what actually is the current situation of service invoicing process in Finland. Another goal was to re-describe Finland´s service invoicing process as it was known to have some shortages and to implement changed process to process actors. In addition target was to find out how changes should come to service invoicing in order for invoicing to stay correct. Some control points also needed to be added as the process had an open recommendation that was done during internal audit. The process was put into practice by introducing it to process participants and going through roles and responsibilities.

The idea was also to research how people working with service invoicing experience it at the moment. This was investigated with a survey that was conducted in May 2015. The survey searched opinions on how responsibilities, roles and cooperation were experienced. One target was also to investigate how company could improve internally the possibility to compare services.

The actions presented above and description of current state of the process lead also towards collecting and creating information and data for the project. The work that was done to describe current state of service invoicing process in Finland related to organizational work which seeks solution for service invoicing process on business unit level. This organizational work started when errors were found in some service invoicing in some countries. After these findings it was felt necessary to investigate correctness of service invoicing in all countries. In addition the target of this investigation work was to give starting point to the project that would create a solution for service invoicing in all countries. The goal of this organizational project is to find a solution that would automate service invoicing process and to ease the use of data on a company level. One of the goals of this master´s thesis was to provide pre-requirements for the project concerning Finland´s service invoicing.

The research problem was examined by searching answers to following questions:

- What kind of problems service invoicing in Finland faces?
- How can company make sure that invoicing stays correct after changes (new services, new products, changes in existing services or prices)?
- How is service invoicing process experienced currently?
- How could company improve the comparison of services internally?
- How can company create readiness for project to help the progress of organizational work related to improvement of service invoicing process (concerning Finland)?

1.4 Measurement of targets

This master´s thesis had following targets:

- Form current status of service invoicing process based on analysis.
- Form information sheet of service invoicing in Finland for the pre-project.
- Add change process and other needed changes to process description and implement it.
- Add needed control points to the process and implement them.
- Form definitions of Finland´s service invoicing for the project.
- Form a plan of how internal comparison of services could be improved.

Achieving the targets presented above had three measures:

- Remark of internal audit: the changes made will fulfill the requirements of internal auditor.
- Service invoicing process will improve what comes to correctness of sent invoices.
- Opinions of the process actors on service invoicing process will be measured twice, before changes and after implementation of re-described process.

The measurement of definitions for the upcoming project was found to be impossible as they would not even be used before the end of this development work.

2 Methods

The work related to this master´s thesis is done as action research. It both researches and tries to change dominant practicalities. Essential in research is that examinees, people working in practice, are taken into research actively. The key is cooperation and active doing in along with research. (Kuula.)

2.1 Action research

Action research means among other things research and development of own work. In action research both research and action come true at the same time. Also Kananen (2009, 9) comments that action research is not merely work of researchers but it involves also people from working life. Action research can be executed in all levels of workers. Action research is seen as a process of professional learning and development. It is related concretely to working life and to the problems it bears. Aim is to identify and remove problems. (Kananen 2009, 9.) Stringer (2007, 177) points out that it is also important to describe what the role of researcher is. Readers should understand the impact researcher and other participants had in research process. (Stringer 2007, 177.)

The power of action research is that people involved in it are the ones that struggle with a problem and they will find a solution to it together and at the same time they commit to the change. Change is one element in action research and it is permanent. Action research holds this way a promise of better. Action research is continuous improvement of action. Action research becomes to participants a process that lasts

through the whole working career. (Kananen 2009, 9.) Aaltola & Syrjälä (1999, 15) write that knowledge is not stable, it evolves continuously and it can be constructed together with other people. At its best, action research transfers like this into a learning process to all participants. (Aaltola & Syrjälä 1999, 15.)

Cooperation is an essential element is action research as has been mentioned earlier. It is executed and participated by those whom the problem involves. Cooperation might not be completely trouble-free as different values meet. Cooperation requires a shared goal that is also one essential part of action research. (Kananen 2009, 9.) Also Kuula writes that in action research it is typical that it´s orientation is towards convention and problems. It is also typical that both examinees and examiner have active roles in change process. Fundamental factor is cooperation between examinees and examiner. (Kuula.)

It is hard to define action research clearly and unequivocally as it is not just research method but a group of methods (Kananen 2009, 11). According to Kananen (2009, 11) action research can be called a research strategy. Also Heikkinen (2010, 214) describes action research as a research strategy that can use different research methods. According to Aaltola and Syrjälä (1999, 18) action research is a process which aims at changing things and developing them. Kuusela (2005, 16) describes action research in general level as a research that rests on participation of examinees. He also describes that it is related to solving problems of social organization. He also points out that there is no unify understanding how examinees participate or how is it possible to combine research and solving problems of organization. (Kuusela 2005, 16.)

Action research is a mix of methods, qualitative and quantitative. It also does not rule out other data collection or material analyzing methods. Essential elements in action research are development of action (change), cooperation and research. Without research changes related to action and improvements is normal development of everyday life at working place. Action research has a feature that things are done in a process. It is a set of cycles that improve action constantly. One cycle holds typically following stages: planning, action, monitoring. In action research the researcher is involved both in action and research. Action, research and change realize simultaneously (Kananen 2009, 11-13.) Also Heikkinen (2010, 214) writes that

characteristic to action research is simultaneousness of action and research. It aims in receiving immediate, practical use of the research. (Heikkinen 2010, 214.)

Kuusela (2005, 53) writes that the most interesting feature in action research is that it is done together with examinees and that the goal of research is make the world of examinees into better. This means that action research is always also a process that bases on cooperation of researcher and examinees. (Kuusela 2005, 53.)

Development work requires that target of improvement is identified and named. After that it has to be specified. It is not enough that problem is located; also root causes have to be investigated. Research might need to find a problem or to define it and to find alternative solutions. Essential is that the core of the problem is found. (Kananen 2009, 30.)

Action is tried to affect by change intervention. This means that something is changed or something is done differently than before, and then it is investigated what happens. In action research reality is changed so that it could be researched and on the other hand reality is researched so that it could be changed. The meaning is not to make just any changes but to make changes that make things better. (Heikkinen & Jyrkämä 1999, 44-45.)

Action research has not have own data collection or analyzing methods. It can contain qualitative or quantitative elements. Especially when there is a need to be assured of change impacts, quantitative methods like surveys are used. (Kananen 2009, 22.)

Action research and qualitative research have following data collection methods: interview, observation, written sources, surveys. Also questionnaires can be used from quantitative methods. (Kananen 2009, 61, 77.)

2.2 Validity and reliability

Validity means in quantitative research the ability of meter or research method to measure what is intended to measure in the research. It means how answerers have understood the meter, questions in the survey. Results are distorted if answerer does not think the way researcher assumed. This means that validity needs to be thought already while planning a research, in defining concepts, universe and variate and

planning carefully the collection of material and meter. Questions need to include everything needed to investigate the research problem. (Vilkka 2015, 193.)

In quantitative research reliability means the accuracy of results or the ability of measurement to give no random results and repeatability of measurement results. This means that when measurement is repeated with same person, the result is always the same regardless of the researcher. Qualitative research is reliable when subject and interpreted material match. It means that subject and researcher share the same understanding. Reliability and validity form together total reliability of meter. (Vilkka 2015, 194, 196.)

Also Kananen (2009, 87) describes, how reliability of research is confirmed by looking at two factors, validity and reliability. Validity means that research has investigated correct things. Validity is verified by using correct method, meter and by measuring correct things. The problem lies in defining what is correct in each situation and how correct is defined, measured and evaluated. (Kananen 2009, 87.)

Reliability means stability of measurement results which means that if same research would be done again, it would give same results. Used meter will give same results in different measurement times. Reliability is sometimes difficult to examine as the reliability meters are not suitable for qualitative researches because starting points and goals are different. (Kananen 2009, 87.)

Reliability of action research is a set of different research methods. Therefore action research is not just one examination but a group of examinations where phenomenon is investigated. If action research is seen as a set of qualitative and quantitative research methods, can reliability be investigated with each method´s own reliability meters. (Kananen 2009, 88.)

Reliability of qualitative research could be assessed by evaluating sufficiency of material, coverage of analysis and evaluation and repeatability of analysis. Sufficiency of material means that material or data is saturated. Coverage means that researcher does not base her interpretations to random parts of research material. Evaluation of analysis is related to documentation of the study and its different parts. Documentation gives to external assessment the possibility to evaluate solutions and conclusions

afterwards. Documentation can be kept as prerequisite to all research. (Kananen 2009, 92-93.)

In addition to validity based criteria, reliable research demands also objectivity. This means that interpretations are derived only from data. Researcher cannot involve her own opinions to research material. Honesty is a virtue in research world also. (Kananen 2009, 98.)

The people involved with research need to read the report and agree with results, they need to approve to results. If they agree with results, it adds the reliability of the research. (Kananen 200, 116.)

In this development work present state of service invoicing in Finland was investigated and described by investigating internal material like price lists, current service invoices, and service descriptions and by making interviews and observations, having conversations and executing a survey. A link to the survey was sent by e-mail to all actors within service invoicing process in Finland. Survey was carried out by using Digium Enterprise´s tools.

Definitions and prerequisites for the future service invoicing solution were created by having conversations with the service invoicing expert. Other process actors were not involved at this stage because the future solution is not yet known. They will have more to contribute when solution has been chosen. The key factors could also be presented only by service invoicing expert as she is very aware of the current process and customer's requirements for invoices.

In all parts of the work I have tried to stay objective. I have also tried to be as careful as possible in data handling to avoid any mistakes in going through answers from the survey. The data that was collected from internal material (price lists, service descriptions etc.) to describe current situation of service invoicing and was inspected by Key Account Managers and the experts doing service invoicing.

I have had continuously conversations with service invoicing expert and guidance from advisor from work. Advisor has approved conclusions I have made based on the research.

3 Framework

Framework of this master´s thesis is composed of processes, process improvement, change management and describing prerequisites and requirements for IT project from business´ point of view. The main focus is set on process improvement and project requirements which are the main reasons for the development work related to this master's thesis. However, since change acts in a significant role in working life, it is also presented as an issue that needs consideration at least while making larger changes in organization. I imagine that a new IT system will change the service invoicing process significantly leading also into changes in employees' roles and responsibilities. At least at that stage change and change management needs to be taken into account.

3.1 Processes and process improvement

This paragraph handles processes in general and process improvement and development.

3.1.1 Description of a process

Process is a way of doing things. The mission of a process is to fulfill the needs of internal or external customers or other stakeholders. Process is a chain of tasks and decisions to meet these needs. Process requires input from internal or external actor. (Tuominen 2010, 9.) According to Laamanen (2003, 19) business process is a group of repetitive actions that are related with each other. It also needs resources to operate and with the help of these resources input is transferred into products (Laamanen 2003, 19). According to Hannus (1994, 41) business process is an entirety that consists of functions and tasks that are joined together. It starts from customer´s need and ends in satisfying it. Essential parts of business processes are: process has a customer that can be external or internal, processes cross organizational limits and process performance has to be evaluated from customer´s (external or internal) point of view. (Hannus 1994, 41.)

Good customer service is based on processes that reach from customer to customer. So at its best a process starts from customer and end to customer. This allows

communicating customer´s needs through the whole process. (Laamanen 2003, 22.)

Processes vary what comes to complexity and importance. Common factor in all processes is that they consist from one or more activities. Steps require effort to get performed and have a result. Each activity adds value to the effort. (Dyba & Dingsoyr & Moe 2004, 2.)

Processes bring order to chaos. Identifying and describing processes help people to understand the big picture and makes development of work possible and raises self-guidance. Describing processes leads often to raised work entities, multiskilling and to reverence of colleague´s know-how. (Laamanen 2003, 23.)

Mission of processes is to describe the logic in company´s operation. Process descriptions help in understanding what is critical in achieving key goals of the company. This way development and measuring can be targeted to critical stages. (Laamanen 2003, 37.)

Processes can be divided into four groups:

- Core processes
- Support processes
- Managerial processes
- Key processes. (Tuominen 2010, 9.)

Laamanen (2003, 54) describes processes as core and support process from which key processes are chosen. Core processes are processes where customer satisfaction is delivered (Tuominen 2010, 9; Laamanen 2003, 54). Those are processes where process starts from customer (for example an order) and ends with customer (item or service is received). General core processes are sales, manufacturing, customer service and reclamation handling. Core processes need support processes to operate. Support processes produce services to core processes. Common support processes are for example information management, human resources and financial management. Managerial processes can be for example strategic planning, management of changes and development. Key processes can be called processes that are essential to success of the company and are chosen for development. Key processes can belong to core-, support or managerial processes. (Tuominen 2010, 9-10.) Business´s core processes are operations that cross corporation´s and key

stakeholders functions. Core processes consist of sub-processes. Usually there can be processes in three to four levels. (Hannus 1994, 41.)

Processes cross department and company boarders. Companies don´t compete just with products but with the whole chain that is attached to the production, usage and recycling of a product. Customer is interested in what the process accomplishes and produces. Company is interested in how organization produces products and services or how processes work. Customers' quality meters relate to products, services and ways of operating. These can be for example liability of product, correctness of advice or the time we react. Overall effectiveness of a process can be measured with information of productivity, lead time, number of errors, number of handlers and costs. Both customer and company are interested of process adaptability, in other words of how the process can produce different products and services flexibly. Company is also interested in how processes adapt to producing different turnouts economically. (Tuominen 2010, 11.)

Also Hannus (1994, 40) writes that core processes go through the whole company. In process management core processes are defined with responsible people both in management´s operational committee and operating level who are in charge of the process and its performance as a whole.

The basis of corporate´s operation is customers´, owners´ and employees´ vision of strategical targets and the grounds of existence. All stakeholders have their own expectations and demands to the corporate. (Hannus 1994, 71.) Hannus (1994, 72) calls the factors that measure succeeding as performance factors. Performance factors measure performance in key areas. Corporate´s success has traditionally been measured with profitability and efficiency. Little by little corporates are starting to realize that good profitability and efficiency are consequence of filling the expectations of customers and employees. (Hannus 1994, 72.)

Laamanen (2003, 122-123) has written that everyone participating to a process has a role that connects him with that so that he knows what his task in a process is. Succeeding in a role demands that tasks and decisions that are attached with that role are clearly defined. Furthermore, people need to have ability, willingness and capability to perform these tasks well.

Laamanen (2003, 87) writes that there are four logical levels to describe a process: present process, moderately improved process, radically improved process and ideal process. He suggests describing moderately improved process unless there is a severe need to make radical improvements. Radical changes hold always significant risks. Present process again is not always worth describing (especially when it is functioning badly). (Laamanen 2003, 87.)

Process map is one of the best ways to get people understand a business process. It helps involved people to understand how the process works, what activities form most of the work, where the handoffs between departments happen and where are the opportunities to improve the process. Process map is a visual representation of activities that are connected together to deliver an outcome to the customer. Arrows in process maps represent inputs and outputs. The map can be either on high-level or on more detailed level. The level of detail needs to be decided based on needs. (Page 2010, 77, 79, 81.)

There are basically two ways to approach drawing a process map: reengineering and quality. Reengineering has a focus on the future state and customer needs and it does not focus on current process. Quality is also focused on customer needs but it examines the current process. According to Page (2010, 78) engaging people with the process is difficult if it is not discussed how thighs work currently. Therefore she prefers to concentrate on mapping the current process. (Page 2010, 77-78.)

Business processes can be described on numerous ways. The most popular is swimlane diagram because it highlights relevant variables, who, what and when in simple form that requires no training to understand. Swimlane diagram presents what is done, by whom and when. Roles, responsibilities and routes reflect the workflow. Roles are the actors who execute process steps and responsibilities are the individual steps that are performed in each role. Routes are the flows that connect process steps and define the route that an individual work item will take through the process. In swimlane diagrams sequence (time) moves from left to right and every actors are presented. Only simple set of symbols should be used in order to keep flowchart simple and understandable. (Sharp & McDermott 2008, 202-204.) According to Page (2010, 97) processes are drawn mostly on standard process maps, especially when work involves people only on one department. If process is cross-functional and it involves people

from several departments, cross-functional process map is usually better. (Page 2010, 97.)

A narrative description of the process map is detail document and it should accompany the map. Because there are different learning styles, having them both provides everyone with a choice which document to explore. (Page 2010, 102.)

Two types of time are related to business processes: process time and cycle time. Process time means the time required to complete one activity in a process. Cycle time means the time that is required to complete a whole process. Cycle time cannot be calculated just by adding up the process times because cycle time includes waiting time. (Page 2010, 111-112.)

Defining process time first gives baseline time which is then used for establishing an improvement target. This time can either be measure or estimated. Experts can usually estimate the time they use on an activity so accurately that it is not worth measuring the time accurately. It is not often even needed especially in administrative processes. When times consumed to single activities are added up, it is known how much time people spend time performing activities that include to a certain process. Cycle time measures the overall time it takes for the entire process and takes into account interruptions that may occur during the process. Customers see usually only cycle time and when they complain about the business process, it refers usually to a problem with cycle time. Costs can also be calculated to give process a financial component. (Page 2010, 112, 114-115, 119, 137.)

Accuracy of the drawn process map can be checked with process workers, stakeholders and sponsor. The process is reviewed to confirm that is reflects the current process. (Page 2010, 135.)

I have now presented some definitions of a process, why describing processes is meaningful and also an idea how to describe a process. There are several definitions to a process but they all seem to have common factors: it is a group of actions that are joint together and customer is at both ends of the process (Hannus 1994, 41; Laamanen 2003, 19; Tuominen 2010, 9) and processes usually cross several departments in an organization (Hannus 1994, 40; Tuominen 2010, 11). Customers can be internal or external. The literature also represented some ways to categorize

processes. Service invoicing process is a key process in our company as it brings the revenue.

The meaning of describing processes is also quite common on literature: processes describe what organization does and when they have been put on formal chart, it is easier to understand and after that develop or improve the process (Laamanen 2003, 23; Page 2010, 77). Process descriptions seem to have some standard forms and I brought up especially a diagram called swimlane (Sharp & McDermott 2008, 202-204) because it has been used in our company before. The current flowchart has been recognized to be good from my own experience and I can fully underwrite Sharp's and McDermott's (2008, 202-204) views that the understanding of swimlane diagram requires no training and it easily presents the flow of the process by presenting what is done, by whom and in which order. I also agree with their point of using as little symbols as possible. Even though using different symbols might add information, it also confuses and makes the chart more difficult to understand. If the flowchart looks difficult, I feel it gets read more rarely. Employees in the target company have also been used to this kind of diagram. These are the reasons why any other process diagram was not even considered. Next I am representing process improvement, what it means and why it should be done in organizations. I also present most common improvement methods, some shortly and few chosen in more detailed level.

3.1.2 Process improvement

Improvement is a result of conscious development work. Repairing a process is not improvement, for example if a system breaks down, it has to be repaired. Improvement is always directed to process. It prevents errors happening in the future. Improvement can also be categorized by the nature of improvement. It can be responsive, proactive or innovative. Responsive improvement occurs when something happens; someone notifies it and starts actions. Proactive improvement tries to understand trends and predict the future. Innovative improvement offers new solutions and it can happen both in small and larger things. Innovation is often supported by setting targets radically higher. High targets force to seek innovative means. (Laamanen 2003, 204-206.)

According to Pastinen (1998, 48) process improvement should be seen as an approach to satisfy customers, employees and owner´s needs. Company´s improvement plan

should align also with its vision and strategy. (Pastinen 1998, 48; Kiiskinen & Linkoaho & Santala 2002, 38.)

Andersen (2007, 3) says that improvement is necessary nowadays. Competition is one reason. If the organization does not improve, it will most likely lose customers to competitors. Customers are also becoming more demanding. The expectations should at least be met, if not even exceeded. If they are not met, company will most likely lose its customers. And finally, the performance level of processes seems to decrease over time. This means that in order to maintain current situation, the process needs maintenance. If process needs to be improved or renewed, even more effort is required. (Andersen 2007, 3.)

Processes are improved for many reasons and interest is raised for numerous reasons. For example customers or suppliers might complain about the business process or it is found out that process faces numerous errors or same errors are done repeatedly. Improvement might be launched by the need to understand how efficiency or productivity could be improved. Sometimes challenges with the handoffs between departments launch the effort to develop the process. (Page 2010, 3.)

It is easy to join Andersen's definitions for process improvement. The world and businesses change and evolve and therefore processes or ways of doing things must change also. If processes are recognized it is also obvious that any problem in the process can launch an improvement need. If processes are not defined and measured I imagine it to be rarer that they are improved formally and in a cyclic manner.

According to King, J. & King, F. & Davis (2014, 45-46) process improvement aims at achieving major progress in organization´s processes by approaching them systematically. Process improvement can rarely succeed if business plan is not well-defined. Business plan includes budget but it must also include the ways to achieve these goals. (King, J. etc. 2014, 45-46.)

The meaning of process improvement is to make things better. The key is in finding causes, not only problems and then to define, execute and follow-up actions, evaluate the results and performing adjustments. (Dyba & Dingsoyr & Moe 2004, 3.)

According to King, J. etc. (2014, 46) major improvements in critical processes result in higher customer satisfaction, higher performance of employees, major jumps in closing competitive gaps, decrease in business unit costs regardless of rising commodity prices, increase in profitability, effective communication throughout the company and long-term supplier viability. (King, J. etc. 2014, 46.)

Realignment is about focusing on a critical process that is causing most pain and measuring and redesigning that process. This means that organization should focus on one process at a time and use measurements that base on real-time, like yield and throughput. Business results like costs, quality and delivery should not be measured. (King, J. etc. 2014, 46-47.)

The target of renewal can vary significantly depending on need. Organizational scope can include several businesses, the whole organization, independent units or just one department. Functional scope can include all essential core processes, certain core process or sub-processes. Renewal target can also be actual work process (workflow or data stream), governance (e.g. performance measurement), information system or organizational structures. Renewal can be done in one of these or in several targets. The more targets, the bigger the change. (Hannus 1994, 263.)

The key in renewal of core processes is understanding of present ways of working and analysis of present problems and consequences. Often just examining actions as processes that cross the whole corporations reveal many challenges and inefficiencies. Challenges and the need for development are often found in interfaces of different departments. (Hannus 1994, 293.)

There are numerous ways of investigating the current status of the process, for example gut feeling, interviews or the opinion of the majority of the employees. However, usually companies would like to get a more formalized assessment before any extensive improvement actions. (Dyba & Dingsoyr & Moe 2004, 55.)

3.1.3 Process improvement methods

Process improvement can be seen as social change from the perspective of human or as technical development from system's point of view. Good development needs both views. There are several concepts to process improvement but according to Laamanen

(2003, 209) there are three basic types that can be found from most top organizations: process designing and improvement of performance, problem solving and benchmarking. Common to all these improvement concepts is describing a process, measuring, analyzing and testing solutions. Joint features can be crystallized to Deming´s PDCA-circle (Plan-Do-Check-Act), seen in figure 1. It is possibly the most used concept for development. Three first phases are actualized without any effort. Fourth phase, that describes improvement, making conclusions and learning, is actualized rarely without paying attention to it. (Laamanen 2003, 209.)

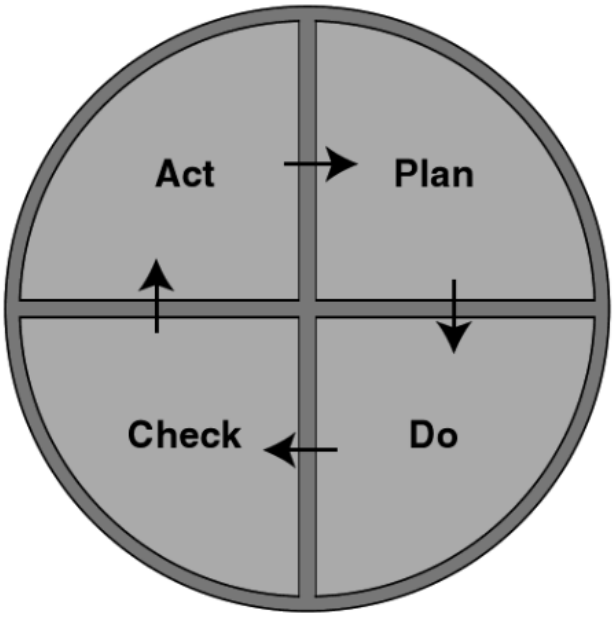

Figure 1. Deming's PDCA cycle (Andersen 2007, 7.)

Deming's plan, do, check, act wheel presents approach to continuous improvement. In planning phase (Plan) the problem is analyzed and improvement actions are planned. In doing phase (Do) previously planned activities are carried out. In checking phase (Check) performance is evaluated by measuring results of done actions. The last phase, acting (Act) means that process is adjusted according to the activities that were certified to give results. After executing all phases of the wheel, an improved process is ready or there is a starting point for a new cycle. The cycle should be in continuous movement and perform the process. (Andersen 2007, 6-7.)

Characteristics in process designing and performance improvement are seeing the needs of stakeholders and aiming at continuous improvement. Process has owner who is responsible for development even after the development project. Performance is

measured from the process perspective. Development possibilities are focused at the process itself and improvement of performance as well as improving a product. Essential in process improvement is precise describing and measuring. Measuring tries to find out factors that need to be influenced that process performance improves as a whole. (Laamanen 2003, 210.)

Problem solving tries to identify a problem that is preventing good performance or disturbing operations in the organization. The starting point in improvement is removal of problem which is believed to improve performance. The whole process is not questioned, improvements are small. Often problem is not defined concretely enough and this makes problem solving more difficult. (Laamanen 2003, 211-212.)

Benchmarking is a method that gives a possibility to answer rationally questions how good should we be and how good could we be. Performance is not the absolute measure of good; it all depends on how good comparison targets are. The most important comparison is done by customers. (Laamanen 2003, 217.) Project management is also one way of improving business processes as it is a methodology that evaluates, defines and manage projects. (Snedaker 2005, 2.)

Page (2010, 142) has presented an improvement technique wheel which is presented in figure 2. There are six techniques that can be used to improve business processes. These techniques surround the business process in the wheel. Internal and external customers are placed in the outer circle as they are the reason why processes need to be improved. The circle is used by starting from the top (bureaucracy) and moving on clockwise. Automating is the last phase because it is more reasonable to automate an efficient business process rather than inefficient one. The previous steps on the wheel remove or reduce inefficiencies in the process. Each of the techniques is used one at a time. There is usually a relationship between techniques. For example, simplifying an activity also reduces cycle time. (Page 2010, 142-143.) Andersen (2007, 168) mentions this wheel as streamlining. According to him the meaning of these techniques is to eliminate waste and unnecessary elements in the process. Techniques can be used separately but the best result is achieved by putting them together and by going through the whole wheel. This way streamlining effect is much stronger. (Andersen 2007, 168.)

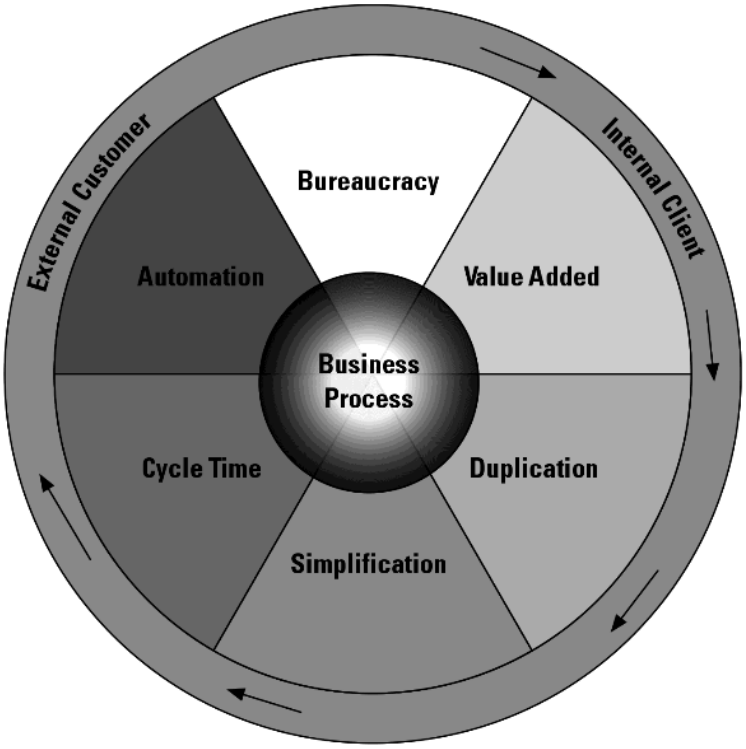

Figure 2. Improvement techniques (Page 2010, 142.)

Bureaucracy is often derived from the need for excess control, the fear of making an error or the desire to cover our backs. It might also be something that has grown over time. Even though bureaucracy is rarely admitted to be a good thing, efforts to reduce it might cause resistance because of the fear of the unknown. The human nature is also that things should be done in the same way than previously. (Page 2010, 144.)

Each step on the business process should be considered separately to determine whether it adds value because every activity in the process adds costs of the end product or service. The value-added analysis is used to examine how each step in the process contributes value to the customer. Because customers define value, it should be investigated whether activities in the process add value to them. Sometimes a step does not add value to the customer but it still needs to be preserved. In these cases a step might add value to the business. If a step cannot be eliminated, it can probably be minimized. (Page 2010, 148-149.)

Duplication happens when several groups are involved with a business process and there is no integration between these groups. Each department may want to maintain their own set of data because they want to have all the information. Sometimes duplication occurs because the other department does not understand what the other

department is doing or does not believe in their competence. When the process moves from one department to another, a handoff happens. Handoffs lead easily to duplication. For example a copy of a document might be stores multiple times by different departments. There is a big challenge if organization does not define single source of data. Errors happen easily when departments use different data sources. As a result, data integrity is questioned. Integrity of data means that data is consistent, correct and accessible. (Page 2010, 151-153.)

Simplification means reducing or eliminating the complexity of one step in a business process. This way process becomes easier to understand and more efficient. When a process is simple, it is also more flexible to answer to customer needs. (Page 2010, 154.)

Cycle time is the time that it takes to complete an entire business process. This time includes waiting or elapsed time. Cycle time is often noticed by customers because they can see how long it takes to receive the result. If cycle time is reduced, it increases productivity and releases resources. Activities that cause delay should be identified and then reduced or eliminated. (Page 2010, 157, 159.) However, nature of the process needs to be recognized before cutting down the cycle time. If the money is actually done in the process and the length has on impact on income, maybe cycle time should not be reduced. (Sharp & McDermott 2008, 105.)

After the business process has been improved with other techniques and it is as efficient and effective as it can be, improvement can move to automation. Other improvement techniques are used first in order to maximize the technology investment. New technology does not need to be necessarily expensive and sometimes a company might already have tools that could also be used to improve a business process (for example Microsoft Office tools, Microsoft SharePoint, network drives, portals, intranets). These existing, everyday tools can help in automating a business process. (Page 2010, 160, 164.)

Internal controls increase the effectiveness, efficiency and adaptability of a business process and metrics bring the process to life. Internal controls prevent errors, tools help people perform their work easier and metrics show if the process is working as planned. (Page 2010, 167.)

Human errors and misunderstandings happen every day in business. Internal controls can be used to ensure accuracy and reliability at crucial points in a business process. They can reduce the number of errors in the process. It is typical that business processes do not have internal controls. Employees try to do their work as good as they can but human mistakes can still happen. Usually even systematic errors are not prevented. In order to place internal controls, possible points where an error might occur, should be identified. The effort and time paid to internal controls depends on goals of development. If multiple errors in a process caused to look the process, more attention should be paid to internal controls. If the goal is to look improvement opportunities, then internal controls should be given less time. (Page 2010, 168-170.)

Different tools can help employees. Job aids help in driving consistency in a business process. Simple and quick job aids can help in complex tasks and provide employees information that they repeatedly look for. Job aid can be created to simplify a step in the process, to drive consistency or to explain how to use a particular item. If business process is complex, job aids help in understanding it. Helping tool can also be custom email form which ensures that all required information is filled before sending it to others. This is a simple way to standardize required information. One of the tools is Microsoft Excel that allows many functionalities. In order to streamline a business process additional capabilities of existing software (like Excel) is worth to be searched even if it takes a little more effort. It is often quicker that waiting for a new system to be implemented. (Page 2010, 174, 179-180.)

Companies should have metrics for their business processes. Metrics that is related to effectiveness is usually easy to find but efficiency and adaptability may be more difficult. The business cares about efficiency and customers are interested in the flexibility of the process. (Page 2010, 182.)

After the process has been redesigned, documented, new tools have been created and metrics set to support the process, these need to be validated in order to make sure that everything works as expected. The new, improved process should be tested before introducing it on the wide scale. Testing helps in identifying possible bottlenecks and gives a chance to fix problems before implementation. (Page 2010, 190.)

Finally, after testing the redesigned business process, it can be introduced to the organization. Implementation plan should include impact analysis, communication plan and training plan. (Page 2010, 207-208.)

When the business process was redesigned some change needs in the organization may have come up in order to achieve improvement. Impact analysis is a tool that describes changes that must happen in the organization to ensure the success of the new business process. Impact analysis is built by walking through the new process and by identifying the change needs, listing reasons for change, business areas that are affected, and any problems with the proposed change. (Page 2010, 214-215.)

Communication plan considers what communication needs to happen to make sure that all stakeholders receive the information they need. After it has been decided who needs to be informed, it also needs to be considered what they need to know about the change. Also timing and how to communicate should be considered. (Page 2010, 216.)

Training plan includes information of what training is needed so that everyone understands and can perform their part in the process. The plan should consider who needs training, who should do training concretely, what needs to be trained, when and where to train and what methods to use in the training. (Page 2010, 218-219.)

Continuous improvement means that business process is monitored and adjustments are made based on observations so that the process continually improves over time. Continuous development ensures that process will achieve its objectives in the future also. This means that the process needs to measured continuously, customer's needs and expectations need to be evaluated regularly and process workers need to be engaged on a regular basis. Without these actions, the process will work well for some time but will then begin to slip back and end up being outdated. Business processes should be improved continuously to stay competitive, to continue meeting customer needs and to keep up with changing technology. The plan for continuous improvement lays foundation for verifying that business process is on track. (Page 2010, 228-229, 243.)

In the process improvement method presented by King, J. etc. (2014, 47-48) there are six flexible and iterative phases that are both process-focused and customer-focused. The phases are identifying the critical process, measuring the process, redesigning it,

testing of redesigned process, institutionalizing redesigned process and continuously improving the process. (King, J. etc. 2014, 47-48.) In my opinion the phases introduced by King, J. etc. resemble the phases of business process reengineering (BPR) that are planning, reengineering, transformation and implementation. (Andersen 2007, 207-216.) However, according to Andersen (2007, 207) the core message of BPR is that processes can be slightly adjusted or completely reengineered where as King, J. etc. (2014, 45) present that major results should be achieved.

Critical process is the one that has the most to improve or the one that has problems most. After identifying a critical process it is important to assess what impact goals have on company. This motivates to achieve these goals. Boundaries of critical process should also be defined in order to avoid process improvement from growing to bee to big. In this first phase of improvement also management roles, like sponsor, stakeholders, team leader and facilitator, should be defined. (King, J. etc. 2014, 48-49.)

In the second phase the process is measured. This phase includes also analysis of customer needs. The meaning is to close the gap between customer´s needs and the process. The phase starts by defining current situation of the process and describing a process map. Then customer requirements and needs are identified. These have to be quantifiable and measurable. (King, J. etc. 2014, 49-50.)

The third phase is about redesigning the chosen process. The point is to use gathered data, both from process measurement and customer´s requirements, to redesign the process so that the gap between these two is eliminated. Ideal state of the process is defined by analyzing the measured data. At this point non-value added tasks are eliminated because customers are unwilling to pay for those tasks. However, all non-value added tasks cannot be eliminated from the process. (King, J. etc. 2014, 51, 19.) According to Kiiskinen etc. (2002, 38, 42) redesigning a process is a project that needs support from management. The expectations of management define the meaning of process development and give limitations to project.

In the fourth phase redesigned process is tested with necessary resources. Also customer satisfaction needs to be tested in order to make sure that both process and customer needs are reconciled. If not, redesigned process needs adjustments before institutionalizing it. (King, J. etc. 2014, 52.)

In the fifth phase of process improvement redesigned process is institutionalized, fully implemented. Implementation needs to be planned carefully and before implementation employees must be trained. This phase includes also monitoring the performance, documenting lessons learnt and sustaining the gains. (King, J. etc. 2014, 53.)

The final sixth phase is continuous improvement. In this phase other opportunities for improvement are searched. This phase can mean also identifying another critical process. (King, J. etc. 2014, 53.)

Process improvement methodology has a strong relationship with Deming´s PDCA (Plan-Do-Check-Act) cycle (presented earlier on page 18). Like all large examinations, also process improvement begins with planning phase. After plans have been made, something needs to be done. This phase includes measuring, redesigning and testing the redesigned process. After these steps the redesigned process needs to be checked in order to make sure that it works as planned. Act step includes implementing the redesigned process. And finally, PDCA cycles are presented in circles, arrows pointing from one step to another to demonstrate continuous improvement. (King, J. etc. 2014, 117-118.)

Usually new information system brings a possibility to improve processes. Sometimes it might do the opposite. Other improvement possibilities are improving process performance consciously or a known problem that initiates improvement process. (Laamanen 2003, 202.) In the case of target company, a new system is enabling a possibility for clear improvement.

I have sought information on why process improvement is important and found out that the reasons are very diverse. Generally improvement is significant because the world and businesses simply change and in order to keep up with pace processes need to evolve. Otherwise the company will most likely lose customers. (Andersen 2007, 3.) On the other hand a problem in the process might also be recognized and improvement actions are done to correct that. Sometimes performance of the process is unsatisfactory and improvement measures are addressed to improve for example efficiency. (Page 2010, 3.) In our company processes were originally described several years ago. After mergers and takeovers process maps have not been formally walked through in order to make sure that the description is still up to date nor attempted to improve the process systematically. Service invoicing process has faced some small

changes and flow chart has been updated by an expert in service invoicing to keep it updated. Still the description was partly outdated possibly because of changes in the team and it did not describe the whole process. It also missed some existing control points.

3.1.4 Implementing process changes

New operations model does not follow automatically after it has been defined. The bigger the change, the bigger is the risk of failing in implementation. The main challenge is to adopt a new way of thinking throughout entire corporation and overcoming the resistance relating to change. Implementing changes is the most difficult on companies that success well or moderately. (Hannus 1994, 116.)

When business processes are improved, there is a danger of continually expanding the scope of a business process. There is a temptation to increase the scope when new ideas, demands and need appear. (Page 2010, 53.)

Many practical experiences of wide process renewal projects have given critical factors that will lead to successful change:

- The commitment of top management is absolutely a precondition.
- The explanation of renewal process and efficient communication, why change is needed and what are concrete goals.
- System of incentives, these should encourage to act according to new model.
- Participation of different functions, organizing has to base on a process. Process owner and final client have to participate closely.
- Creativity, one of the most important factors in analysis and planning phases is to get rid of old ways of thinking and working.
- Deep and systematic analysis, present core processes and operational environment have to be understood in order to develop new solutions that are useful.
- Clear specification of responsibilities, which leads units or teams toward the wanted direction.
- Quick results, concrete quick results that will show the benefits of new operations model are essential in creating wide support to change process.

These are essential factors in succeeding but not necessarily all that is needed. (Hannus 1994, 266-267.)

Measuring is a way of getting information of what is about to happen. You usually get what you measure. Processes also help in understanding what is critical in achieving

good results. This way also beneficial measurement can be developed. Measurement helps in analyzing occurrences. Process performance can involve customers, outputs, operations, resources, inputs or vendors. Lead time is one of the most commonly used measurements. When lead time is shorten, costs are reduced and quality is better. There is less errors, higher customer satisfaction and reaction time quickens. (Laamanen 2003, 149-150.) King, J. etc. (2014, 9) present that two fundamental measures of process improvement are throughput and yield. Throughput measures how fast a task is finished and yield measures if the task has been finished correctly and without errors, the first time. (King, J. etc. 2014, 9.)

Change can head to better or to worse situation compared to previous. It is not possible to know which way things are going without targets. And that is why improving is impossible without targets. A good target is presented with numbers, it has a unit for measure and it is tied with time. If these all are not presented, target is more like a direction or wish. A good target is also presented in a positive way, it is set by the group itself, it is written, it is enough high, but achievable, target is far enough in the future (about 6 months) and the group and rest of the organization have to be able to accept the target. Even though numbers are important in target setting, the most important thing is a phenomenon that we want to change. Setting targets is about communication. Employees´ commitment to goals and targets is a sum of many factors. (Laamanen 2003, 202-204.)

Process measurement requires involvement from top management, a methodical and disciplined approach and focus on each process step's output. With measuring a process problems and their causes can be identified. Measuring gives also accurate information of process' parameters. Measurement of results is simpler and it can provide a quick fix but it does not give any cause or immediate feedback on problems. (King, J. etc. 2014, 22.)

Even though process improvement has not been systematical in the target company and it does not have quality management system or handbook, it has its own security standard that bases on ISO27001 standard (N.N 2016). The company´s security standard sets high-level requirements for all business services, processes and IT infrastructure. The security standard comments that the responsibility of process owner is to ensure that all steps in the process are carried out responsibly in terms of security. Roles and responsibilities must be clearly defined by the process owner and include for

example responsibility for process design, interaction with other processes, accountability for the end results and the identification of security weaknesses and improvement opportunities. (X Security Standard 2015.)

3.2 Prerequisites of IT project

The improvement project of service invoicing process in target company is only in the beginning at the moment and Finland is the last country in process phases, coming to realize in 2017 according to the current project plan. The purpose of this master´s thesis is not to suggest or build new project structures but to provide information and data from business user´s point of view to project to achieve a result that would be satisfying to all stakeholders. The focus is on starting points of the project and user´s requirements but also other stages of project are introduced more closely if user from business is involved somehow significantly. In this section I also shortly introduce PRINCE2, a project management methodology that is used in the target company. Anticipatory plan for the new solution is presented later. According to that IT has a significant part in the project.

3.2.1 Project

Turner (1999, 2) says that companies need be ready to change their ways of working and business processes in order to respond to changing environment. Many clients expect to receive unique product and services. Therefore organizations become more and more project-based. (Turner 1999, 2.)

What is a project then? According to Maylor (2010, 4) project is often defined as a task that has a beginning and an end. This, however, is not sufficient definition. Projects are also unique, they have not been performed before exactly the same way, and some variety always exists. Project is also temporary. In addition to time constraint, it has people executing the task (temporary organization) and also financial resources are temporary. Project is also focused; it has a specific mission, a task of delivering a particular product, service or result. (Maylor 2010, 5.) Sometimes it might be difficult to make a difference between a process and a project. Project is a unique execution and process is something that repeats itself. (Laamanen 2003, 26-27.)

Turner (1999, 3) suggest that since projects are not precise, those should not even be defined precisely. Usually project managers define that projects are about delivering objectives within the constraints of time, cost and quality. But basically all in life is about delivering objectives on time, on budget and has a demand of quality. New objectives require unique, novel and transient actions or things. With these dimensions it is more difficult to achieve time, cost and quality constraints because there is less previous experience that plans could be based on and therefore the risk of failure is higher. (Turner 1999, 4.)

Projects have four constraints, scope, time, cost and quality. Scope is the total amount of work to be done during the project. Scope often defines also what is not to be accomplished. Time means total duration of the project. Time and scope are normally tied together; the more there is to be done, the longer it usually takes. Cost is total costs of the project including all direct and indirect costs. Quality means typically performance requirements or how well project meets expectations. Along with scope, quality is reduced when required features are not included in the final deliverable. The relationship of these elements is important to understand. If scope is increased, time or money (or both) need to be increase also. If scope is increased but time and money are not, most likely quality will suffer. (Snedaker 2005, 20-21.)

The four phases of project according to Maylor (2010, 33) are:

1. Defining the project: what the project is about, finding possibilities and alternative to the problems. Questions what and why are answered.
2. Designing the project process: modelling how the needs will be developed and evaluating these to decide the best possible process for the task and minimize risk. How, who and when questions are answered.
3. Delivering the project: carrying out the project as described in previous phases.
4. Developing the process: assessment of process and outcomes of the project, evaluation and changes for the future.

Normally project is divided into consecutive phases that are based on time. Phasing helps in making decisions. Inside each phase a project is divided into smaller parts, manageable work units. (Pelin 2009, 103.) According to Maylor (2010, 110) one of the planner´s tasks is to determine the objectives of each phase. The use of check-points or gates provides an opportunity to review progress. The criterion for passing a gate is defined in advance. (Maylor 2010, 110.)

Even though all IT systems are meant to deploy, there is no universal model for deployment project because every deployment depends highly on target, future using environment, technology, organizational structures and the combination of these. The deployment of information system has among other things following tasks:

- installation of new hardware and software and possibly new infrastructure
- new databases
- instructions (also for exceptions)
- informing
- training of users and other needed personnel, also supporting units
- backup system (old system) usage
- fallback routines
- moving to production
- measuring availability of new system. (Forselius 2013, 13.)

All projects should begin by stating what the problem is. This identifies the unique problem that needs to be solved. After the problem is identified, project management needs to define, what the desired outcome or mission of the project is. With these steps project has described what the current state is and what is desired. After these steps possible solutions can be looked for. List can be crated for example by brain storming in a small group of experts. List of possible solutions should also include to do nothing option as it sometimes may be the best solution. When the list of possible solutions is created, criteria for evaluating them needs to be created also. Criteria can include looking at IT strategy to determine which of the suggested solutions align that best or which of the solutions have best business case. Also potential market requirements can be thought. After these steps project needs to define target scope, time, cost and quality metrics or definitions. A created criterion is then used to rank possible solutions. The best possible solution should be found from top of the list. If expected solution is not on the top or near the top, criteria and assumptions should be checked. (Snedaker 2005, 174-175, 183, 186-187.)

Virtanen (2009, 17) presents that project goals are unclear. Projects need to be planned appropriately but not too precisely. Sometimes inaccuracy is needed so that creativity is not vanished. Project standards mean forgetting own sense if those are obeyed perfectly. (Virtanen 2009, 17, 37.) In complex world projects are the tool that

are used to meet the demands of changing environment, fulfilling goals, renew and to survive. Virtanen (2009, 19-20) writes that in order to success in projects following conditions need to be fulfilled:

- Organizations have to understand their own strategy and dependencies between projects.
- Projects are executed in a way that creativity and innovation are possible.
- In practice companies have often many projects going on at the same time. These have to be controlled simultaneously even though it is not always easy to see dependencies between different projects.
- Without adequate (mental or financial) resources project is unlikely successful.
- Projects success due to good leading. (Virtanen 2009, 19-20.)

Very often organizations have many projects going on at the same time. New projects are starting before older are ended and some are in planning stage. The know-how and other skills of project managers are essential when project briefcase have multiple projects at the same time. (Virtanen 2009, 27.)

Usually it is thought that projects succeed if those are well planned, executed in a timetable that was previously planned, with the pre-planned resources and if goals are achieved. Virtanen (2009, 48) presents that actually it is hard to define content of the project because they are connected to other projects and other operation. Results of single project are often affected by many factors other than project activity only. He also says that project goals change fairly often during project. People do not often know what they want. Goals are clarified as the project goes on. One of the most interesting things that Virtanen (2009, 49) present is that successful project have often been defined very vaguely. Well planned projects fail quite often. This means that planning is not self-evident. He also says that it has to be possible to clarify success factors during project. (Virtanen 2009, 47-49.)

On the other hand Leppälä (2011, 149) writes that projects force people to be creative. Because of scarce resources and time projects need to find unusual solutions that would not have been considered otherwise. Project plan is always incomplete and the lacks are reveled when work proceeds. Filling these lacks need creative steps. (Leppälä 2011, 149.)

Defining project goals is an iterative process where project goals are specified. Usually goals are kept stable but Virtanen (2009, 156) presents that those should rather be seen as dynamic. It should be possible to change and specify project goals as the project goes along. Setting project goals happens always with incomplete information of the future. (Virtanen 2009, 156-157.)

Project´s business objective describes why project has been started and why someone wants to pay it. Business objective comes more exact in stakeholder requirements and user requirements. During project these become more precise requirement specifications. When planning proceeds definitions are sharpen to detailed technical and functional plans and definitions. (Pelin 2009, 207, 209, 211.) All development and projects should be connected to strategy. Those should fulfil strategic objectives to achieve competitive advantage. (Turner 1999, 35.)

One of the key features of project development is that goal is preplanned as accurately as possible. Project manager is responsible for creating project plan. Uniqueness of projects leads to the fact that result must be concretized as much as possible. One of the reasons that project fail is that result or goal is unclear to management and workers. It is understandable that making results is difficult if it is not clear what the project is aiming at. When it is known what must be achieved, planning of actions is easy. (Virkki & Somermeri 2002, 24.)

Project plan is prepared before starting actual project by the request of management. Plan needs to clarify what is going to be done and how. It is used before, during and after the project. Project plan is a tool for management to make decisions concerning project. Project plan is also a tool for project manager during the whole project. It is also a tool to control project progress, to follow used resources and achieved results. One of the purposes is also restore project history and to act as communication data. (Virkki & Somermeri 2002, 24-26.)

Project plans are technically similar in very distinct projects. Also Pelin (2008, 89) suggests that project plan needs to answer following questions: who, what, when, how and how much? Project planning is about searching for the best solution to the company. Project plan investigates results related to time and cost and chooses the best solution. (Pelin 2009, 89.)

When the complexity of project increases, the need for formalized plan increases also. Traceability has become important in many companies. This is required from project plan too. If the result is unsatisfying, a good project plan can proof that the planner took every precaution possible to ensure a good result. (Maylor 2010, 107.) When project plan has been approved by management, project can start. After this project needs steering. (Virkki & Somermeri 2002, 63.)

The impact of preparation to succeeding is major. The better the project is planned, the more efficiently and inexpensively it will success. Preparation and definition stage are often reacted critically, as nothing seems to happen but preparation that is taken to right level will speed up the project and improve the quality of results. (Forselius 2013, 26.)

Turner (1999, 5) also points out that project plans need to be changeable as the plan is for certain wrong in the beginning. Plan need to exist to perform as framework for coordination but as the project progresses plan needs to be updated. (Turner 1999, 5.)

According to Lööw (2002, 63) the most common mistake in project planning is estimating time incorrectly. The whole project group has to understand the goal of the project and all participants need to know and understand how their work and results will affect the project. (Lööw 2002, 64, 49.)

3.2.2 Features of an IT project

Starting point of IT project is usually nonspecific. There is no clear objective, no building drawings. Specifications must be done with wide range of users, there is not anyone clearly stating what to do. Communication might be difficult with two different groups, users and IT personnel. The content of work might be difficult decide and freeze because agreements and documents can be interpreted differently. Binding acceptance can be difficult to get beforehand because solutions are understood only after they are seen working. Change management is difficult because new things are learnt during work and as a result to this more demands appear. Delivery agreement is often ambiguous. (Forsman 1995, 19.)

Also Turner (1999, 26) describes that information system project normally have poorly defined goals but the methods are well defined. It is difficult to get users to say, what

they want and even more difficult is to get them to keep their ideas unchanged. (Turner 1999, 26.)

Development project should always have an owner who belongs to company´s or business units' board. Project should have a steering group that should include project owner, project manager and representatives at least from those business units and support organization that are affected by the project. (Myllymäki etc. 2011, 80-81.)

The bigger the purchase is, the more carefully it has to be planned. According to Forselius (2013, 26) the stages in preparing a software project are starting preparation, defining system requirements, planning basic architecture, dimensioning purchase and planning execution. The stages after starting preparation are stages that depend on each other's results and might need iteration to achieve wanted solution that takes reality into account. (Forselius 2013, 26.)

Software delivery has to have always a true business need. (Forselius 2013, 27; Virkki & Suomermeri 2002, 6.) Preparation should not be started without an assignment. Development of actions means taking new processes as a part of operation, development of existing processes or in some cases renouncing some processes. In other words it is almost always about improving a process. And improving processes require purchasing better systems and tools. Information systems are tools of business and those should also be understood as such. The purchase of information system should be seen as a possibility to use better systems and as a possibility to develop division of work and tasks. (Forselius 2013, 27.)

The starting point for the purchase is assignment from management. It has tentatively described need for the purchase and starting point: what are we purchasing and why. The support of management is the first requirement in succeeding. Also the role of purchase owner is central. The owner has to have enough authority and responsibility to make needed decisions or to get them from higher management. The more stakeholders are involved, the more assertive management is needed. (Forselius 2013, 27-28.)

Whether the system will be small or large, ready or custom made, the key requirements need to be defined in preparation stage concretely enough to be able to assess reliably conditions for realization of business goals. Requirement definition is usually the

biggest work in preparation stage. If it is not possible to evaluate functional width of information system with accuracy of 20 % based on requirements, it is not possible to deliver it as users want. When business processes related to the information system are described and user cases represented comprehensively, common vision is easy to communicate. If information models are described preliminary and interfaces to other systems are described, predictability of project is good. The level of requirements predicts the quality of results. (Forselius 2013, 29.)

In the beginning of defining requirements all user groups are described. After recognizing user groups, a good practice is to describe user needs by writing user stories. These stories tell how named user will handle typical task with the help of new system. In user stories things are always looked from user´s point of view without telling what system does or how it works. The stories tell above all successful actions with new system. The stories should be short but those should describe true need of business. The stories should be written to each user group. User stories are a good way of making future users of information system to discuss about their needs. Terms that belong to the area of new system should be collected as they occur. When stories are told by many users, it is almost impossible not to meet problems with terminology. If the meaning of system is to take care of saving information to database and to manage data, data groups and the relationships between them have to be described. (Forselius 2013, 32-33.)

Projects´ requirements are obligatory; these are needed for particular purpose. Requirements are formed when project´s stakeholders are interviewed. One of the most important stakeholders are users, the people who will use the result of the project. If the project does not meet user requirements, it is a failure. Project should always solve user´s problems. User´s needs are not all need that project meets. Also the needs of the market and company need to be taken into account. The project´s stakeholders need to be discussed with in order to achieve optimal set of project´s requirements. Because user´s also might have a lot of wishes, it might be useful to differentiate must-have and would-like-to-have requirement. (Snedaker 2005, 229-230.)

A good requirement is both clear and precise. It doesn´t limit planning too much, it´s easily understandable and is not in conflict with other requirements. If conflicts occur, those must be solved as soon as possible. Requirements guide planning. IT projects usually have requirement phase and after that execution phase. (Pelin 2009, 207, 210.)

After these steps it is time to start making functional requirements. The first and most harsh way to present functional requirements is process flow descriptions. With the help of those all processes that will use the future system are described. The point of these process descriptions is to show logic from certain start to hoped result. The best way to describe processes is to use charts where actors are on swim lanes. Task and information should have a different symbol. The movement of information is described with arrows. Top of arrow points out the direction of movement. Actors are user groups or information systems they use. New system is described on own lane in process flow chart. Few practical recommendations process description have: one process in one chart, process has clear beginning and end, information, action, data flow, start, end, links etc. have own symbols, all key actors are in all charts in the same order, the new system and its most important user group are on adjacent lanes (system below), other user groups are above the most important user groups (further from the system) and other systems are below new system, not more than eight lanes in description (if there are many occasional actors, they can be described as one in category "other user" or "other system"), the flow must be continuous, no adjacent symbols on same lane, no symbols describing action or information on borderlines, calendar time forward and backward can be described. All recommendations cannot always be followed but those are worth aiming at. A good manner is to make after the chart a list of use cases, interfaces and other possible system functions. Each business process should also have quality requirements that will create basis for the quality requirements of new system. (Forselius 2013, 36-37.)

Process flows have arrows that show information flow between actors and a new system to be purchased. When an arrow points from user to system, it is normally a use case. In addition to user stories and process flows, it is necessary to describe also use cases. Primary meaning of use cases is to describe situations where a user communicates directly with new system. A good use case describes all necessary actions in that particular use case (screens, prints, automatic interface messages and handling rules). Use case should have at least following information:

- name on the use case and id
- general description, in which business process the use case occur
- actors and other operators
- simple chart of the use case where actors and possible affect to other use cases is presented

- starting point of the use case, why actor does something and in which state the system is at that moment
- main flow of events in successful use case, this is describes as chain of events where user and system operate in turns giving data and moving control to other party
- exceptional and alternative events
- quality requirements attached to use case
- list of system´s actions that occur in use case. (Forselius 2013, 37.)

List of system´s features starts by collecting all features that occur in use cases. In addition to that all interfaces to other systems need to be described. It is also important to describe direction of data flow. It is usually more troublesome to receive, check and save data instead of just sending data. Usually information is also moved and stored in data warehouses. These interfaces are often hard and quite expensive to implement but these are also flexible solutions. (Forselius 2013, 39.)

After these stages follow specifying the requirements, planning technical landscape, development of software, testing, and deployment of system and finally maintenance of the system. Also quality requirements have to be defined. These are for example functional quality, reliability, usability, production performance, maintainability and alienability. All quality requirements have to be able to verify. (Forselius 2013, 43-44.)

The purpose of requirement definition is to transform and specify preliminary requirements and business targets into a form where next stage can build technical and functional requirements on it. (Myllymäki etc. 2011, 153.) The meaning of technical and functional requirements is to analyze suitability of information system, execute fitting of information system by parameterizing or customizing and execute realization of information system. Definition stage decides how business need is solved. This means that cooperation between business developers and information system developers is highly important. (Myllymäki etc. 2011, 156.)

Quality is related to IT projects what comes to planning, monitoring and testing. There are various quality management systems but they all have same main components to quality management: user satisfaction, prevention versus correction, continuous improvement and management commitment. User satisfaction is met when project´s deliverable meet user requirements and when those requirements are correct. This

means that final results must satisfy user´s real needs. Quality is easier to ensure beforehand rather than building it when project is underway or at the end. Quality management systems try to prevent quality problems rather than correcting them. One of the main components is also continuous improvement. Plan-Do-Check-Act cycle is a pat of many quality systems and the point is that the process is about continuous improvement. First, plans are created, then project is executed and results checked and finally appropriate actions are taken to improve the project planning process. The last main component is commitment of management. Executive support is one of the key factors in project´s success. Management need to be willing to make needed investments to the project in order to ensure quality. When quality in a project has been planned, it also needs to be monitored and tested while project is underway. The costs of poor quality or high quality should be recognized. The higher the required quality level is, the more it usually costs as it mean more work, monitoring and testing. On the other hand, also costs of poor quality should be considered. (Snedaker 2005, 286-289, 297, 299, 302.)

3.2.3 Failures and pitfalls of an IT project

Normally only successful standard procedures are introduced but Leppälä (2011, 35) presents that it might also be worth investigating errors. Humane features that expose projects to failure can be found behind errors. Projects fail in many different ways and for many reasons. Even more often results are unsatisfied. (Leppälä 2011, 35.) Also Turner (1999, 74) has described traps or pitfalls that occur in the way project is established or the way it is planned, organized, implemented or controlled. These threaten successful implementation and are management mistakes which project managers do. (Turner 1999, 74.)

Standish Group publishes CHAOS report yearly. It presents a view to the state of the software development industry. In 2015 report studied 50 000 projects all over the world, from small enhancements to massive implementations. Table 1 summarizes the outcomes of projects from the last five years using success factors: on time, on budget with a satisfactory result. (Hastie & Wojewoda 2015.)

MODERN RESOLUTION FOR ALL PROJECTS

	2011	2012	2013	2014	2015
SUCCESSFUL	29%	27%	31%	28%	29%
CHALLENGED	49%	56%	50%	55%	52%
FAILED	22%	17%	19%	17%	19%

The Modern Resolution (OnTime, OnBudget, with a satisfactory result) of all software projects from FY2011–2015 within the new CHAOS database. Please note that for the rest of this report CHAOS Resolution will refer to the Modern Resolution definition not the Traditional Resolution definition.

Table 1. Outcomes of software projects (Hastie & Wojewoda 2015.)

The report shows that there is a lot of work to be done to achieve successful results in software projects. The report also shows that smaller projects have a much higher likelihood of succeeding that larger ones. The project results were also compared between agile and traditional waterfall projects. Agile approach resulted in more successful projects and less clear failures in all project sizes. (Hastie & Wojewoda 2015.)

The Finnish Information Processing Association, The Finnish Software Entrepreneurs Association and Celkee carried out a survey in 2013. According to the survey under half of the software projects were successful. The biggest failings happened in timetable, cost estimate and different views between buyer and supplier. (Forselius 2013, 14.)

Research indicates that significant part of actions that lead to failure of a project were made or left undone in the early parts of the project or while preparing, planning and organizing the project and in the beginning of business and information system development. Companies should take a serious aspect to development projects and prepare and give them adequate resources. The commitment and participation of business is important whether IT has a big or a smaller role in it. After all, it's about their development. (Myllymäki & Hintikka & Dahlberg & Uimonen 2011, 199). Information system projects are almost always business development projects. The primary goal is to improve business, not just introduction of new system. (Myllymäki etc. 2011, 226.) A part of preparation is also that the project scope, functional goals, timetable and budget are reviewed realistically. (Myllymäki etc. 2011, 199). In

information system projects is always necessary to define used methods and concepts. Otherwise there is a danger of misunderstandings between different parties. (Pelin 2009, 81.) Snedaker (2005, 212) presents that usually project´s get into trouble because some project steps are skipped or they are not performed properly. (Snedaker 2005, 212.) Anyhow, projects are exposed to risks. Systematic risk control can eliminate potential risks or at least project has been prepared for certain risks. (Virkki & Somermeri 2002, 59.)

Forselius (2013, 14) presents that significant reason to these results lies in working against good professional practice. Defining requirements, planning and steering are often inadequate, change and risk management is forgotten and responsibilities are vaguely defined. The communication between different parties is not working. (Forselius 2013, 14.)

Problems and failings in project preparation stage increase significantly the chance of failure or troubles in the project. Preparation and decision making are often done with insufficient resources and the big picture is missed. There is not enough expertise or experience or it is not exploited. Problems can also occur because preparation stage is led by another person than the next stage. There is always a risk of interruption in information flow. To receive adequate results in preparation stage, different points in preparation should not be conducted separately. Decision somewhere might affect other things also, for example business case. Impact of a decision to other factors must always be checked. (Myllymäki etc. 2011, 38-39.)

According to Pelin (2009, 205-206) one of the project tasks is to ensure that adequate amount of work is done to achieve project objectives but nothing more. The most important thing is to get clear and comprehensive definitions for project execution. There must also be distinction between hopes and things that truly matter. Many projects are started while definition phase is still going on and this causes often expansion of content during project. All projects face the need to make changes but those have to be controlled and done carefully.

Usually processes appear to project failures in two ways. Processes are either not known or present processes are set as target processes without questioning them at all. It´s also important that the differences between present and target processes are identified. This helps in understanding the width of change. Notable feature in failed

projects or projects that have faced problems is that very often processes are missing owners or the content and meaning of ownership has been left undefined. (Myllymäki etc. 2011, 55-57.)

In development projects processes and ways of working usually change. Planning and preparation should include also a list of actions that need changes. It´s also possible that when ways of working change, it faces resistance among end users. Conducting requires decisions and actions. (Myllymäki etc. 2011, 121, 123.) Change usually fails if it is not planned, conducted and lead properly. People might not resist change itself but for example impact that it has for working commune or to the status of employees. Change can for example effect on work tasks and therefore affect power or status. Changes are also scared usually because the future is not known. If changes happen a lot, employee might feel that he´s in the middle of changes and cannot have effect on things that concern him. If employee is afraid of negative effects of the change, he´s not eager to define, test, learn or use the new system. (Myllymäki etc. 2011, 135.)

In particular development projects typically have needs for changes (Pelin 2009, 213). IT projects are especially exposed to changes. Understanding grows during project and brings more hopes and therefore original definitions can change. Change requests should be handled formally by using a form. This should include general information of change (name, number, content, author…), reason for change and arguments, assessment of change impacts (to project, production, other projects…), processing entries and acceptances. Changes should also be marked in change log that includes date of change and required workload. Also information about changes is important. All documents should be updated in order for those to match the situation after the change. (Pelin 2009, 217, 219.)

IT project management is an iterative process. This means that project is refined as it goes along. Different project elements and steps need to be revisited sometimes more than once throughout the project planning and project management process. Change should be seen normal. The better change is managed, the better are the possibilities to success. (Snedaker 2005, 164.)

If the nature of project goals being dynamic is accepted, there must be a difference between final goal and its achievements. The final goal of the project is the development goal why the project exists. Final goal is far more static than

achievements. Final goal also tells outsiders interface to strategic goal. With this definition final goal is static but project´s achievement can be specified during the project. (Virtanen 2009, 159-160.)

The meaning of project management is to lead the project (Virtanen 2009, 163). Technical procedures are needed in order to steer and control the project. Project management includes following:

- Control of entirety and scope: how goals have realized, do the operations correspond with planned?
- Management of timetable, resources, costs and purchases: have actions been realized according to original timetable, is there enough resources?
- Risk management: have any of the identified risks realized and what affects they have had on the project, what kind of actions have been taken to eliminate or minimize the risks?
- Quality control: how project has applied ways of working that have been defined in organization´s guidelines, on what level customer satisfaction has been?
- Communication: how information is shared inside and outside project, is information up-to-date, how progress has been communicated?
- Information management: what kind of documents project have, how information is being controlled? (Virtanen 2009, 163-164.)

According to Virtanen (2009, 165) project guides tell rarely of project management that concerns experience. He means by this empirical feeling of project´s controllability. Technical tools are needed to guide the project but also experience should be taken into account. (Virtanen 2009, 165.)

Change management process should be known by all stakeholders of the project. Everyone has to understand impact of changes on a project. Formal change process should be used to all changes, also to little ones. Several small changes can have as devastating effect on a project as one or two major changes. (Snedaker 2005, 237-238.)

Whether the change process is launched necessarily or willingly the success of the project need more than quick start. Current situation and goal need to be identified. In addition there must be a steering mechanism which makes sure that direction of development stays correct. Development processes last for years. In a matter of fact

development of operation should be continuous process that lasts forever. (Virkki & Somermeri 2002, 2.)

Steering of changes is easier if total change that can last for years is divided into smaller sections. Each of these sections or phases receive own starting points, goals and resources. Changes in smaller parts affect less into whole project. (Virkki & Somermeri 2002, 3.)

The first pitfalls according to Turner (1999, 74) relate to the way the project is set up within the parent organization. Project is likely to fail if project plan is not derived from business plans. Also procedures for managing projects must be defined. As the project teams form quickly in order to overtake the tasks successfully, it is important that there is a properly structured process. If priorities of the project are not communicated to all involved parties, people start to assign own priorities that usually differ from project priorities. This leads to the situation that there is no coordination and correct work is not done. Shared vision is also one of the pitfalls that should be considered while setting up the project. Shared vision can be one way of building commitment to the project and its goal. It can also be a powerful motivator. (Turner 1999, 74-75.)

Second pitfalls happen in project planning and include traps in the way work is defined, time and costs are calculated and how these are communicated to the project team. Usual pitfall is to plan project steps on detailed level only. On the other hand, those might be described only on high level. Project work should be planned at least on two levels: the milestones and the route map. Milestones describes project´s strategic plan, consisting intermediate goals and route map is tactical plan. Another trap is to use too difficult tools for project planning. Complex plan do not achieve anything or they might confuse situation. Project manager is not an expert on all areas and therefore he should delegate certain milestones to experts. They would be responsible for achieving a milestone at given time and cost but allowing them to decide how to get to the milestone. One of the project planning traps is also to make unrealistic estimates concerning work. For example, a person working full time on a project is available to work less than work days calculated together. Holidays, bank holidays, sickness, group meetings are among other things need to be taken into account. (Turner 1999, 75-77.)

Organizing and implementing a project have also pitfalls to consider. Lack of cooperation is one of them. Cooperation can be built by creating a clear vision for the

project. The other pitfall here is that resource providers are not committed to the project. If they are not committed, they are unwilling to release their resources to the use of the project. One of the pitfalls is also the fact that resources are not available when required. Even if resource providers are committed, project manager needs to make sure that they understand project requirements concerning the use of their resources. These pitfalls also include that management responsibility is not defined. When project roles are described, it is a common mistake to consider people who do the concrete work. Usually management roles tend to be forgotten. It is surprising that communicating too much is more often one of the pitfalls than communicating too little. If every piece of information is sent to all project participants, people soon learn that only some of the information concerns them. After learning this, they throw information straight to recycling bin without reading it. Project manager needs to define who needs the information so that when people receive it, they know it concerns them and it needs to be read. Also committees are used for communication. There is a tendency for committees to grow organically. People invited to the committee stay there even if they are no longer required. These people usually also talk most at the meetings. Project´s communication and information channels must be clearly defined and limited. The last trap here is to use technical manager, whose responsibility is to manage the design, as a project manager. (Turner 1999, 77-78.)

Monitoring and control include also some pitfalls. Sometimes the purpose of control is not understood correctly. The purpose is to monitor progress of the project and to compare progress to the plan and to take necessary actions to achieve project´s objectives. Monitoring might lead to revising the plan or goals, or work might continue according to the existing plan. One of these pitfalls is that progress in not monitored against the plan. If progress is reported against the plan, control is efficient. There lies a pitfall also in having ineffective review meetings. Formal review meetings need to be held. Attendance must be controlled, there has to be fixed criteria for reporting and meetings must be held at fixed intervals. The last described trap here is having responsibility without authority. If project manager has no authority for control, he cannot take action to accomplish project´s objectives. (Turner 1999, 79-80.)

Integration related problems can also have an impact on project success. Integration to other systems is constantly growing task field. Information system project doesn´t usually take care of master data but it tries to adapt the current situation and makes only necessary changes. This might make master data situation worse. Usually

business intelligence and data warehousing are the ones suffering from this. (Myllymäki etc. 2011, 140-141.) Integrations are a growing field in more and more complex technical environments. Integrations are often poorly considered and budgeted in information system projects. (Myllymäki etc. 2011, 146-147.)

Projects begin to fail almost without exception in the early stages of the project. Failures concern people and project management, project is not run correctly or steering does not work the way it should. From project´s point of view failures concern external factors like changes in project existence, stakeholder´s opinions, needs, resources or goals that become impossible to achieve with given timetable and resources. (Virtanen 2009, 211-212.)

Virtanen (2009, 212) has listed factors that might trigger failure:

- Projects act with insufficient information. When information is missing, decisions need to be made according to best guesses.
- External events might be unpredictable. Project environment changes so fast that the only option is to adapt.
- Foundation of the project in unclear and disturb execution of the project. Project goals might be defined imprecisely or even wrong. Resourcing might also be inadequate.
- Project management has shortages or project is not connected to organization. Failings in management might concern management of people or things. If project is not connected with organization, project manager does not understand the meaning of the project or relationship to organization´s strategy.
- Communication related problems can wipe out the project results. Projects success only if those are able to communicate internally and externally.
- Project manager and project team are not infallible. Sometime project fail because people are inept, careless or stupid. (Virtanen 2009, 212-216.)

Usually there is not only one reason for failure but things are tied up together. However, quite often reason can be found and almost all of those reasons could have been considered beforehand. Almost without exception failure begins in the early stages of the project, when project is being coordinated or launched. (Virtanen 2009, 216.)

According to Turner (1999, 80) projects are subjected to seven forces and these pressures must all be managed. These affecting pressures are sponsorship and schedule, external influences, project definition, attitudes, people issues, planning and control systems and project organization. (Turner 1999, 80-86.)

External context and strategy of parent organization are faced by two forces that are sponsorship and schedule and external influences. Finance is often the most important factor in projects. Project cannot start without finance and that will be coming only if the project owner or sponsor thinks that project is beneficial. Finance is the biggest project expense and it influences all other project strategy areas. Project´s completion date might be a key parameter on a project. Even a small delay might cause loss in revenue and increased financing charges. Overall timing is important when risks and dynamics of its management are calculated. Available time for each stage and amount and difficulty of work to be accomplished influence in the way task is managed. Some feeling of urgency should be built into a project but too much of it can create instability. External influences include following factors: political, economic, social, technical, legal and environment in nature. These factors cause major part of project overruns. (Turner 1999, 80-81.)

Project definition and attitudes are forces that appear within the organization. Development of project´s definition is fundamentally important to project´s success. Project definition should be stated at the beginning of the project and it should include its purpose, ownership, technology, cost, schedule, duration, financing, sales and marketing, and resource requirements. If all these areas are not covered, performance may suffer later on. Attitudes are probably the most important force. If attitudes are supportive and positive, motivation is high among the people working in the project and there is a major commitment to making the project successful, the changes of succeeding in the project are good. These factors are achieved by paying attention to creating a clear vision or mission by linking project´s plans to business plans and by functional and task managers cooperating to achieve the same objectives. It is also important that project receives visible support and commitment from top management. However, projects should not be insulated from criticism. (Turner 1999, 82-84.)

People issues, planning and control system and project organization the forces that arise from internal implementation. Usually project´s demand remarkable effort from the people working on them. Also institutional resistance must be overcome. This puts

massive demands on the qualities of the people working on the project. Importance of team work should also be recognized. This includes handling of conflicts and good communication. Attention should be paid at the beginning of team´s work and mix planning with team building. Constitution of the team should consider social aspects as well as technical aspects. Planning and controlling all significant functions like scope, quality, cost, time, risk and other elements must happen with appropriate systems. All changes (proposed or actual) to project baseline should be monitored carefully. All people working on the projects must understand changes properly. Organizational issues, like relevant management structure, extent of owner involvement and expected use of contractors and contract strategy, must be considered as early as possible in project´s stages. (Turner 1999, 84-85.)

Problems with change management can also lead to project failure or to significant problems in the project. If controlling of change requests fails, it can cause a remarkable change in project scope. The growth of project scope and changing requirements are a significant reason for project delays and crossing budget. Change request are change requirements that happen after planning. The amount of change requests is usually high because participants are unable to comprehend abstract things in definition stage. When end users start to see the true user interfaces, complaining usually starts. (Myllymäki etc. 2011, 106-107.)

If project documents are not updated on time and those are felled behind it causes problems at some point. Documenting is an effective tool itself. Documenting detailed results and reviewing them bring up errors and lacks. Finding them at the early stage is far cheaper than making discovery at later point of the project. Creating documentation afterwards is also slower because the situation where information is freshly in mind has been lost. (Leppälä 2011, 49.) Also Virtanen (2009, 162) highlights the meaning of project documentation because project is about creating information.

There is a chance of failure even after the beginning of the project. Project follow-up, decision making and reporting must operate constantly. This requires a full-time project manager and professional participation both from business and IT. The problem with IT projects is often management of change requests. It must also be recognized that the final results of the project will not automatically be deployed. It has to be planned on time and thoroughly. (Myllymäki etc. 2011, 199-200.)

Project is limited by time and it has to have an end. End related problems are: people move to next project before finishing the previous, getting documents to meet the final result, acceptance of project is often difficult, who accepts the project, good performance is not rewarded, closing and results is not informed, project ends when money ends, getting employees back to line organization, deployment of incomplete system and project end is not clearly defined. (Pelin 2009, 355-356.)

When project is reaching to its end, when achieved result is ready project manager begins project closing actions. The project result is approved by management and decision of ending the project is done. Project manager needs to demonstrate that result is ready and exactly the way it was meant. After result has been approved and implemented, project documents are archived, resources released and project end has been communicated to all stakeholders, the project has ended. Project manager prepares a final report of the project that is a summary of project execution. It includes information of changes that were made to project plan and the reasons of changes as well as consequences of changes. (Virkki & Somermeri 2002, 29, 69; Pelin 2009, 364.)

3.2.4 PRINCE2 - project management model

The target company´s project model bases on PRINCE2, a project management model that is widely used in many organizations. The model has been adjusted what comes to implementing special descriptions, templates and terminology. Company has also added a separate stage called "closing" to the model. Some management products are also mandatory. (Intra site 2015.)

The project management model is a stage gate model (figure 3) that focuses on gate requirements. The same project model should be used for management of all types of projects and in all business areas. When the model is used, it will be improved continuously based on experience. (X Project Model master presentation 2015.)

The used project model is based on seven principles:

- Continued business justification: the project must have a documented and continued business justification.
- Learn from experience: lessons are sought, recorded and acted throughout the life of the project.

- Defined roles and responsibilities: roles and responsibilities are defined and agreed, engaging the business', users and suppliers interests.
- Manage by stages: the project is planned, monitored and controlled on a stage-by-stage basis.
- Manage by exception: the project has defined tolerances to establish limits of delegated authority.
- Focus on products: the focus is on defining and delivering products, in particular their quality requirements.
- Tailor to suit the project environment: the project model is tailored to suit the project´s environment, size, complexity, importance, capability and risk. (X Project Model master presentation 2015.)

Figure 3. The project stages in the target company (Intra site 2015.)

In the beginning there is an idea or a need. This may appear from new business objectives, responding to competitive pressures, changes in legislation or a recommendation in a report or an audit. Before the project is fully scoped, pre project stage verifies that the project is worthwhile and viable. (X Project Model master presentation 2015.)

After it has been decides to go ahead with the project, it need to be planned in a detailed level. The detailed planning, establishment of the project management strategies and controls are covered in the initiation stage. Also the plan for the next stage is planned during this stage. (X Project Model master presentation 2015.)

The Project Board delegates day-to-day control to the Project Manager on a stage-by-stage basis. The Project Manager needs to assign work to be done, ensure that the outputs of the work meet relevant specifications, and gain suitable approval where appropriate. The Project Manager also needs to ensure that progress is in line with the approved plan and that the forecasts for the project's performance targets are within agreed tolerances. The Project Manager informs the Project Board of progress through regular Highlight Reports. (X Project Model master presentation 2015.)

The purpose of the closing stage is to provide a point at which acceptance for the project product is confirmed and to recognize that the objectives which were set have been achieved. At this stage user acceptance of the project´s products is verified, and project also ensures that the host site is able to support the products after the project is disbanded. Finally project reviews the performance of the project against its baselines. Also lessons learned are documented. A plan for benefit realization is revisited and further opportunities identified. The business case is verified and long term benefit realization initiated. (X Project Model master presentation 2015.)

There are basically four gates that are used in the project model: authorize initiation, authorize the project, authorize stage or exception plan and authorize project closure. Each gate has requirements that need to be fulfilled on order to proceed with the project. Each gate stage produces also management products, for example stage plan, which are approved by the project board. (X Project Model master presentation 2015.)

Company´s project model presentation also lists common causes for project failures according to OGC Best Practice:

- Lack of clear links between the project and the organization's key strategic priorities, including agreed measures of success.
- Lack of clear senior management and ministerial ownership and leadership. Lack of effective engagement with stakeholders.
- Lack of skills and proven approach to project management and risk management.
- Too little attention to breaking development and implementation into manageable steps.
- Evaluation of proposals driven by initial price rather than long-term value for money (especially securing delivery of business benefits).
- Lack of understanding of, and contact with the supply industry at senior levels in the organisation.
- Lack of effective project team integration between clients, the supplier team and the supply chain. (X Project Model master presentation 2015.)

I find it positive that the target company has a thorough presentation of the project management model that is used. The presentation includes detailed information of the project model and its stages, roles and responsibilities. In my opinion it is also good that some of the most common reasons for project failures are listed. The list seems to

correspond with the literature I investigated for this master´s thesis. These found reasons for errors are presents later in this chapter.

3.2.5 Increasing chances of success in an IT project

When is a project then successful? According to Pelin (2009, 51) project success is measured at the end of project with three meters: time, money and results. However, business value can often be seen only after several years. Turner (1999, 71) says that project´s success is maximized if project manager, project team and other stakeholders agree before they start the project how they are going to evaluate project´s success. (Turner 1999, 71.)

Project should be assessed comprehensively. This assessment should include view of project, organization, customers and other stakeholders. All do not evaluate success similarly. (Virtanen 2009, 197.) According to Virkki & Somervuori (2002, 30) project is often assessed only based on result and achievement. The development of IT system is based on business needs. Therefore also impact on business should be taken into account when assessing the project success. Project is seen successful when timetable and budget are kept what comes to project workers. However, business is often ready to pay and wait a little more as long as result meets with business demands. Therefore projects should be assessed even after a few years to see if business goals have been fulfilled. (Virkki & Somermeri 2002, 30.)

The best results in information system projects seem to come when both business and IT are committed to project and cooperation works well. The pre-conditions of cooperation are respect and making own duties well. To cooperate at least two parties are needed. And if cooperation doesn´t work, there is fault in two or more parties. IT is often described as estranged group who speak with acronyms but it is usually more trustworthy side in information system projects. The goal of business is seldom clear and stable. (Myllymäki etc. 2011, 197.)

Factors that increase the chance of success are:

- support from management
- clear ownership
- adequate understanding of software
- commitment, participation and feedback from client and end user

- clear requirements
- price setting that is appropriate for requirements
- competent and motivated makers
- fair awards
- successful partition of work in all levels
- realistic goals
- measuring results
- adequate monitoring and steering. (Forselius 2013, 18-19.)

By paying attention to these factors and creating the best possible prerequisites for operation, the success of project can be increased. The above list is not perfect but listed things should be kept in mind in all states of the project. (Forselius 2013, 19.)

Also Snedaker (2005, 9) has listed success factors that increase the possibility of IT project to success:

- Executive support. They have a big impact on project resourcing, cross-functional delivery and visibility on company level.
- User involvement. IT might delay communication with users because they want to avoid encountering with people who do not understand IT world. Users who do not have experience of IT usually have unrealistic expectations. They also tend to increase the amount of requirements along the way. If this happens, users complain that it is too late to make any meaningful changes.
- Experienced project manager. Impact of experienced project manager on project´s success is enormous. The importance of experience increase as the size of project grows.
- Clearly defined project objectives. Project scope (total amount of work to be accomplished) is defined through project objectives.
- Clearly defined (and smaller) scope. The longer a project lasts, the bigger is a change of failure. Normally only way to limit time used to the project is to narrow down the scope of the project. In large projects it might be worth to split project into smaller sub-projects or phases. Smaller projects are more manageable.
- Shorter schedules, multiple milestones. Project is more likely to success if timeline of the project is short. Multiple check-points help in noticing as early as possible if project is heading off-course.
- Clearly defined project management process. Well defined processes help in doing correct things in the right order.

- Standard infrastructure. If software infrastructure is standard and there is no unique solutions, development projects are more likely to deliver on time, on budget and with the features that were required. (Snedaker 2005, 9-19.)

Customer oriented approach and action that is based on processes create preconditions to successful projects. Development of business or customership demands understanding of customer´s needs and seeing organization´s operation as a set of actions that begin from customer´s needs and end in satisfying those needs. Projects cannot succeed without balanced management. This means that there is a balance between leading people and managing things. These both are needed if projects are wanted to succeed and if organization wants to make sure that project meet organization strategy. Management should be able to think of the entirety, see the changes in operational environment and to understand how organization should be renewed. Actually project manager´s realistic understanding of own ability and prerequisites for operation leads to the best final results. (Virtanen 2009, 95-96, 105, 185).

Project is often defined with goal, resources and time. Project success is promised if these three factors are held in mind. Most project guides do not take into account the complexity of projects. Projects are often diverse, contradictory and intermittent. Management and endurance of uncertainty have big roles. (Virtanen 2009, 16.) Project is a demanding way of working. In order to success all parties need to know the rules and they also need to be willing to obey these rules. It requires also flexibility and readiness to accept less comfortable solutions. Projects are highly vulnerable to changes, surprises, problems and to cumulative pressures that concern work and timetable. (Leppälä 2011, 179.)

As researches indicate (Hastie & Wojewoda 2015; Forselius 2013, 14; Myllymäki etc. 2011, 199) projects face numerous problems and they vary what comes to effects. Some problems lead in project´s failing and some challenge projects otherwise. Actions that were done or left undone in the early parts of the project lead most often to failings or to unsatisfying results. (Myllymäki etc. 2011, 199; Virtanen 2009, 211-212.) Also Forselius (2013, 14) presents that among other things timetable and cost estimates were the reasons for failures. These are the actions done in the early parts of the project. Based on these results it seems that the beginning of the project is crucial. Though, it has to be remembered that also other stages of project's can lead to failure.

The literature that I researched indicates that project should have formal project management elements in order to succeed. However, I also agree with Virtanen (2009, 17-20) that some creativity should exist in order to sustain innovation. This was brought up also by Hannus (1994, 266-267).

3.3 Change

Even though changes made to service invoicing process were quite small at this point, I want to introduce some key elements of change because almost always ways of working change after improvement actions. Change is also something that in my opinion needs consideration when upcoming IT projects proceeds.

3.3.1 Definition of change

Change means always movement from former situation to something new and different. Change requires both new information and willingness to learn it. Therefore change means learning new things and adapting it. Adapting new situation depends on how change is realized and what kind of skills people have to adapt the change. (Tuomisto 1997, 15.)

The main rule is that any decision other than status quo is development. The biggest reason in staying status quo is that it consumes the least energy. Other decisions might be unpleasant and consume energy. In this case the first thing that can be done is to remember goals. Status quo can never be seen as an option, other alternatives have to be identified and benefits and disadvantages must be searched concerning all options. The commitment of top management is important. If they are not committed to change and searching for better solution, failure is almost inevitable. If there are several options that are better than status quo, there is no reason to stay in it. (Lipiäinen 2000, 99-100.)

Virkki & Somermeri (2002, 1) write that almost any dominant situation, product, service or procedure is changed only when it must be done. Occasional, mainly cosmetic improvements are done but those just lead situations into worse. True change process starts when nothing else helps. (Virkki & Somermeri 2002, 1.)

Change is often a social phenomenon by its nature. Even though everyone has own relationship with change, it is attached to close people and coworkers. No matter how technical change is, it has effect on the relationships between members of teams. (Laamanen 2003, 256.)

Laamanen (2003, 257) writes that all decisions are based on feelings or at least those have a significant role in them. If change is wanted, it is all about changes in feelings. All people have a comfort zone that is related to changes. If there is lot of changes, life starts to feel distressing and stressful. On the other hand, if there are too little changes, some might feel life boring. (Laamanen 2003, 258.)

3.3.2 Phases of change

First change phase is the awareness of the need for change or its possibilities. People become aware that this is not the way to continue, it is not either possible or worth it. At this stage feelings might become impatient. Mind is focused on recognizing risks. Even a good thing is abandoned easily if there is one serious shortage, disadvantage or risk. There is a big difference whether change is experienced to be positive or negative. (Laamanen 2003, 258.)

After the need for change has been identified or reality has been accepted, human mind starts to find a solution. If suitable solution is not available, there is more anxiety, even depression. If possible solutions are found, there is careful optimism. Typically first the best solution is selected on emotional level and after that begins generation of justification. After making a decision of solution, hesitation starts. Mind starts to seek confirmation for the decision. Real commitment to new operating model happens by accepting first all positive effects of the change and then finally, when the last serious doubt has lost. (Laamanen 2003, 259-260.)

Human being and relationship to change is quite stable. People react to change differently but mostly change is experienced to be confusing and causes quarrel. We have, however, used to the thought that things change. (Erämetsä 2003, 14.)

When change is voluntary, self-determination is not violated and change starts from himself. Voluntary change does not cause resistance. Necessity makes change quicker and raises also resistance. Planning execution of change, leading it and empowerment

should be invested as much time and energy as to planning the results of the change and deciding it. Change content and implementation of the change should not be separated. (Erämetsä 2003, 15.)

Change can be experienced to be good and/or bad or it is not either. It all depends on how change is experienced. Interpretation can rely on reason or feelings. Change is good when it eases the work and it is good also when change is done due to the necessity. The way change is experienced is different. Even a good change can be bad if it is not lead correctly. (Erämetsä 2003, 18-20.)

According to Erämetsä (2003, 23) change can be divided into four levels:

- Change of individual. It is about changing self-management type of things like changing action from one way to another. It can also be changes in who you are. The change of an individual is the core of organizational change. If individuals do not change, organization does not change either.
- Work related changes. These are changes like implementing a new system as a part of the process. Most of changes in organizations belong to this category. It should be noted that these changes are related to individual changes as well as corporation culture even strategy changes.
- Strategic changes. These changes mean corporate mergers or takeovers, new products or markets or distribution channels. Changes might affect one or more units or departments.
- Cultural changes. Organization´s culture changes slowly and progress is often difficult. Culture should develop slowly, piece by piece. (Erämetsä 2003, 23-25.)

Erämetsä (2003, 27) suggest that changes in strategical or cultural level should be as minimal as possible. This rule concerns also work related changes and individual changes as long as change is separate from natural development and growing. Changes should also be done as rarely as possible. Development is inevitable but changes should be done deliberately so that people could feel more secure and have a sense of control. (Erämetsä 2003, 27-29.)

3.3.3 Change process and resistance

Error in the system is the cause for everything, writes Lipiäinen (2000, 144). No matter how much actions are changed, if the reason is error in the system, it does not help.

But an error is caused by something, it is not the reason. Reason is always human who has planned products/services, chosen material for products and services and installed or marketed products/services. In corporate life this is seen most clearly as quality problems. If there is a problem in quality, it does not help if things are done differently. Behind of errors there might be confusion in processes, overlaps, gaps, calibration problems and so on. (Lipiäinen 2000, 144-145.)

Different methods suit in different changes. Timing and change resistance have to be taken into account too. The change situation has to be controlled. According to researches following four things have to able to execute in change: improvisation, wisdom, respectful interaction and communication. Improvisation can create order from chaos. In wisdom overconfidence destroys curiosity, openness and sensitivity in solving complex problems. On the other hand excessive caution prevents from seeing fears and deepens insecurity and doesn´t encourage curiosity. Respecting other´s opinions build trust and create honesty. Change situation has to be set up with continuous communication. By communicating nonstop people´s thoughts are coordinated and complex systems described comprehensively. Nonstop talk is even more important if the company have separated links. (Lipiäinen 2000, 141-144.)

In his work Lipiäinen (2000, 144-149) introduces few change processes. One of those is a triple-loop-learning. According to him Robert Hargrove has presented a triple-loop-learning in which innovative solutions are achieved by working together. The change starts from you. Therefore one must change first and then goals and results have to be defined together. Hargrove's steps are: a shared goal, clear roles, time in dialogue, shared work spaces and zest factors. These zest factors create new; develop employees and teams to be superior. These can be compulsive challenges, pride of achievements, and fear of failure or passion for experiments. In England's Nissan Peter Wickens had a goal that usual people could achieve unusual results. In this he aimed with following steps: top management is committed to change, change agents from different levels and occupational groups to describe detailed change needs, highlighting the need for change, planning the change process, developing people and to maintain and strengthen the change process. Even if change management could be planned, realization of it is humane and psychological matter. Technological and economical challenges must be answered with all employees. (Lipiäinen 2000, 147-149.)

In order to get people to participate to the change process, manager needs to ensure that need for change is explained and understood. Manager should also make sure that the objectives and benefit of the project are understood by all. Participation is an important way of making people feel that they have some control over the change. If people understand project objectives and feel that they may benefit from it, they are more likely to give their contribution to the project. Also training and development of employees increases the overall commitment to common goals and processes. These can also help in motivating employees and gaining acceptance that relates to change or to specific training needs implicit in the change process. Development of employees improves also internal communication and participation that will add the chance of project success. Team development is also one element in overcoming change resistance. Project manager should encourage people to work together in tea. Also interacting with others in the organization should be encouraged. This way each other´s perspectives are easier to understand and common goals are developed. This overrides individual interests and contributes to the project success. Allowing people to participate in planning and managing the change requires clear leadership, direction and vision from project manager. People need to understand what is expected of them. Finally, project manager needs to have full support from top management. (Turner 1999, 57-59.)

Commitment requires awareness, understanding and accepting the change. The goal of commitment is that people become makers of change instead of being target of the change. Feeling of being the target of change is one of the sources for change resistance. It would be best if people could be part of every phase of change. The more people can affect, the more they will commit to change. (Laamanen 2003, 260-261.)

Change management is not merely executing things, it´s also creating conditions. Man has to create such conditions where employees can achieve their professional goals. In order to be successful in change, company must also manage to lead the change not only adjust to it. In first option company has a bigger chance to succeed with the criteria it has set itself. In the latter case company might avoid making mistakes but is in the position of challenger most of all about customers. (Lipiäinen 2000, 139-140.)

Typical challenges in leading changes are:

- Reasons for change are not communicated.
- All is given ready and forced into practice.

- People are not given a reason to change and they are not helped in finding a reason to change.
- Change is implemented even though culture, processes, meters and general will are against change.
- Nothing is divested. More procedures or tasks are added on top of the old ones.
- Change is done in too big pieces. Smaller steps are easier to digest.
- Middle management and supervisors are not committed.
- Top management does not stand behind the change nor lead it.
- Communication is forgotten.
- Feelings are left unnoticed. This increases negative feelings and resistance.
- A small change is done bigger than it is. Problems are seen even if those do not exist.
- There is too busy. Sometimes organizations need change and people are willing to change but it is not done because they are too busy.
- Change is reversed with another change. Separate changes are implemented without coordinating those.
- Effects and extent of the change is estimated incorrectly.
- Only a unit takes part in change although it concerns the whole company.
- Change is too big or it does not base on reality.
- Change is not managed; there are no meters, timetable or responsibilities for the change.
- Change factors are not identified. Power or significance of supervisors or unofficial organization is not considered. (Erämetsä 2003, 37-40.)

Change management requires according to Lipiäinen (2000, 144) even more personal communication in reliable and understandable communication. Reliable communication can help in improving attitudes and motivation. Corporates internal media doesn´t allow sparring. In worst case they can become source of rumors. (Lipiäinen 2000, 144.)

Healthy change resistance is natural and even good and useful thing. If there is no resistance, all things would be accepted without questioning those. At same time resistance can be difficult and negative matter. It depends on a degree of resistance. At worst case change resistance can disable the operation of organization and lower the performance. On the other hand healthy criticism serves company when it is utilized correctly. Change is a process and resistance makes it better and more correct. (Erämetsä 2003, 98-99.)

Rejection is a natural reaction to unfamiliar things. It is important to notice that especially rejection in the beginning comes from feeling. It cannot be affected by reasoning. People need time to digest change. It is better to start working with people who support change rather than waste time for objectors. Quick start is more important that persuasion of them. However, it is important to hear objectors and to appreciate their opinions. (Laamanen 2003, 269-270.) The hardest part of the change is creating need for change. Especially in the beginning people might experience changes as a threat to their own position or work. Even if the change is inevitable, it might face resistance. (Tuomisto 1997, 23.)

Change resistance can be overcome by changing feeling of threat to energy of possibilities. The fear of loss can be overcome by taking change agents to planning the change. They relay change needs and goals to their teams and bring back feedback to development team. Tolerance of uncertainty can be raised with open communication and raising tolerance of criticism. Management of unpredictable can be raised by introducing them similar changes elsewhere and by keeping them constantly up to date. Also positive surprises cause lack of trust because the target of surprise understands that something has been kept secret from him. Tolerance for difference can be grown as long as the traditional way of working is not degraded. Past has to be respected but future has to be taken as an exciting challenge. Loosing face can be avoided with openness, honesty and in the light of new information to become supporter of the change. Also fear of fiasco is overcome with communication. (Lipiäinen 2000, 149-150.)

Effective communication is the most important factor in minimizing change resistance. Communication means talking but also listening and using received information. If communication channels are long like many large companies have, information may be lost, filtered out or distorted. (Turner 1999, 57.)

Change should be measured. What is measured, it grows. Change is unclear and might even fail if it is not measured. There is also a danger of over measuring. When change is considered, correct things should be measured. Measurement and monitoring are a way to see what results are achieved by doing things. Measurement is a tool for monitoring and monitoring enables management and giving and receiving

feedback. This leads to corrective actions when feedback is given properly. (Erämetsä 2003, 175-176.)

Change is not a goal but a process, a journey, not an end point. Therefore change has to be taken care of, followed and repaired. (Lipiäinen 2000, 153.) Also Laamanen (2003, 267) points out that without follow-up, nothing changes. No matter what, in all cases change is complex, dynamic, complicated and horrible. In the real world change processes fail more often that succeed even though those are led by intelligent, well-educated and experienced managers. The fundamental reason for failure in change is minor or even nonexistent ability, expertise and will to lead people in appropriate, goal-directed and motivating way. (Lipiäinen 2000, 153.)

Changes done to Finland´s service invoicing process were quite small but added reliability of the process. However, done actions concerned only a small part of the participants in service invoicing process and therefore I feel that the changes were taken into practice smoothly.

4 Development work

The needed level of development or improvement varies among literature. Some define that the level of improvement can be either small or larger depending on a situation (Hannus 1994, 263; Laamanen 2003, 211; Andersen 2007, 168.) King J. etc. (2014, 45) point out that the improvement needs to be significant in order for impacts to be major. In our case major improvement measures were not an option. There is an organization wide project that aims at improving service invoicing process in all countries underway and therefore there was no funding to changes. It also meant that any major changes would not be done because the project is coming. All done changes were therefore done with existing resources and only by making smaller changes to process itself and focusing mainly on strengthening control points to make sure that invoicing is and stays correct. If invoices are erroneous customer satisfaction and reliability decrease and in case the company invoices too little, it loses revenues, if the errors are not noticed.

The improvement measures we took had an objective to describe current process as it is and to make reasonable and cost-free improvements to it. Main focus was on adding change process to the service invoicing process chart and adding control points to the

process since service invoices have been erroneous in other countries and this topic was mentioned on organizational level even though service invoices in Finland have mainly been correct. The improvement measures concerned mainly service invoicing expert. The change process involved also new process actors to service invoicing process. Of course one of the most important tasks was implementing these changes into practice.

As it was stated already earlier, the Finnish service invoicing process would be a part of organization wide project that would aim at improving the invoicing processes in all countries. The development work related to this master´s thesis did not have finance nor many resources to do any major improvement actions that would need finance. The model I chose to use mainly was Deming´s Plan-Do-Check-Act wheel (presented on page 18) and also Page´s improvement wheel (presented on page 20) was kept in mind but not used systematically as it would have required much more participation from all process actors. As the development project is underway, it was felt in the target company that it would be too heavy to execute improvement wheel as a whole. The process will also most likely change significantly after the project so it was not seen necessary to polish off the process before the IT project (automation part in the improvement wheel). One reason for using mainly PDCA-cycle was also that improvement methods would not need to be introduced widely and the improvement actions are simple to do according to the wheel. The research was action research, where the researcher participated in development actions with others. In addition to the researcher, especially service invoicing expert in Finland gave contribution to the work.

First, to plan correct actions and to identify biggest pains, I analyzed the current state of invoicing process in Finland from three aspects. The first stage was to analyze the current status by viewing the correctness of the invoicing. This was done by comparing invoice calculations to agreements, price lists and service descriptions. The second stage was to investigate whether the current process description is up to date and to analyze change needs and control points considering also the remark of internal auditors. The last, third aspect was to investigate how process actors feel about the process; roles, responsibilities and biggest bottlenecks. Based on analysis of current status from these three aspects, improvement actions were chosen in cooperation with service invoicing expert and supervisor from work.

After choosing improvement measures they were implemented into practice according to the Deming´s wheel. Process was improved with few smaller changes and change process was added to the process description. The change process describes how changes should move in the invoicing process. Some process controls were added also. These improvement actions are presented more closely in chapter 5.4. In addition to improvement measures I also described preliminary requirements for the upcoming project concerning service invoicing process in Finland.

According to third phase, check, in Deming´s wheel impacts of improvement actions were measured. This was done by investigating opinions on cooperation, roles and responsibilities again after implementing the changes. Another indicator was approval of internal auditor to the remark process had concerning process controls. I also measured correctness of invoices that were sent to customers before and after the changes.

Fourth phase, act, in Deming´s wheel is about adjusting the process based on the measurement. In this development work measurement phase was left unfortunately quite short. This is why it may not have indicated the total change yet. Any need for corrective action did not arise during this period.

After investigating the process itself the researcher defined prerequisites for the project concerning service invoicing process in Finland.

4.1 Analysis of invoicing´s present state

I started this development task by going through agreements, price lists and invoice calculation concerning all customers. The purpose of this was to investigate whether we are invoicing correctly all. I also went through basis´ for invoicing and checked every report and its definition to make sure we are invoicing on correct basis and that the source report is defined correctly. As far as it was possible, also report itself was checked (that it brought correct figures). As a result I formed an excel sheet that had all this information in English (some of the data was previously only in Finnish). This sheet was inspected by one other person making service invoicing and knowing used excel macros (making sure at the same time that these macros bring correct information to invoice calculations). After this, document was sent to Key Account Managers for their inspection. They have the knowledge of all scribed information so they were the best to

make sure that document was correct. Description of present state also fulfilled the needs of organizational investigation of service invoicing´s correctness in Finland.

The document was found to be accurate and to correspond the present state of invoicing. However, later some mistakes in invoicing were found but these rooted to service descriptions that were not accurate enough. It was stated that this was enough to prove that invoicing is correct at current state as far as it could be investigated reasonably.

This investigation revealed that background information is somehow confusing. All customers have their own agreements and services. In service catalogues almost all customers have own names for services even if they are the same than other customers have. So basically same service can have multiple names. In addition to this basis for invoicing can vary depending on a customer. It is also possible that same service can have different content depending on a customer. This means that different customers can use the same service but the basis for invoicing is different and service name can be same but content isn´t. This leads to the difficulty of finding the same service from different customers and for example comparing profits.

4.2 Current service invoicing process in Finland

Service invoicing process in Finland is nowadays quite a complex process with different customers, agreements and invoicing basis'. There are several customers to invoice and these all receive more than one invoice. Invoice calculations that are detailed versions of sums on the invoices, are done before creating actual invoices. The timetable is also quite tight. All invoice calculations must be done by 4th day of each month. There are ready excel templates to make invoice calculations and excel macros are used to form the calculations. If all figures are not available on the 4th day of the month, estimations are used at this point.

Service invoicing has many sources for information that is used in invoicing as figure 4 shows. This makes the process even more complex from automation's point of view. And of course it is difficult and troublesome to information sources also in the case they are manually keeping a table of some manual tasks. This figure was done to describe diversity of data sources to pre-project that investigated Finnish service invoicing

process. It also benefits the upcoming IT project as the data sources are clearly seen and stated that all used data is not only in data warehouses.

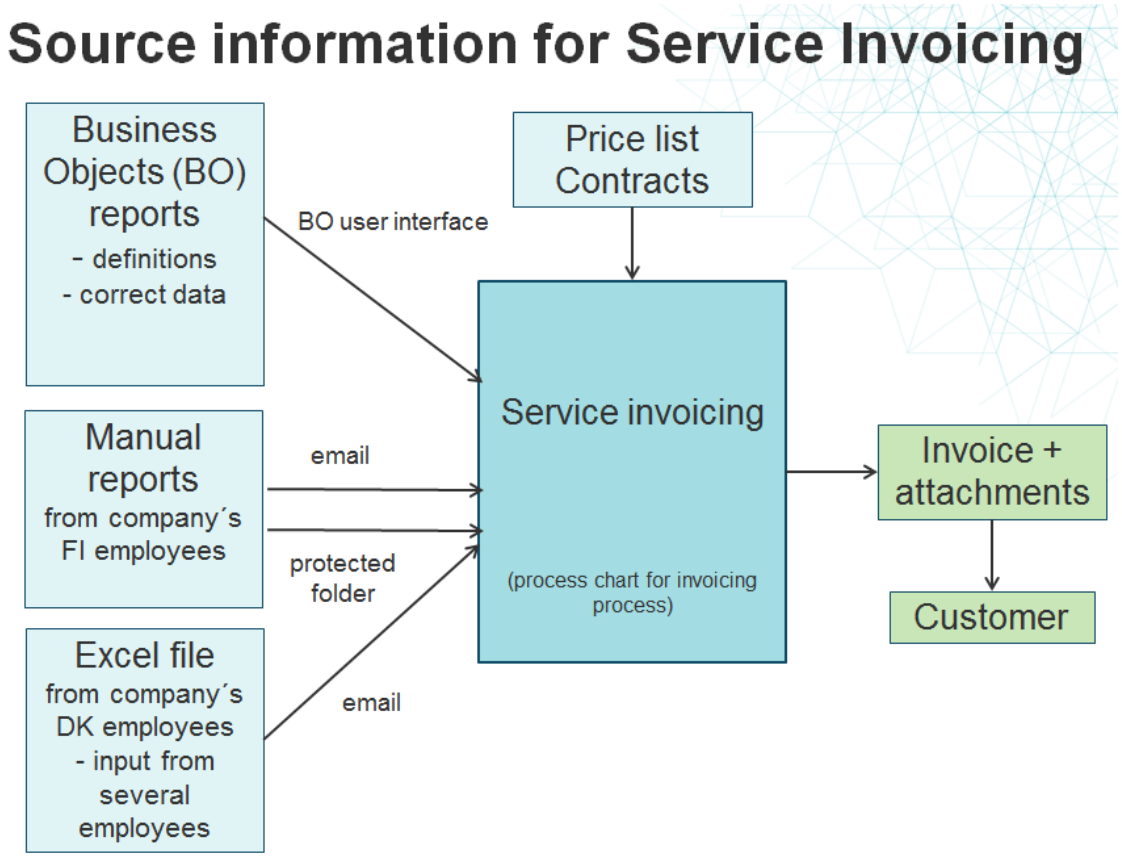

Figure 4. Service invoicing data sources

Invoicing process starts in the beginning of each month (figure 5). Business Object reports are gathered by using Business Objects user interface. All reports are ran and saved to hard drive. Manual reports are saved to protected folders or sent by e-mail to the person who collects data and makes invoice calculations. Nordic customers use Nordic volume data in calculations so when calculations concern them, data is received also from Denmark by e-mail.

After all needed data is gathered, existing excel templates are used to create customer based invoice calculations. The amount of calculations depends on a customer. Excel macros create calculations mostly and manual input is fed to the template also. Billable change requests and other manual charges are on one Excel sheet.

Invoicing team does checking and compares invoices (euros and volumes) to previous month's invoicing and to previous year (corresponding month) to see bigger anomalies.

The calculations are sent to financial department who make reservations to SAP at this point. After this invoices are sent to corresponding Key Account Manager (KAM) to get approval to invoices. Key Account Manager makes own checking, mainly concerning prices and invoicing of done change requests. Invoice calculations are sent also to corresponding Service Delivery Manager (SDM) who concentrates on checking service volumes.

After Key Account Manager´s approval Finance department sends invoices to customers. Invoice calculations are also sent to customers by e-mail. The current process description was gone through with participants during the work and was discovered to be accurate what comes to tasks and control points.

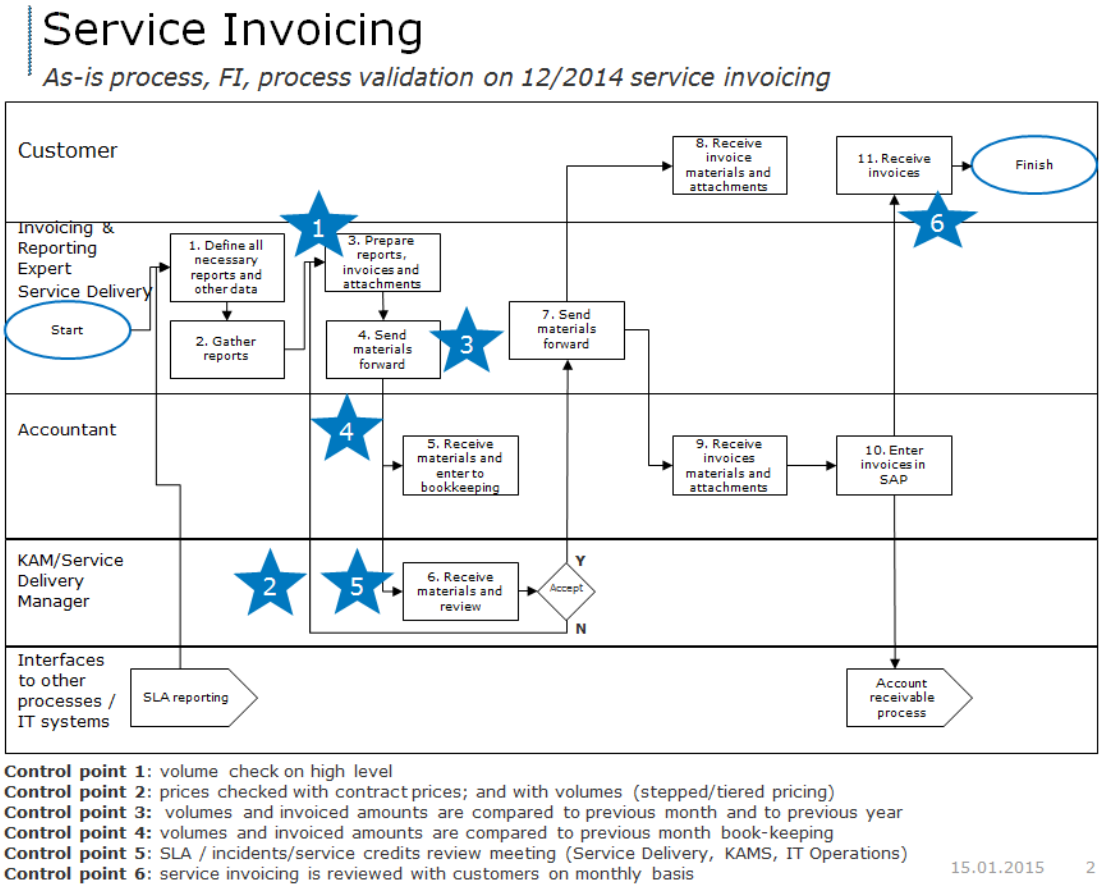

Figure 5. Service invoicing process in Finland

As I wrote earlier, service invoicing process has been audited by internal auditors who made one recommendation concerning efficiency of manual controls. Recommendation was to evaluate the need for business re-processing for invoicing activities for increased control efficiency. (Audit report, Invoicing processes in X NO, DK and FI

2015.) This recommendation was taken into account when changes were made to process and control points were added.

4.3 Functionality of service invoicing process in Finland

Opinions on process responsibilities, roles, cooperation, biggest bottlenecks and development of participant´s own role was examined in a survey during May 2015. The questionnaire is as attachment 1. It was sent to all process actors. The total amount of people working with the process is ten and few people from accounting (these people can vary; they are not the same always). The survey was sent to these people and to accounting´s group e-mail. They were given about a week to answer. Seven people answered.

Questions 1-4 were with numeric evaluation and they had also open text possibility. Questions 5 and 6 were only open. The scale was from 1 to 4 where 1 is poor, 2 is adequate, 3 is good and 4 is excellent. This scale was used to avoid threes in answers. The meaning of this was that the answerer had to be either more satisfied or dissatisfied to the thing asked.

Questions were following:

1. How clear in your opinion are the responsibilities in overall in the process? If the responsibilities are not clear, what area should be improved?
2. How well do you know your own role in the process and responsibilities it involves? If not well, what should be defined more or better?
3. How well does the cooperation work with your colleagues (in the same unit)? If not well, how should working be improved?
4. How well does the cooperation work between the units concerning the process in question? If not well, how should it be improved?
5. What are the biggest bottlenecks or challenges in the process in your opinion?
6. How would you develop your own role in the process to make the process more efficient?
7. Can you please describe an example of situation when cooperation worked extremely well or poorly?

Service invoicing process in Finland received scores 3 or 4 in all questions. This indicates that process was felt already quite well working and people are satisfied with the process. Detailed answers and diagrams are presented in appendix 2.

Responsibilities are comprehended mostly very clear. Improvement could be done in communicating the roles and responsibilities to stakeholders inside the company. The responsibility of original data and reporting (in which the invoicing is based on) is missing/unclear. Own role and responsibilities are seen very clear and most of the answerers gave score 4.

Also cooperation with colleagues is experienced to be good or very good. It was brought up that it´s good to also sit near concretely, this smoothens things often. Some process participants have to gain more experience.

What comes to cooperation with other units, it was felt that sometimes getting information or corrections from other departments takes too much time. There should also be better understanding of what is done in each unit. Lack or unclearness of original data/reports was brought up also in this question.

The answerers brought up following challenges/bottlenecks:

- There are different interpretations on the price list. When personnel changes, the agreed interpretations are not always told to the next responsible person.
- Time schedule and deadlines.
- Lack of resources or scarce resources in both invoicing and reporting.
- Technical failures in reports.
- Too many manual steps.
- The difficulty in ensuring correction of data.

Development of own role brought least answers. The answerers thought that the level of automation should be raised. Examples of situations where cooperation worked extremely well or poorly did not receive any answers.

4.4 Development steps in service invoicing process

As the literature showed, the improvement target can be either small or bigger and the target of actions can vary. (Hannus 1994, 263; Laamanen 2003, 211; Andersen 2007,

168.) The researcher took a through look at current state by investigating the process from three aspects and as a conclusion of current status in invoicing correctness, process and the functionality of it some development suggestions were found. Conversations with process participants brought up also some new proposals after analysis of current status. These proposals were discusses with service invoicing expert and added to process flow chart. The changes were not huge but especially adding control points and describing change process strengthened the process.

Page (2010, 160, 164) suggests that everyday tools could be used to improve process by helping to automatize it. The target company has already taken these steps as the invoicing is done by using Excel macros. During this work also IntraShare site was launched and all invoicing data is saved there.

The current status was discovered to be on a good level even though the process is highly manual and risk of error exists also. The analysis of current invoicing proved that invoicing is most likely correct at present state. Possible errors would be related to the fact that services are not described as detailed as they should in my opinion and the description of a service offered to customer should also be detailed enough to differ it from the service to other customer´s. The same service name can be offered to customers but the content is different and there is not necessarily exact information of that. However, these possible errors would be minor and it would be impossible in this work to go through each service customer by customer to check whether the description is correct and detailed enough in service catalogue. Therefore this job was left out from this master´s thesis.

Possible error might occur also when services or pricing change. Therefore it was felt needed to add change process in service invoicing process flow chart. Describing change process added new actors to service invoicing process. People who are responsible for a product received a role as they should inform changes on their area to service invoicing and check that invoicing is correct after a change in their field.

As the service invoicing project would start in a few years, any major changes would not be done to existing process. Any temporary systems were also ruled out as there are no funds reserved for the development before project. Process was also seen as well working so there was no reason to make major changes to the process itself.

However, some changes were made based on comments from survey, conversations with persons responsible of the process and due to a remark of internal audit.

New process flow chart can be seen in figure 6. The appearance of process chart was kept same as it was felt to be well functioning and easy to understand and comprehend. Several control points were added to the process. Control points are marked with a star in process flow chart. Internal changes lead to tightening timetable in producing service invoices. They need to be done by the 2nd day of each month. Because all data is not available at this point, estimations are used in services that do not have accurate data available at that time.

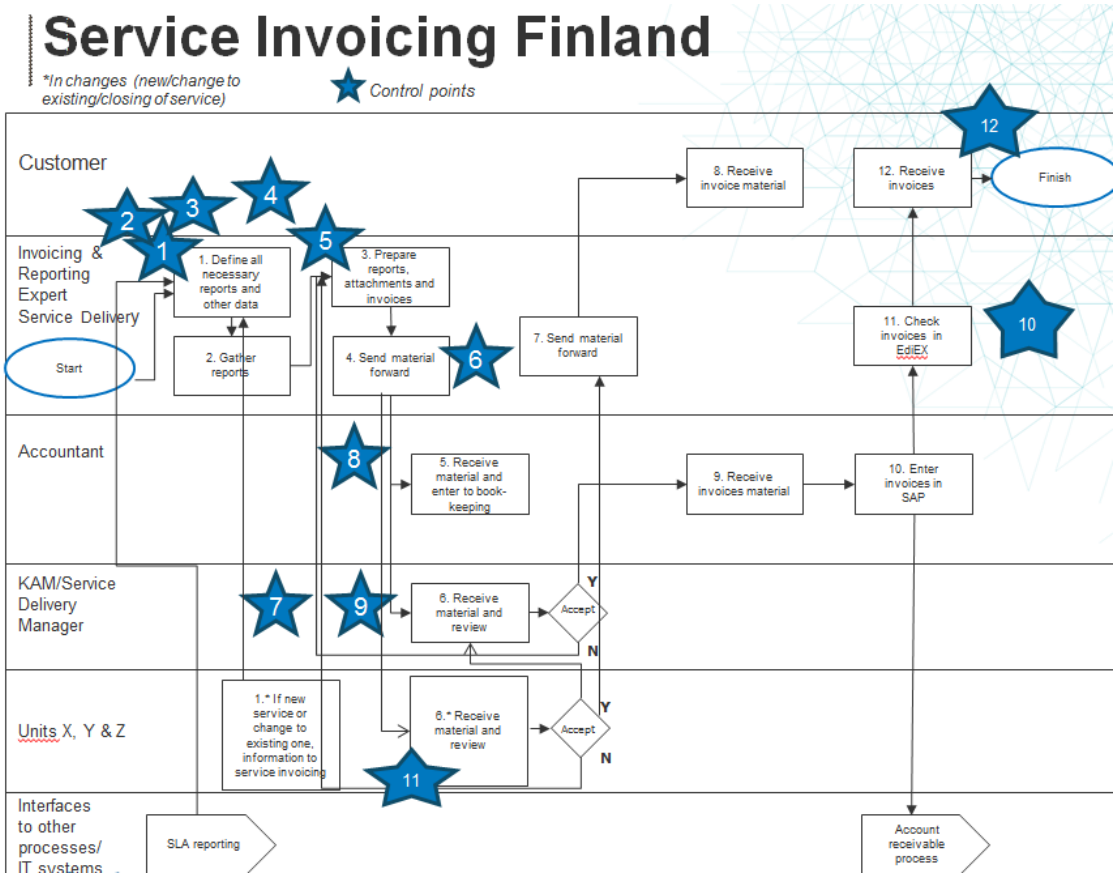

Figure 6. Updated process flow chart

The biggest change was adding change process to existing process flow chart. In case of new service or if existing service or price changes, people from responsible product area are involved. They will give input to invoicing in the beginning of process so that invoicing is possible and they will also be responsible of checking invoices after all changes. An excel sheet was added to share point to be used as a log where to mark

when invoices have been checked after the change. The change process was gone through with process actors whom it concerns.

As it is very important that no one is able to make any changes to invoicing templates or to send invoice calculations, access to these files is very limited. To make invoices visible and easy to access without the fear of changes, intra site was opened during September 2015. All invoice calculations and reports are saved there every month. This makes it possible to check invoices easily for anyone who has access to service invoicing share point site.

Internal audit wanted that Key Account Manager would inform acceptance of invoices by email directly to Accounting. The accepted invoices should be attached to this e-mail. This was added to detailed work instructions as well as to process chart.

Some errors had happened after entering invoices to SAP so it was also seen needed that invoices would be checked before sending them to customers. This was a new step to process description as well as a new control point.

Several control points were added to the process as a conclusion of analysis. One of them was a control in the early stages of the process what comes to data warehouse loadings or actually this is one of the prerequisites for doing service invoicing. If loading in data warehouse fails, reporting team gets automatic e-mail. This controls that all loadings are ready and successfully done before searching reports from Business Objects (user interface). Invoicing is based on reports so this was an important addition to control points. This actually was already an existing event but it was not described in process flow chart.

Correctness of data was one of the things that came up in the survey. This demand has been answered in development work partly. Expert in service invoicing receives in the beginning of each month a report that tells whether the data between data warehouse and one of the source systems match. If there is significant difference, it will be investigated before using data in invoicing. Invoicing uses information from other source systems also and report has been created for one source system only. This report existed but it was not used. After re-describing the process it was taken into use again. Another reconciliation report has been defined and is on a list of reports to realize but has not been completed due to the lack of time in reporting team. The

definition of this report is as appendix 3. The researcher took part in defining this report. Data from one another source system is checked in accounting. They check and compare data before using it in invoicing. This is a manual checkup. However, the existing report tells the situation of data that is mostly used as invoicing basis. The report that waits to be finished will benefit service invoicing but even more reporting and reports that are sent to customers.

One new control point is using of product table. It was created by service invoicing expert due to the demand of internal audit. This is a document that has all services and prices sorted by customer. The table is updated always when changes happen. Invoicing is compared and checked with this table. Product table is updated by the same person who makes actual service invoices. On the other hand it is good that updating and invoicing is on one hands but on the other hand it does not minimize the possibility to miss something in invoicing as the author is the same person. If information of changed service or price does not come to product table it does not rise to invoices either. If person was someone else, for example product manager, it might reduce the change of errors.

Conversations revealed also a need for one control point before sending actual invoices to customers. Invoices will be checked by an expert in service invoicing prior sending them to the customers to make sure that the invoices to be sent are correct.

As mentioned earlier, people who are responsible for a certain product became involved with service invoicing process what comes to changes. They will also check invoices that have changes (new/change to existing/closing of service) prior sending those to customers to ensure that services are correct and on correct invoice and this was added also as a control point. These added control points satisfied internal auditor and recommendation was closed.

4.5 Requirements for service invoicing project

The pre-project had done investigation in all countries concerning service invoicing. They recommended, based on their findings that company would aim for a Nordic enterprise solution. Harsh draft of this solution is presented in figure 7. (Internal document 2015.) Analyzing current status of service invoicing in Finland gave a good starting point to creating requirements for service invoicing with new system or solution.

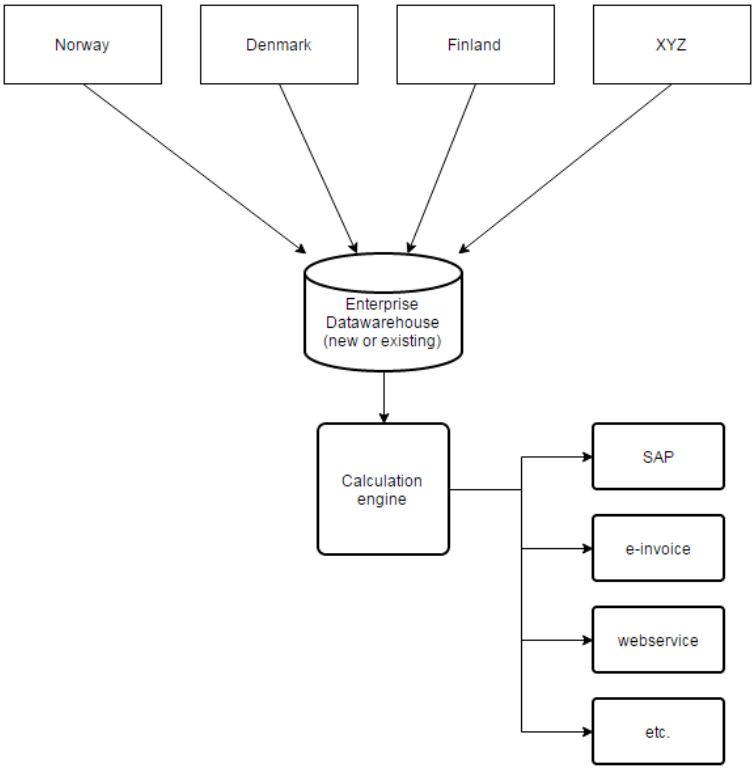

Figure 7. Presented new architecture

As the research of literature showed, the key in succeeding in a project is to pay attention on planning especially in the beginning of the project (Forselius 2013, 26; Myllymäki etc. 2011, 199; Virtanen 2009, 211-212). Planning phase is important and critical what comes to latter phases and the success of the whole project. It is also important to involve correct people and the ones who actually will work with new system. Still, there must be readiness to change plans and to leave room for creativity (Virtanen 2009, 17-20; Hannus 1994, 266-267).

Possible change resistance should also be taken into account. Even if the new system would be better than the old solution, it might effect on something that raises resistance. Change resistance can be minimized by involving people (Laamanen 2003, 260-261) and by communicating constantly (Turner 1999, 57). I would say that involvement is important also to the success of development project.

Processes can also relate to project failures. Processes are either not known or current process is set as a target process. (Myllymäki etc. 2011, 55-57.) Updating current process description benefited also future project. The current process is described and

documented with control points and gives a clear view to the whole process taking into account also preconditions that need to be fulfilled in order to make invoices; reports play a crucial role in invoicing and those need to be correct and available before starting invoicing process. I agree with Myllymäki etc. (2011, 55-57) that when project is launched, current process should not be set as future process as it has still many steps that could be improved. However, I think that control points need to be sustained at some level. For example in my opinion invoices should always be manually checked in some level that they are somehow correct before they are sent to customers. Even if the exact sums are not controlled at this point, magnitude of invoices should be controlled. The range of sums is quite well known based on history knowledge.

During this work it was decided to stop at least temporarily service invoicing project as some countries have so much problems that it was seen more important to get invoicing correct first and then resume with the project. I hope that the root causes for errors will be investigated while they correct invoicing because it would help the project after it is launched again.

As the project would anyhow be continued at some point, I saw it worth describing the definitions and prerequisites for the project concerning Finland´s service invoicing. However, they were left on higher level than I first planned as I did not receive resources for more detailed definitions. Those would of course have been difficult to describe since the solution is not yet known surely.

These preconditions and definitions have been described by the researcher and they were gone through with the person who is responsible for service invoicing in Finland. She also makes calculations for Danish invoices also and has a view to service invoicing more widely. Specific definitions can be found in attachment 4.

5 Research results

The challenges in the process before improvement actions were:

- Manual process has a risk of errors.
- Manual process is not efficient.
- Source data is not always up to date (communication in case of changes or failure of information system) and uncertainty of correctness.

- Strong dependency of one person.
- Uncertainty of correctness of service invoices.
- Customer satisfaction.

These identified challenges formed the basis of objectives and research questions to this master´s thesis. Objectives were:

- Form current status of service invoicing process based on analysis.
- Form information sheet of service invoicing in Finland for the pre-project.
- Add change process and other needed changes to process description and implement it.
- Add needed control points to the process and implement them.
- Form definitions of Finland´s service invoicing for the project.
- Form a plan of how internal comparison of services could be improved.

Just to shortly summarize improvement actions that were made to Finnish service invoicing process, the following actions were taken:

- The whole process was gone through and re-described as it was known that some existing steps were not visible in the process chart. These were added to the process description.
- The flow of changes was described to the process description and advised to the people who are responsible of products.
- Smaller adjustments were made to the process flow, for example checking invoices prior sending them to customers.
- Control points were also re-checked and some were added.
- The re-described process was introduced to all process actors.

In addition to these improvement actions the upcoming improvement project was also given a good starting point as now the process description is verified and completely described. Also data sources have been described and this in my opinion reinforces the description of the process. In addition to these, preliminary definitions were described. The analysis of present state also revealed things that challenge service invoicing process and could also benefit the target company it attention is addressed to those discoveries.

The process is still manual and it was already stated before that this development work could not probably change this as it has already taken into use the automatization

possibilities offered by standard working tools (Excel macros). The fact that manual process is not efficient still exists because the level of automatization is the same. The problem with source data is connected with two factors: either communication does not work (informing about changes) or the source data for invoicing is erroneous. This challenge was answered by adding a change process to service invoicing process chart and by introducing needed new steps to the people whom it concerns. Also checking existing reconciliation report between DataMart and one source system was reminded and added to process control points. In addition to this, reconciliation report with another source system was defined and is waiting to be realized.

Efforts have been made to improve communication by involving new process participants and ensuring that the source data to be used in service invoicing is correct. The process is still highly dependent on one person. Customer satisfaction is maintained by delivering correct invoices. The added control points and change process will ensure furthermore that invoices which are delivered to customers are correct.

The possibility to compare service profits was investigated but it was noted quite soon that because customers have do diverse services, it is impossible to form such a chart within the time to be used on this development work. Therefore this was left undone.

The improvement actions were measured with three ways:

- Remark of internal audit: the changes made will fulfil the requirements of internal auditor.
- Service invoicing process will improve what comes to correctness of sent invoices.
- Opinions of process actors on the process were measured twice, before changes and after implementation of re-described process.

The measurement of preliminary requirements for the upcoming IT project is difficult as they were not used before the end of this work.

After familiarising with re-described process and added control points internal auditor commentated that the amount of control points have clearly been increased and suggested closing of recommendation even though controls are still highly manual.

Service invoicing process in Finland is quite a manual process but on the other hand people involved with it are very precise. And even though invoices need to be basically ready at 2nd day of each month for internal purposes, actual invoices will not be sent to customers before around 15th day of the month. This means that there is about two weeks' time to make invoice calculations and to check them. Perhaps because of these reasons invoices sent to customers are very rarely erroneous because of some error in the process itself.

To find an indicator that would measure correctness of invoices I sought information of erroneous invoices sent to customers before improvement actions. The process had produced erroneous invoices to two customers. The other one had erroneous data on the invoice from the beginning of the year 2015 and error was fixed on the invoice 10/2015. The other one had an error on the invoice in 10/2015 and it was fixed to the next invoice (11/2015). This means that during 2015 the company sent ten erroneous invoices. The problem with this measurement is that the root cause for nine erroneous invoices was confusion in information at the background of service invoicing. Process itself worked correctly, the cause was behind the process and rooted to the sum of many occurrences. This could not have been prevented even if new control points and process would have been in place. One erroneous invoice could have been prevented if the new process and its control points would have been in use.

I also suggested that we would have measured the time that was consumed to the process by service invoicing expert to see if that would shorten after process changes. However, this was not seen possible to measure as the invoicing work is not done all the same time.

Updated process description was taken into practice in January 2016. The invoices sent after January has not been noticed to be erroneous. Opinions on service invoicing process were investigated another time in March 2016. The questions and the scale were kept same than in previous survey in May 2015. Also the answerer group was the same than previous. Survey was not sent to new process participants to avoid losing comparability of answers. Some process actors that were present in May 2015 are not working in the target company anymore and some have changed tasks and due to that they are not involved with service invoicing anymore. Therefore the amount of potential answerers was a little lower. The survey was sent to seven people and to accountings group mail. Answering time was about a week like before. Six people answered.

Service invoicing process received quite similar scores in follow-up survey. However, generally scores are a little lower compared to the scores in May 2015. There is less 4´s and more 3´s than in previous survey and also 2's occur. The detailed answers and diagrams are presented in appendix 5.

Responsibilities are comprehended quite well. The completeness of invoicing data is experienced to be unclear. Responsibility of correctness of source information is still unclear like in May 2015. Also approval of invoices as a whole is unclear. Key Account Manager checks and approves prices and change requests added to the invoice but they do not check or approve volumes. This is done by Service Delivery Manager but they are not obligated by auditors to approve invoices like Key Account Managers are. Unclear is also that if the key person is absent, who will do service invoices. Own role and responsibilities are understood well or extremely well.

Cooperation with colleagues is experienced to be good or excellent. The cooperation between units is also felt to be on good level, the most of the answerers gave score 3. It was noted that sometimes some information is forgotten to share to all relevant stakeholders.

The following things were brought up as biggest bottlenecks/challenges:

- There is a risk of erroneous data or data is not delivered on time due to the tight schedules.
- Back-up in case of holidays and sickness/lack of resources.

Development of own role brought up some answers that concerned updating internal instructions and responding within given timeframe. It was also noted that the process is quick and efficient at the moment and any change in own role would not speed up or make the process more efficient. It was also brought up that the demand of key Account Manager´s approval for invoices (by auditors) is somehow complex as they do not have agreed and approved back-up for example for holidays.

In May 2015 the answerers did not give any examples of situations where cooperation would have worked extremely well or poorly. This time they brought up that for example in March 2016 all invoicing data for accruals was delivered several hours before deadline and in most cases all data is on time what comes to internal needs. Some

separate cases exist, where the data has not been delivered on time but these have been related to the fact that approval has been missing from some other party.

Even though responsibilities are experienced to be clear mostly, the answerers brought up that they should still be sharpen. There should be clearly defined responsibilities for data correctness and approval for service invoices. I agree with this. The responsibilities should be described on detailed level and at the same time also back-up should be described. At this moment it is unclear to all in the process who will substitute service invoicing expert if needed and who will back-up Key Account Managers who give final approval for invoices.

I see it also inconsistent that auditors demand only Key Account Manager to approve invoices when they check only prices comparing used prices to price lists. They also check that service requests to be invoiced are on the invoices. However they do not comment volumes. Therefore it can be said that if volume for service A should be about 10000 and is on the invoice 1, they do not have obligation to check that. Of course service invoicing expert has checked the volumes prior sending them for approval but on the other hand she does that for prices also. The auditors do not demand this but volumes are checked by Service Delivery Manager to ensure that those are correct.

The correctness of source data or technical failures on reports was not mentioned in follow-up survey. This means that either improvement actions related to these things in the process (reconciliation reports between source system and Data Warehouse and control points) ensured answerers of correctness or this was just not seeing as a challenge at this moment.

Lack of resources and tight schedule was brought up in May 2015 and also now, in March 2016. Short delivery time was brought up mostly. The schedule has been tightened from 4th day to 2nd and this means that other units need to give their figures basically in 1st day of each month. One answerer brought up that it might be worth investigating whether it is possible to create a separate process for accruals using more estimated figures. I would support this as this would ease the pressure in first days of the month and help in ensuring that data to be used in service invoicing is even more likely correct as people would have more time to check figures and all loadings to Data Warehouse would certainly be over.

Even though the scores are generally slightly lower in March 2016 than in May 2015 I am not worried about this. This might be natural variance and also answers in open questions gave indication that something was done correctly even though some pains still exists (resources and schedule). These were the things which the researcher could not effect on. However, I do feel that responsibilities and back-up could have been agreed and described on detailed level for example to the Power Point presentation where the process flow chart exists and I will recommend this to be done. I am also happy that the tightened schedule has raised an idea of using more estimates on invoicing. This means that people actively think solutions to the challenges.

Due to the fact that monitoring period after changes was quite short, the researcher suggests that monitoring should continue in order to see, if corrective actions to the process needs to be done. This will be the last phase of Deming´s wheel. Any need for corrective actions did not come up during monitoring period what comes to correctness of sent invoices. I hope that improvement will be made in the process continuously based on future findings and observations.

6 Conclusions and recommendations

The research has investigated and clarified the current state of service invoicing process in Finland. Even though process was experienced to be on good level, some challenges had been identified and were found during development work. Changes were made based on investigation and changes were taken into practice. In addition research has provided preliminary definitions of service invoicing concerning Finland to IT project in order to get a successful project. Also further recommendations were done by the researcher and those are presented later on.

The research questions were answered:

- What kind of problems service invoicing in Finland faces?
  The service invoices are most likely correct when considering the process that produces invoices. If errors exist or occur, they root most likely from background information that cannot be checked within the process.
- How can company make sure that invoicing stays correct after changes (new services, new products, changes in existing services or prices)?

Change process was added to the process description and importance of communication was emphasized with new process actors whose responsibility is to inform and check changes.

- How is service invoicing process experienced currently?
  The process was experienced to be on a good level.
- How could company improve the comparison of services internally?
  One solution to this was coding services with internal code that would help comparing services between different customers. However, investigation revealed that services vary between customers and almost all customers would need a separate code for example for service A because content of service differs slightly from other customer´s corresponding service. Therefore it was stated to be impossible to gather such data during this master´s thesis.
- How can company create readiness for project to help the progress of organizational work related to improvement of service invoicing process (concerning Finland)?
  The project that aimed at improving service invoicing at a company level was put on hold during this master´s thesis. Therefore the work related to this question was left on more theoretical level than first anticipated. The definitions of Finland´s service invoicing were done but hey were left on higher level than first thought, due to the lack of resources and interest from the company. It would have also been difficult to do more precise definitions when final solution is not known. Readiness was created by creating an up-to-date process chart with all control points and also creating a picture of data sources to understand how complex the whole process is from information´s point of view.

The research was conducted as an action research where the researcher participated in planning and executing improvement actions. The reliability and validity of the research are verified through the following matters.

Chosen framework supports the development work. The target was to improve a process and process improvement was one of the key elements in the framework. One target was also to describe service invoicing needs for upcoming IT project so that was another element in the chosen framework. Also change was covered short. As the changes done in this development work were quite small and affected only small amount of workers, the researcher decided that change could be handled less. The importance of paying attention to change is much higher when project for improving the

process is started again. The research questions correspond with the development work also.

Actions were decided together with service invoicing expert and advisor from work so all done measures had acceptance from them. The questions for the survey were also planned together with the advisor and reliability and validity was considered already while setting the questions. All answers were handled with care by maintaining objectivity. All phases of the research were documented.

The chosen meters are clear and measure the change. However, as I mentioned already earlier, the monitoring period should have been longer in order to find out if the process really improved reliability and correctness of service invoicing. The meter concerning correctness is anyway challenging because the sent invoices are almost always correct due to the fact that process actors are precise and there is quite a lot of time to check the invoices.

The development work was limited to concern only Finland. This ensured that the change actions were possible to carry out. And of course the results were followed, measured and assessed at the end of the work.

Even though I had been working with service invoicing before and any major changes had not happened in the process itself, I was surprised to see how much there was things in the background affecting service invoicing. Change process should be considered self-evident and the information flow should be smooth in order for invoicing to stay up to date.

To make sure that service invoicing stays correct and any changes does not cause hurry, I suggest that service invoicing is involved with all conversations and emails that affect invoicing or include information of future changes to services or pricing. This way they can follow the progress of certain change. Formal meetings should also be organized with proper notes to follow changes in customer´s business, as there might be something that affects service invoicing too. Even though someone pointed out in the survey that it eases things when all sit near each other, this does not guarantee information flow. So communication should be paid careful attention.

I also suggest that all happened errors in service invoicing should be documented and listed in order to keep a log of them. Erroneous invoices are an indicator of service invoicing process and I would consider it difficult to remember later on, how many and what kind of errors invoicing has had. If errors happen, there should also be an investigation of how such an event could be prevented in the future. Based on this investigation the process could be adjusted if needed.

In my opinion there should also be a simple change log of done changes to invoicing. If service or price changes, a new service is implemented, or something is deleted, there should be list of done actions, for example changes to excel macros and source reports. This would leave a better tracking possibility if something needs to be investigated later.

Service invoicing is at the moment on one person's hands who has basically all the knowledge. Service invoicing has grown to be quite a big manifold and I consider it to be dangerous to leave it on the responsibility of one only. There are many things to remember and if only one has the knowledge of all, it would be extremely difficult to fix the situation in case of losing that person. So, I suggest that there should be immediate search for solution to this. One possibility could for example be changing the responsibility of service invoicing to accounting department. However, I think that service invoicing should be looked in the big picture and also to think of the future when making such decisions. Invoicing could, in my opinion, fit to accounting department as they already participate in service invoicing process and all other invoices are done there. If process would be moved to accounting, there is a danger that view to the business is narrowed and causes mistakes to invoices because of that. Another solution is to make sure that in case of absence, invoices can be handled by someone else also. This includes also a danger as there is so much to remember and changes happen from time to time that the substitute should have up to date information all the time. This is very difficult to put into practice if the other person does not make service invoices regularly. The service invoicing process does however have up to date instructions for making invoice calculations.

The follow-up survey revealed that also Key Account Managers have challenges in back-up. I suggest that detailed responsibilities and back-up would be written down as soon as possible.

As analysis of current status revealed, service descriptions are not enough detailed in some cases. One of my suggestions is that all service descriptions would be gone through to make them customer based. It should be described in detailed level what service A is for customer X. With differences, it was found impossible to make an internal coding for services. I would also suggest that content of services would be standardized to all customers. Service A should mean the same service and components to all customers. If content differs, service name should be different or at least it should be clearly stated which components customers use. To make comparison of services easier, it might also be reasonable to change service names to be exactly same with all customers. This might of course mean changes in agreements but could be done when agreements are renewed. It might also be worth describing these in Finnish and in English. It would also be good that this work would be carried out before service invoicing project starts again because service names possibly have to be fed to new system. If wish for new system is also to follow profits and possibly compare them between customers, services need to mean the same thing and the content of the service needs to be same in all cases.

Reports are an essential part of service invoicing as invoicing is based on information on reports. Whatever the future solution will be, it should to be tied up with renewal and automatization of reports in my opinion or at least at the same time with planning invoicing system, it should be kept in mind to have a possibility to develop that also later on. It might also be worth thinking of portal to customers where they could search for reports by themselves, to check service invoices or just to check volumes for certain service. It should also be considered that this search could be done any time of the month and search period could be any period (not just calendar month). This could provide added value to customers. The reliability of reports should be paid attention.

At the moment service invoicing has quite a lot of manual input. It means that data is modified before using it for service invoicing or data is collected manually. These should be gone through and to investigate whether these manually added data could be transferred into automatic or if the invoice basis could be different, something that is collected automatically instead of manual tally.

Another thing concerning service invoicing project is that the processes in all countries should be mapped in order to see similarities and differences. The assessment of good and bad things in each process could also benefit when defining the future process if

common process is pursued. The project should in my opinion pay careful attention on reliability of data (source systems, DataMarts/Data Warehouse, Business Objects).

I consider that the cycle time (about 15 days) of service invoicing process is quite high even though the process in question is highly manual. If all process steps would be gone through and measured I think it could be shortened. This would benefit the company as revenue would be received earlier. It has to be assessed of course when and if it would be worth doing this exercise because of the future project that might change the whole process and ways of doing invoices.

The tightened schedule for producing service invoices for internal use gave more pressure on units giving input to invoicing and also to service invoicing expert creating all invoice material. Therefore I see it worthwhile investigating the possibility to use more estimated figures in the beginning of month by creating a separate process for that as suggested in one answer in follow-up survey.

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Process cooperation survey/Service invoicing Finland

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Results of cooperation survey 1

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Definition for reconciliation report between system X and data warehouse

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Definitions for service invoicing Finland

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Results of cooperation survey 2 (follow-up)

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