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TECHNOLOGY, COMMUNICATION AND TRANSPORT

DELIVERY PROCESS DESCRIPTION AND DEVELOPMENT PROPOSALS FOR GLOBAL ROLLS CENTER

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<p>Abstract</p> <p>This thesis was done for Global Rolls Center, a department of Valmet Technologies Oy. The goal was to model and investigate the delivery process of Global Rolls Center to identify development topics. This thesis was delimited to the delivery process of Global Rolls Center due to a recognized need for improvement in the delivery process.</p> <p>Process development in this thesis is based on process management, process modelling and process development theory. The delivery process of Global Rolls Center was modelled, and processes were divided into core and support processes. These processes were investigated and analyzed for recognizing development topics. Working methods for analyzing and searching development topics were project engineer interviews, studying feedback for Global Rolls Center, participating in on-going development projects, participating in internal meetings, and using discussions from internal meetings as source for identifying development topics.</p> <p>The result of this thesis was that there were several identified development topics for Global Rolls Center. These topics were discussed with the Global Rolls Center team and development projects were started based on the results of the thesis.</p>	
<p>Keywords Process improvement, process, development project</p>	

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1 INTRODUCTION

1.1 Background and objective of the thesis

I worked as a trainee in Global Rolls Center which handles internal trade and project management in Valmet Technologies Oy. The topic of the thesis was suggested by the supervisors. Global Rolls Center recognized that there is a need for development in their delivery process. The goal of this thesis was to describe the delivery process of Global Rolls Center and to list topics that can be further investigated and developed to improve the delivery process.

The theory base of this thesis contains process types, process modelling and process development. The goal of the description of the delivery process of Global Rolls Center is to outline the framework for the following research of the potential development topics. The delivery process is divided into different phases and these phases are divided into different processes.

Project engineers of Global Rolls Center were interviewed, and the data was used as source for development proposals for the delivery process. Other sources for development proposals were internal meetings and my earlier experience working in Global Rolls Center.

1.2 Introduction of Valmet

Valmet is a company working in the pulp, paper, and energy industry. It is main supplier of process technologies in this field and Valmet is offering services and automation to this industry. Valmet is working globally, and it is described as a leading developer in pulp, paper, and energy industry. (Valmet 2021.)

Valmet has a long history in this industry. It has been working in this field for over 200 years. Valmet as it is now known has been formed over time. It has been owned by Finnish government and it has been a part of state's metal factories in the past. Valmet's product range and company name have changed many times over the years.

Since 1950's paper machines started to be a more important part of the production program. At that time, the name of the company was Kone ja Silta and it delivered paper machines to Czechoslovakia, China, Switzerland, Soviet Union, France, Finland, and many others.

In 1953 Valmet started to produce paper machines in Jyväskylä, Rautpohja. They became the workshop's main product in 1960s and this led to growth of the company. Valmet started to be an internationally significant company after delivering machines to leading paper industry countries.

The latest change was in 2013 when Valmet demerged from Metso company. In January 2014 Valmet Oyj in its current state was formed. (Valmet 2021.)

1.3 What is Global Rolls Center

Global Rolls Center is a part of Valmet Oy organization. It is created for centralized project and quotation management in roll improvement field. A team of project engineers prepares internal quotations for internal customers upon request. Global Rolls Center's products are paper, board and tissue machine spare rolls. These products are divided into groups and each group has a project engineer responsible for it. The product groups are tube and spreader rolls, dryer cylinders, sym- and belt rolls, composite rolls, cast iron and suction rolls.

Global Rolls Center is utilizing Valmet's all manufacturing and procurement routes for these products. Products are quoted from Valmet's various manufacturing locations or from subcontractors. A project engineer from Global Rolls Center chooses the best available option and prepares a quotation to local sales for the best possible result in cost and delivery time.

When a local salesperson makes a deal, they will proceed with internal purchase order to Global Rolls Center. This purchase order will start the delivery process. The delivery process starts as the purchase order is received and it ends when the roll is delivered to the customer.

2 PROCESS

2.1 Background of process development

In Martinsuo and Blomqvist's (2010) publication *Process Modeling for Improved Performance* process is described as "customer value-creating activity chains that require resource investments, effective control and management from the companies in order to fulfill their objectives".

Resources are consumed and required for the process. These resources are raw materials, workforce, capacity, tools, and knowledge. Some of these resources can be outsourced and some are internal. These resources have always the same rule: supply is limited. These limitations are money and capacity. (Martinsuo and Blomqvist 2010, 5-7.)

To develop processes, we must understand existing processes and use different tools and theories to find possible improvements. Theories and models that are utilized for process improvement are quality management, six sigma, activity based management, business process management and lean management. These theories and models are based on analysis of the processes. (Laamanen and Tinnilä 2009, 46-47) Tools that are used for project management will also be reviewed. Process is described in writing and visually in flow charts.

Key factors of improving process management are improving productivity and focus to eliminate non-value-adding activities. (Martinsuo and Blomqvist 2010, 4-5.) Goal of the process improvement is to develop business and increase process performance. (Laamanen and Tinnilä 2009, 46-47)

People are the most important asset in successful project management. Every person will have an impactful role in project phases. It is important that everyone involved in the project has a clear role and responsibilities in the project.

2.2 Process types

Processes can be divided as core and support processes. Core process is part of a process which is connected to external customer. Support processes are managed inside of the company and their purpose is to support core processes. (Martinsuo and Blomqvist 2010, 6-7.)

Processes are also categorized to main and sub-processes. There are several sub-processes in one main process, and they can be displayed on a chart with multiple different levels. Main process produces result and sub-processes are part of overall process. (Martinsuo and Blomqvist 2010, 6-7.)

When the aim is to develop and improve processes, it is important to utilize these two different categories. These processes are categorized as current and target processes. The current process represents a process which is currently in use. The target process is describing a process how it should be performed to reach the main process objective. (Martinsuo and Blomqvist 2010, 6-7.)

2.3 Process management

Process management can be explained as a chain of activities which produces value to the customer. These activities can be described as a process. To manage process its goals must be identified. Goal of the process management is to identify and model processes. Results of process modeling can be used to improve processes. With these results processes can be improved to create more value to the customer with less resources within the company. (Laamanen and Tinnilä 2009, 52)

In process management the company will identify the core processes of their business. Then the company will study how core processes are linked to its organizational structure. This is done by observing company objectives and resources that are used in the core processes.

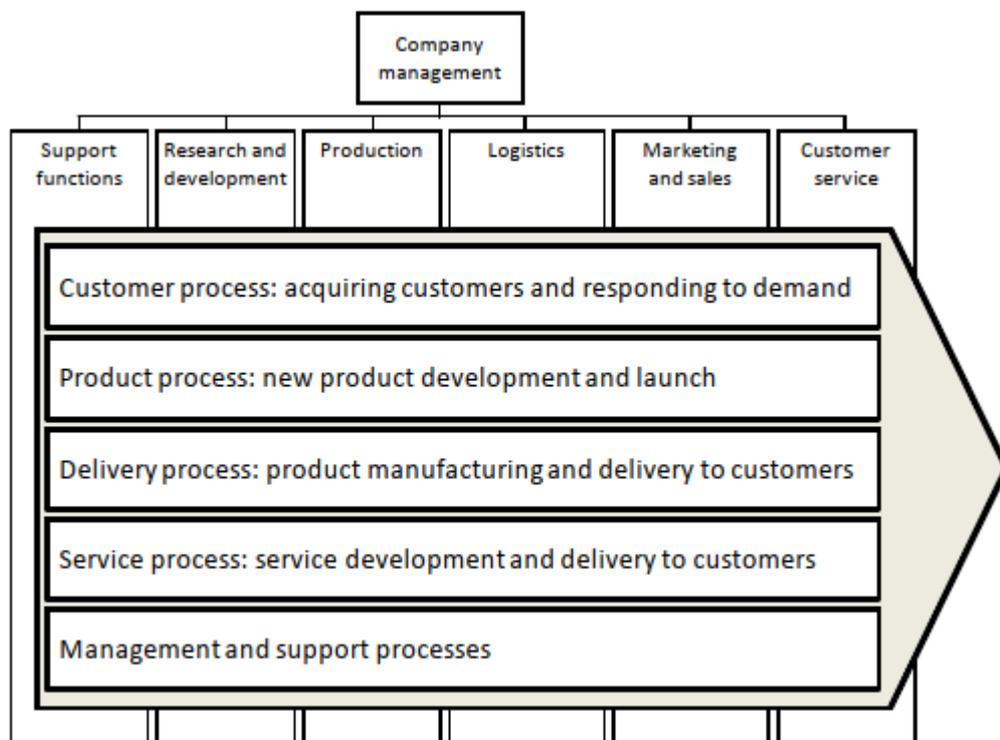


FIGURE 1. Process architecture and company's organizational structure (Martinsuo and Blomqvist 2010, 7.)

Processes are structured by their objective in the organization. This determines what resources these processes have access of. From figure 1 it can be seen that inside of matrix organization core processes can be divided into different main categories. These categories utilize and use different resources within the organization. (Martinsuo and Blomqvist 2010, 6.)

The goal of the process is to satisfy customer's needs and create value for the company. This is reached by process management. Process management is based on company objectives and its purpose is to track and understand processes. Gathering feedback is key element for process development. (Martinsuo and Blomqvist 2010, 22.)

2.4 Process modelling

Process modelling is a method to understand what kind of value customer is experiencing from the current process. Goal of the process modelling is to find what activities are critical for the value creation. Successful process model can lead to a better customer satisfaction if customers feels that they have received better service, and this can increase customer's will to use company's services in the future. (Laamanen and Tinnilä 2009, 52)

Process development is started from process modelling. Starting point for process modelling is to identify all components of the process and with this information to create overall view of the process. After the process is analyzed, it is decided what the process model should include. To make this decision it has to be analyzed which details are important for process model and what kind of relationship this process has with other processes. (Luukkonen, Mykkänen, Itälä, Savolainen, Tamminen, Maarit 2.1 (2012).

The process model goal is to model work activity where a group of people is working in an organized way to reach the defined objective. The process is completed by using different working methods, communication, and coordination. Working tools are divided to material tools and non-material tools. An example of material tools are different programs, working lists and emails. Some of non-material tools are knowledge of persons, earlier experience of workers and meetings. (Luukkonen, Mykkänen, Itälä, Savolainen, Tamminen, Maarit 2.1 (2012).

2.5 Process development

After process modelling process development can be started. The first step is to recognize the objective of the process and to define scope for the development project. A topic of the development can be a process inside of process model or to supporting processes outside of process model. The development topics can be divided into different main categories. The first category is the model resources itself like human resourcing, criteria for people working for the process and their motivation. The second development topic for the development is the currently available working tools. Next one is collaboration and communication methods which can be working methods, meeting arrangements, emails, file sharing and scheduling. The last one is the process model itself and its goals. These can be different phases of the process and what are goals in those phases and what tools are in used in different phases of the process. (Luukkonen, Mykkänen, Itälä, Savolainen, Tamminen, Maarit 2.2 (2012).

When the scope of process development has been defined, next step is to acquire data from the current process. It is usual to analyze what is the current status of the process and search whether it reaches the performance objectives which are set for this process. There are many different strategies to collect data from the current process. Some of these methods are interviews, group works, studying data history from past, observation of the process and process simulation. (Martinsuo and Blomqvist 2010, 9.)

In process management feedback is used for data gathering for process development. When process is performed it is important to consider output-based performance. This means whether the process achieved its goals. Then functionality and quality-based feedback during the process are measured. By this it is measured if the process functioned as intended. (Martinsuo and Blomqvist 2010, 7-8). Process and its activities should be measured and controlled from beginning to the finish.

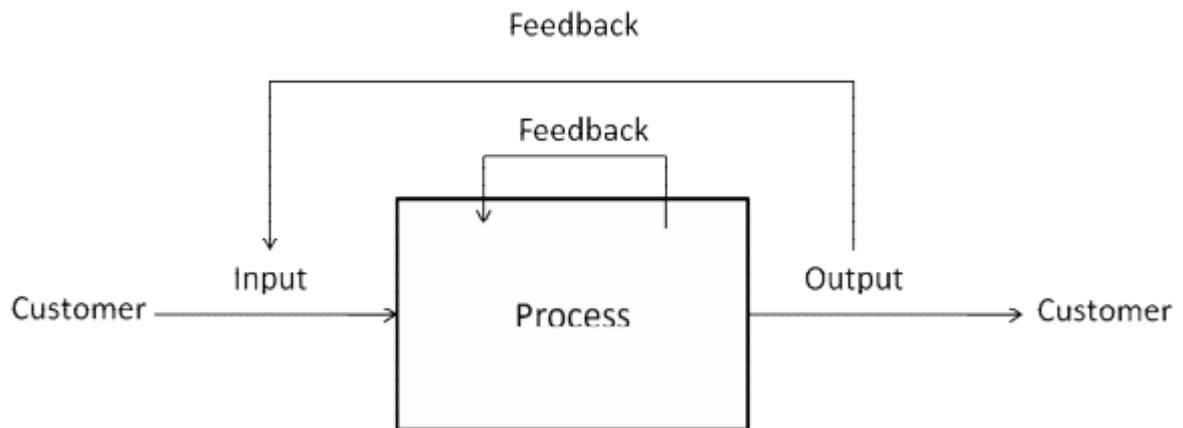


FIGURE 2. Feedback in process management (Martinsuo and Blomqvist 2010, 8)

When the process is analyzed, and development areas are identified, next step is to model the target process.

2.6 Project management

Project's goal is to manage processes to reach defined objective. To handle set of processes it is important that the project has a clear objective and a schedule. Project is a method to allocate resources to the specific objective in the company. (Laamanen and Tinnilä 2009, 65)

Project plans and schedules with different phases are utilized in project management. Project management goal is to reach project's objective efficiently in the planned schedule and budget. (Laamanen and Tinnilä 2009, 66)

Project types can be divided into many different types. One type of the project is delivery project. Objective of the delivery project is to deliver equipment, facility, or a product to the customer. This type of the project is based on investment calculations and defined schedule. Goal of delivery project is to create value to the company and use allocated resources efficiently. (Laamanen and Tinnilä 2009, 67)

3 PROCESSES OF GLOBAL ROLLS CENTER

3.1 Receiving purchase order and initial data for project start-up

When Global Rolls Center receives a purchase order, it activates project start-up actions. Internal customer sends request for quotation to the Global Rolls Center. The quotation is sent by Global Rolls Center, and it includes technical specifications of the product, delivery time and transfer price. In case of an end customer purchase the internal customer sends the purchase order to Global Rolls Center.

The first step is to check the details of the purchase order to ensure that it is corresponding to the quotation. The most important factors to be checked are technical details, price, and delivery time. Usually, these detail confirmations are completed via e-mails between the local sales representative and Global Rolls Center project engineer. When the project is complex or there are many unclear factors, the project engineer can arrange a start-up meeting with the local sales representative. The head engineer can also join this meeting to get all the necessary technical details for starting the preliminary design for the project. This meeting is arranged via online voice services.

3.2 Project start-up actions

When all this information has been gathered and confirmed, the project engineer will open the project in Lotus Notes database. The projects are divided into two different groups based on their manufacturing location and type. The first group is projects that are manufactured in Jyväskylä, Rautpohja and the second group is for projects that are manufactured in other Valmet locations or they are subcontracted.

These databases include information about the project. There are different sections for different type of documents in the database. There are sections for the documents in each project phase: quotation, purchase order, order acknowledgement, engineering data like reference drawing, open issues, and economical follow-up. All documents will be stored in this place for easy access and sharing.

After all the information has been collected and confirmed from the local sales representative and the project has been opened to Lotus Notes database, a project will be opened to ERP system by the project engineer. This is done by creating order acknowledgement. The process is divided to two different groups based on the manufacturing location and on the fact whether it is a project of Valmet's own manufacturing or whether project manufacturing is subcontracted. The reason for this is that here are two different ERP systems in use in Valmet since there is an on-going transition to a new ERP system.

The order acknowledgement contains all the necessary information for a project start-up. It includes internal transfer price, delivery time, main dimensions, and technical details. There is also information about the end customer, internal customer, delivery and payment terms, contact person in sales area and the responsible project engineer in Global Rolls Center.

After the order acknowledgement has been made, it is stored to Lotus Notes database. Order acknowledgement is shared as a viewing link from Notes database. This link will be shared in email and everyone in mailing list can open this link to view the order acknowledgement.

Distribution of the order acknowledgement depends on the manufacturing location and project type. When the project is manufactured in Jyväskylä, the order acknowledgement will be shared directly to all departments that are part of the manufacturing process. These departments are engineering, procurement, manufacturing planning and logistics. A local sales representative is also included in the mailing list in all cases.

When the project is manufactured in a different Valmet's manufacturing location, or it is subcontracted, the order acknowledgement is shared with Global Rolls Center buyer who will generate a purchase order to this specific manufacturing location. This purchase order will start project start-up actions in that location.

The order acknowledgement is a starting signal for the project start-up within the Valmet organization. When the order acknowledgement is distributed, it triggers certain processes in different departments. The project manufacturing schedule is created, engineering starts to reserve time and workforce to the project and logistics will mark planned delivery time to their systems. This is the phase when the project is officially started.

3.3 Project follow-up

The project follow-up is an important part of project management. Global Rolls Center is managing projects in variety of locations, and it is possible that some of the projects will face difficulties due to various reasons. Therefore, projects need to be monitored to ensure successful delivery.

It is important to share information about possible delays or difficulties in the project to all participants. Quick communication with the local sales representative is essential if project's delivery time is changed, since it is important that the end customer gets the information as soon as possible.

There are various reports and ways to ensure information flow from different manufacturing locations and suppliers to Global Rolls Center.

In weekly meetings Global Rolls Center collects reports from different manufacturing locations and suppliers about the current situation of their manufacturing progress. These reports are updated to Notes database frequently and project engineers can follow their own projects from there.

In order to follow the manufacturing status in Jyväskylä, Global Rolls Center team has weekly meetings with production planners. In these meetings local delivery planners will show the current situation of the production. Project engineers can see on-going projects from this presentation. It will show the current state of the projects: whether they are on schedule or not, or is there a risk of delay. Results of these meetings are uploaded to Notes database.

3.4 Project closing

After manufacturing is finished and the product is ready for shipment, Valmet's logistics department starts to prepare delivery to the end customer directly or to Valmet's location near the end customer.

Global Rolls Center's role in logistics is to have correct shipping address in order acknowledgement. Global Rolls Center is not involved in the logistic process, since all the projects are sold with FCA incoterms. FCA means free carrier delivery which means that the internal customer will be responsible for the logistics of the product. Valmet's logistics department prepares the necessary actions so that the product can be picked and shipped from the manufacturing unit.

The project will be billed from the internal customer in the ERP system after the project is finished. In case of manufacturing defects Global Rolls Center handles all warranty issues.

3.5 Flow chart of the project start-up of Global Rolls Center

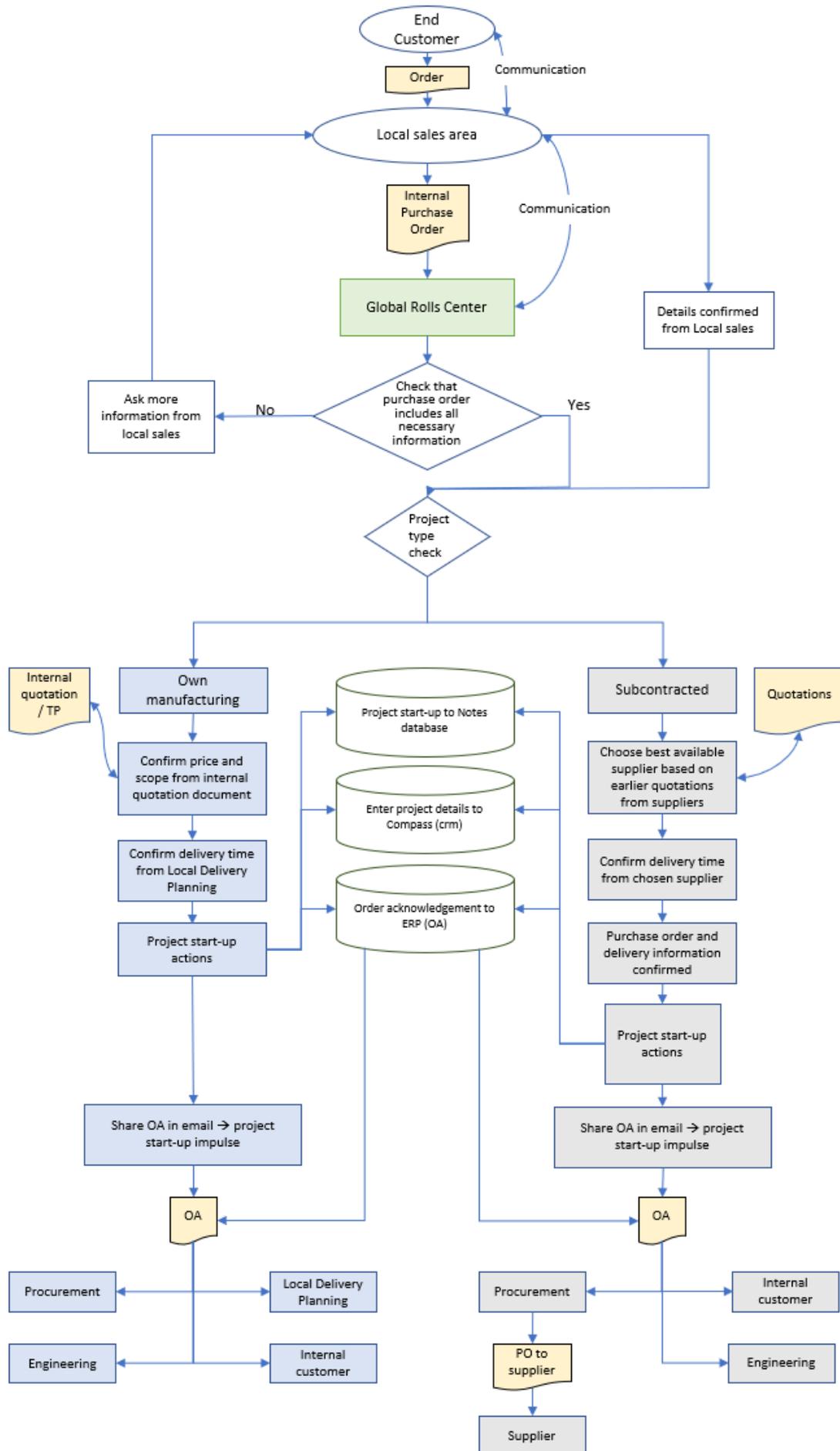


FIGURE 3. Flow chart of the project start-up of Global Rolls Center (A. Keskinen 2021)

4 DEVELOPMENT TOPICS

4.1 Methods to identify the development topics

The development topics are related to the delivery process of Global Rolls Center. The topics were searched from internal meetings, on-going development projects, earlier experience from working in Global Rolls Center, analyzing feedback that Global Rolls Center has received and from personal interviews of the Global Rolls Center project engineers.

In the interviews of the project engineers the delivery process of Global Rolls Center was discussed and the project engineers gave feedback on each part of the process. Feedback was collected from personal interviews and from a feedback form which was filled by project engineers during the interview. The feedback form included questions from each section of the delivery process. The results of these interviews were analyzed, and comments were taken into account when development topics were searched. The project engineers gave numerical score for each part of the process in the feedback form, and this data was also utilized when development topics were searched.

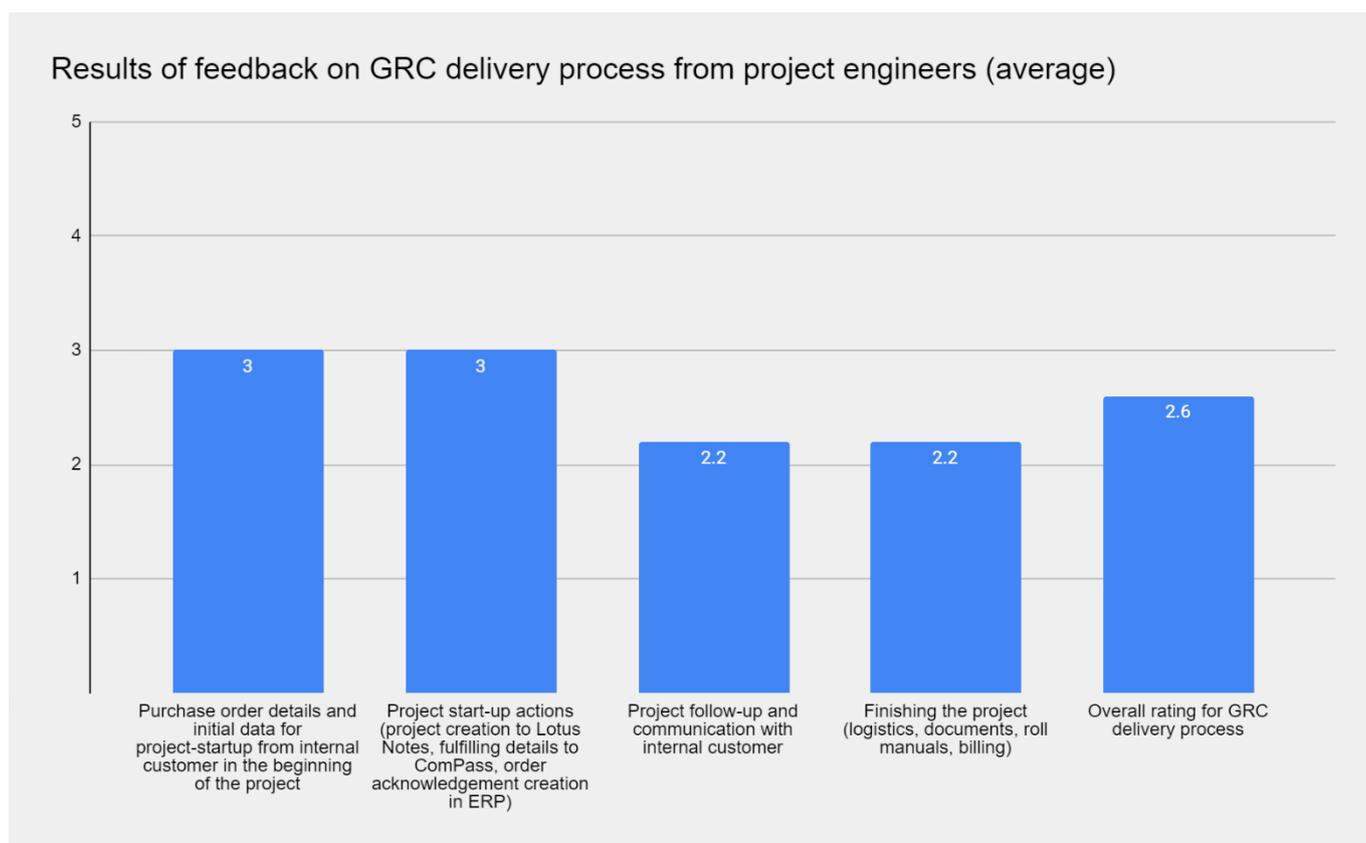


FIGURE 4. Results of the feedback from project engineer interviews (A. Keskinen 2021)

4.2 Areas of development topics

Topics that were searched for development are divided into four different groups in Global Rolls Center delivery process. These groups are receiving the purchase order and initial data for project start-up, project start-up actions, project follow-up and communication during the project and project finishing. All the development topics are divided into these groups. A problem that is identified will be described and development action will be given to this specific issue. The focus of this thesis was on identifying topics that can be used in development projects in the future.

5 DEVELOPMENT PROPOSALS FOR THE DELIVERY PROCESS OF GLOBAL ROLLS CENTER

5.1 Purchase order details and initial data for project start-up

A comment from the project engineers' interviews was that there is a lot of variance in purchase order details that are sent to Global Rolls Center. It is not unusual that a purchase order is lacking relevant information that is needed for project start-up actions. This can lead to delays in project start-up since the project engineer has to contact the local salesman to get these details and receiving an answer can take some time. Sometimes the local salesman will contact the end customer to get this missing information. It also takes project engineers work time to send these emails to get the missing details.

This issue occurs frequently and one action to solve this problem is to standardize purchase order form that is sent to Global Rolls Center. This can be reached by providing instructions for purchase orders in the local sales areas. These instructions should include what details purchase orders should contain. These instructions would vary based on roll type, since different type of rolls have different details which need to be included in a purchase order. This could be done by providing a purchase order template to local sales areas with the quotation. The purchase order template would include all necessary details that are needed to start a project for a specific roll type. This would standardize the purchase orders that are received by Global Rolls Center and it would decrease situations where the purchase order is lacking some relevant information. If purchase order template is not filled correctly when it is received by the project engineer, it could be sent directly back to the local sales area and asked to fill all the fields. After that the project would be started by Global Rolls Center. This topic could be a development project of Global Rolls Center.

There are different ways how internal customers deliver purchase orders to Global Rolls Center. It is instructed by Global Rolls Center that the purchase order should be sent to Salesforce and to the project engineer's email with a reference code which will forward purchase order to the correct case in Salesforce. There are cases where this instruction is not followed: The purchase order is sent only to the project engineer's email, purchase order is sent as a new quotation request to Salesforce or it is sent to an existing Salesforce case but the email is not shared with the project engineer. This can cause that the purchase order is not recognized without delay. This issue can cause delays to project start-up, especially during the holiday times.

One action to avoid these situations could be to add specific instructions to the purchase order template. These instructions would include detailed information about how to send purchase orders to Global Rolls Center and declare that it is possible that the purchase order is not available to Global Rolls Center if it is sent incorrectly. In this way situations where the project start-up is delayed due to an incorrectly sent purchase order could be avoided. Since there are many different sales locations and employees are changing it is possible that instructions are not always forwarded to new employees immediately. When Global Rolls Center sends a quotation, it would include a purchase order template which would cover all the needed details.

5.2 Project start-up

One problem that was identified from the interviews was related with communication about open issues in new projects the preliminary design of which has been started. In some projects there are details that need to be confirmed during the design process. An issue with this is that design engineers approach and solve these situations in different ways. In some projects design engineers will contact the internal customer directly to solve open issues. Some of the designers will only send a notice to the project engineer that a detail needs to be solved. In this case, the project engineer will translate the question into English, and then he will send this question to the internal customer. This way is problematic, since it is frequent that there is more than one question from the design engineer related with the ongoing project. This will lead to several e-mails to the internal customer, and it is possible that the internal customer must contact the end customer several times.

This type of solving issues is time consuming for the project engineer, design engineer and internal customer. During the interviews project engineers commented that there is no consistent way of handling open issues during the project. The design engineer may decide how the process is handled, and it can cause delays and problems for solving the open issues. This issue could be solved by having a meeting with design engineers and agreeing on a consistent way to operate when solving open issues of a new project. Based on interview results, situations where open issues are sent to the project engineer's e-mail one by one and from there to the internal customer should be avoided. An efficient way to do this is to have a complete list of open issues before project engineer or design engineer contacts the internal customer and thus the end customer.

There have been projects in which the schedule has been delayed in the beginning of the project due to slow gathering of initial data for an approval drawing and customer's acceptance of the drawing. The approval drawing includes main dimensions and technical details of the product that will be manufactured and before manufacturing this drawing needs to be accepted by the end customer.

This topic has been under development during 2021 in Global Rolls Center's on-time delivery accuracy and project progress reporting improvement project. One action from this project was to add points to the manufacturing schedule when an approval drawing is ready and by when it must be approved by the customer. This is done to avoid situations where the project is delayed due to a missing customer drawing and/or delayed acceptance for the drawing from the customer.

Approval drawing is done by the engineering department, and it is sent to the project engineer. The project engineer saves this drawing to Notes database and then he contacts the internal customer to start an approval process for the drawing. To improve this process the project engineer will share a manufacturing schedule link and approval drawing link to Notes database when order acknowledgement is shared with the internal customer.

Manufacturing schedule will be available in Notes database in 1-2 weeks after the order acknowledgement is shared. In this way the internal customer can see when he can expect to have an approval drawing and when it must be approved by the end customer to keep the project on the

schedule. Global Rolls Center project engineer can see when the approval drawing will be ready from the manufacturing schedule. With this information he can communicate to the internal customer to get all needed initial information for the drawing from the customer before this date to ensure that the approval drawing will be ready on the scheduled date. By following this procedure Global Rolls Center can avoid delays in the beginning of the project in the approval drawing process and the internal customer knows the exact date to get customer approval for the drawing to ensure that the project will follow its original schedule.

During the project engineer interviews one topic related with order acknowledgement in the ERP system was brought up frequently. There was a concern of the end customer order acknowledgements when they were made by Global Rolls Center. These order acknowledgements require a lot of work time and effort from project engineers. There are many details that need to be solved before the project engineer can finish end customer's order acknowledgement. The problem is that this required information is shattered to the different departments in Valmet, and usually it takes many emails and Microsoft Teams meetings before all details are collected. Information about payment terms, end customer details and delivery are found from the local sales representative. Some of the technical details are found from customer service, which has prepared end customer quotation. Then Global Rolls Center starts to collect all this information and starts to prepare order acknowledgement to ERP system.

To make this process more streamlined the project engineers suggested that there should be clear instructions and rules for making an end customer's order acknowledgement. The distribution of the responsibilities for giving the information to the project engineer about the project must be clearly defined. Information about the project should be controlled by one department. This would save time and in this way also situations where some of the data is missing or is incorrect when making the order acknowledgement could be avoided.

Projects that are using multiple suppliers are challenging and time-consuming to a start-up in the ERP system. Also, it is not unusual that sometimes one of the suppliers is changed during the project. This causes another problem in the ERP system. Change management in ERP is a difficult task and there are no instructions on how this is done. To solve this problem, it is suggested that ERP support team provides instructions to change management when there are unplanned changes in the project. There should be also clear instructions for non-standard projects, like projects with multiple suppliers. This would save work time and make process more efficient by avoiding mistakes when making order acknowledgements without contacting ERP support.

During the project start-up a project engineer creates a product information card to customer relationship management system called Compass. The product information card includes details about a roll or rolls that will be delivered. The main details such as main dimensions, roll position, covering and other details are filled in. One identified issue in this system is that there are fields that must be filled in before the card can be saved. Some of these fields requires information that is not available in project start-up for example roll weight and max stresses that the roll can handle. This information is available after roll engineering. Usually, a project engineer must put number one in these

fields to be able to save the roll card and to create unique GRID number for the roll. Roll engineering fills the rest of the roll card when engineering is finished. The compass system should be changed so that it would allow saving the roll card with main details about the roll. This would avoid situations where the roll card includes information that is not accurate.

In the project start-up phase the project engineer fills project details in Salesforce system and transfers it to Notes database. Some of the details that are transferred from Salesforce to Notes are customer information, roll type and machine number. All relevant information about the project is saved to Notes.

One issue the project engineers brought up in the interviews was that they must fill these details to two different systems and transfer these details to Notes if a quotation turns into an active project. Since this information already exists in Salesforce, it is questioned why the project engineers must use their time to transfer this data. There is also a problem because Notes database is usually updated only in the beginning of the project. Some of the information may not be corrected if there are changes later in the project, for example an updated manufacturing schedule, a revised purchase order and a new preliminary drawing for the roll.

Due to high project volumes it is possible that some information is not updated in Notes. There is a clear need for a better project management tool that could utilize data from different systems since currently the data is transferred manually. This would be a big development project and it would need many system integrations. This kind of tool would be beneficial for many different departments within the Valmet, and it would make project management more agile and efficient. For the development project it should be checked whether there are similar tools in use inside of Valmet and if they could be utilized by Global Rolls Center.

5.3 Project follow-up and communication

From interview results and general observations on Global Rolls Center delivery process it became clear that project follow-up and communication have many development areas. Many of the issues that were found were related with the fact that Global Rolls Center does not have proper project management software. In this section the identified problems in this area are described and some corrective actions are proposed.

The main concern of the project engineers in project follow-up is that currently there is no system where you can see all on-going projects of Global Rolls Center. There are many duties and dates which must be followed during the project to have a successful delivery in the planned schedule. The project engineers have their own lists of their own projects, and usually most of the information and dates are only found from project engineers' emails. This is a challenging situation especially during holiday times since it is hard to follow colleagues' projects when they are absent. Project engineers have also many on-going projects at the same time, so it is hard to keep track of every project. This causes another problem which is that internal customers are asking for frequent updates of projects status and this leads to project engineers having to use a lot of their time to solve the status of the project.

The project engineers must also manually take care of that that a preliminary drawing is sent to an internal customer in time and that the internal customer has signed acceptance in the preliminary drawing. The due dates can be found from the project manufacturing schedule, but it is very time consuming to follow every project individually. In the project follow-up there are also many different dates by when certain actions, such as confirmation of a change in a product, are needed to be confirmed by the end customer before manufacturing or engineering can continue.

One solution for this issue is to use a project management tool that would have all Global Rolls Center projects listed by the roll type and project engineer. The internal customer should also have access to this tool. Situations where project engineers' emails are filled with status update requests would be avoided, since internal customers could check the project status and certain deadlines by using this tool. This would help to avoid delays by making it easier to follow deadlines of the preliminary drawing process or open issues that need to be solved by a certain date.

One solution to improve the current situation is to utilize some of the existing tools that Global Rolls Center is currently using. Salesforce could be used to track projects and their status. All requested quotations are listed in Salesforce by roll type and project engineer. Salesforce saves all communication during the quotation process. There are fields in Salesforce that are filled in with important information to include customer details, machine information, roll type and position. These details are transferred to Notes during the project start-up.

As a development project Global Rolls Center could utilize Salesforce to transfer quotations that have proceeded as active projects into separate que in Salesforce as on-going projects. All the details from the filled forms would be transferred to a new case that would represent the on-going project. The list of the projects could be filtered by the project engineer so that it would be easy to see all the current projects in Salesforce. A project case in Salesforce should include fields for certain important dates such as deadlines for solving open issues in project start-up, preliminary drawing delivery to the internal customer and date for confirmation of preliminary drawing by the end customer. The current situation of each project could be presented with a traffic light model. The green light would show that everything in a project is going as planned, and there are no tasks currently waiting for action. The yellow light would tell that some tasks are waiting for action or answers, but the project is still on schedule. The red light would tell that there are tasks that should have already been completed or started by the schedule.

Global Rolls Center utilizes various suppliers and manufacturing units. This creates a challenge to follow-up the schedules of the projects and keep on-date of the status. Global Rolls Center has weekly meetings with suppliers and different manufacturing units where they report the status of the projects and pass information on possible difficulties or open issues with on-going projects. After these meetings schedules are saved to Notes database from where a project engineer can check the status of their project.

The format of these status reports differs based on the supplier and the manufacturing unit. To utilize this schedule information more efficiently one development project could be to standardize the

manufacturing reports with all suppliers and manufacturing units. A standard format would also help to use this information in the project management tool.

There have been cases where there is an identified risk of a project delay due quality or scheduling problem. In some projects a risk in the project schedule and a possibility of delay is identified and some departments are informed, but Global Rolls Center project engineer has not got the notification. It has led to situations where a project engineer will get information about the delay in the end of the project. This situation is not preferable for either the internal customer or the end customer. In case of delays, it is important to forward the information to all parties involved. To avoid the information gaps, it is important to make it very clear in the beginning of the project that all open issues and possible problems should be informed to the project engineer as soon as possible. This should be messaged to all parties when order acknowledgement is shared, and project has been started. It is important that information flow within the organization is handled well to ensure a successful project and good communication with the sales location.

In case of Valmet's own manufacturing location, the project engineer has only access to project engineering schedule that is done in the beginning of the project. This schedule is saved to Notes database under the project. This creates a problematic situation where the project engineer has no tools to check a detailed schedule of the project and is not able to see if project schedule has been updated after it has been saved to Notes. The project engineers requested that they should have viewing access to see the current status of the manufacturing. This would help to avoid situations where the project engineer must only rely on information from weekly meetings with the local delivery planning. The project engineer could also check the schedule by himself and would not need to contact the local delivery planning by email if he wants to confirm that the project is following its original schedule.

5.4 Project closing

In general project finishing and logistics are working well in the delivery process of Global Rolls Center. After the product is finished, the logistics department will handle its delivery and other necessary actions. This thesis was limited to the Global Rolls Center delivery process, so the logistic department was not involved in the development topics. In the closing phase of the project there a couple of issues were found which could be improved to make this part of the process more fluent. These issues will be described in the following section.

The roll manual and inspection reports are included in the delivery. Since manufacturing is done globally in various locations there has been challenges with these reports.

The first problem is that there are various practices of reporting in Jyväskylä's manufacturing unit since the roll manufacturing in Jyväskylä is divided based on the roll type. Various practices in roll inspections reports have led to situations where the report has not been delivered when a roll has been sent to the customer or it has required separate emails to find these documents. It depends

on the roll type and people behind the project from where roll inspection documents can be found and when. The roll manuals do not have the same problem since their making is handled by the manual department.

Global Rolls Center has instructed that the project engineers will save the inspection reports to Notes under the project folder. Sometimes the project engineers are not informed when the inspection documents are ready. In addition, there are different places where these documents are stored. To make the roll inspection documents more easily available and to save working time in this process, it is proposed that these documents were saved into one location where the internal customer and the project engineer could get these documents easily. Valmet already has a system that has this feature, but it has not been taken into the full use yet. Global Rolls Center should have a meeting with people that oversee the roll inspection reports and instruct them to save these documents to Compass. Every roll in a project has a unique grid card in Compass under the end customer and their machine. By saving these documents to Compass situations where roll inspections reports are shattered in different systems are avoided. The project engineer would inform the internal customer that all documents are found in Compass which is also used by the internal customers. In the order acknowledgment there is a link to the roll card.

Second issue with the inspection documents is when Global Rolls Center is using a supplier for the roll manufacturing. Different suppliers have their own way of handling inspection reports, and it is not unusual that the documents are missing when the roll is finished. These documents need to be asked independently by procurement department and it can take some time. Then these documents need to be inspected by the project engineer to ensure that they fulfill Valmet's requirements for inspection report. This topic has been discussed during the spring as development area since this way to handle this process is not efficient. It has also led to situations where inspection documents are delivered late.

One development topic for this area would be to require Valmet's suppliers to use predefined inspection document form and ensure that the inspection documents are finished and delivered at the time the roll is finished. When suppliers followed this protocol, project engineers and procurement would receive these documents on time without problems. This can be combined with a new way to store these inspection documents. The project engineers would save these documents to Compass and with these steps the inspection reports would be available from same place and in the same format for any manufacturing unit or supplier.

One identified issue with project closing is manual billing in ERP which needs to be done by the project engineer when the project is finished. This issue is associated with the lack of the project management software where the project engineer could easily see what projects have been delivered lately and whether they should be billed. Currently this process is based on the project engineer's own notes and emails. This also creates difficulties during holiday times, since colleagues have no tools to check what projects have been delivered lately and if they have been billed. If Global Rolls Center utilized a project management tool it would help to keep track of the finished projects and avoid situations where the billing of the projects is done late.

5.5 General observations of Global Rolls Center delivery process

Global Rolls Center delivery process is a large-scale process which involves many different departments within the Valmet organization. The workload is high due to the amount of on-going projects. This thesis described and analyzed issues that were found from the delivery process but most of the projects are delivered successfully and on time. This is due to very professional and experienced project engineers and management. It is a demanding task to handle a set of processes globally and keep the delivery process standardized and efficient.

Results of project engineers' interviews and other observations of the Global Rolls Center delivery process reveal that most identified issues and development topics were related to project follow-up and communication during the project. There are several topics for further development in future development projects.

Many of the proposed development topics are related to co-operation with other departments or suppliers in Global Rolls Center's supply chain. There are also proposed development topics about making processes more standardized.

One main topic that was identified in this thesis was a need for a project management system that would organize projects and the tasks related to these projects. This is a big development project for the future but based on the observations and the interviews there is a clear need for it.

6 DISCUSSION

This thesis described the delivery process of Global Rolls Center and analyzed its parts to recognize the areas in need of development to improve the delivery process in the future. The delivery process was divided into four different core processes that were analyzed with different methods. Process development and modelling theory was utilized in the process of this thesis.

It was found that there are several development areas in every phase of the delivery process. The development topics were described and development proposals were introduced.

Sources of development proposals were internal communication, interviews, and meetings. There is a possibility that some development topics were not recognized since people working in this process may not see all the issues that could be seen if interviews had included external people.

The delivery process of Global Rolls Center is a complicated process with many different departments involved. It was challenging to delimit the topic of the thesis and to find the most important and the most significant issues to be investigated and developed further. Other challenges were deciding how much analyzing and research was necessary for every identified development topic and how to decide which findings were important and feasible enough to take into development.

Global Rolls Center was satisfied with the results of this thesis since it brought up various topics to be developed further. Global Rolls Center launched several development projects for their delivery process based on this thesis.

Overall this thesis reached its goal and it indicated several topics that can be improved in Global Rolls Center. I gained experience on process development and knowledge about the delivery process of Global Rolls Center.

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APPENDIX 1 FEEDBACK FORM FOR PROJECT ENGINEERS

Feedback for GRC delivery process

Feedback for Global Rolls Center delivery process phases.

*Required

Purchase order details and initial data for project-startup from internal customer in the beginning of the project *

	1	2	3	4	5	
Poor	<input type="radio"/>	Excellent				

Project start-up actions (project creation to Lotus Notes, fulfilling details to ComPass, order acknowledgement creation in ERP) *

1	2	3	4	5
<input type="radio"/>				

Project follow-up and communication with internal customer *

1	2	3	4	5
<input type="radio"/>				

Finishing the project (logistics, documents, roll manuals, billing) *

1	2	3	4	5
<input type="radio"/>				

Overall rating for GRC delivery process *

1	2	3	4	5
<input type="radio"/>				