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**Payment on time in a global leading company**

AUTHOR

ADVISOR: Jan Frick

Student number:

207088

.....

207010

.....

Name:

Rebekka Kverneland

.....

Kristian Børsheim

.....

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Signature administration:.....

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### 3. List of Abbreviations

The following list shows the abbreviations in this paper. Some of them are commonly used in the field written about, and some are created by Schlumberger and used internally in Schlumberger. Other again is used to simplify the writing and reading of this paper.

<b>Accn</b>	Accenture
<b>AP</b>	Account Payable
<b>ASL</b>	Approved Suppliers List. This is an ERP system, used for supplier management, information flow etc.
<b>DSO</b>	Days Sales Outstanding
<b>DFCFI</b>	Direct financial cost from fees and interests
<b>DFM</b>	Document Flow Manager. Used to enable good communication between Schlumberger and Accenture.
<b>EAF</b>	Europe and Africa. Schlumberger have divided all countries in to different Areas, and Europe and Africa is one of them.
<b>ERP</b>	Enterprise Resource Planning. When ERP is used in this paper, it refers to Oracle and Lawson.
<b>KPO</b>	Key performance objectives
<b>M-I</b>	M-I Swaco, a Schlumberger company
<b>NOR/ NOR Geomarket</b>	Norway and Denmark Geomarket. Inside every areas there are many Geomarkets, and one of the Geomarkets in the area Europa and Africa is NOR.
<b>OFS</b>	Oilfield Services. This is the main business in Schlumberger, and involvees all companies except the companies belonging the two other business groups; M-I Swaco and Smith.
<b>P&amp;S</b>	Procurement and Sourcing. P&S is an department under SSO (Shared Services Organization).
<b>PO</b>	Purchase Order. A purchase order is an official offer issued by a buyer to a seller, used to simplify the procurement and invoice processes. It is also a big advantage when paying the invoices.
<b>POT</b>	Payment on time.
<b>PT</b>	Payment Terms. In this paper it will refer to credit time and date calculation. Credit time is how many days the debtor is given to pay the

	invoice. Date calculation is when the credit time is calculated from. The most common date calculation is invoice date and invoice received date, the latter often noted as invoice receipt date. When payment terms, credit time or date calculations are stated as improved in this paper, this means that it is an improvement for Schlumberger.
<b>Sib</b>	Schlumberger. Unless otherwise specified, this applies to Schlumberger and all Schlumberger's companies.
<b>SSO</b>	Shared Services Organization. This is everything in Schlumberger which does not belong to a segment. Departments under SSO is HR, Finance, IT, Procurement & Sourcing etc.
<b>SWPS</b>	Schlumberger Web Procurement System
<b>T&amp;Cs</b>	Terms and Conditions
<b>URN</b>	Unique Reference Number
<b>WACC</b>	Weighted Average Cost of Capital
<b>Q</b>	Quarter

#### 4. Currency used

All monetary values are in general noted with a "\$", and this is representing USD, if no other currency is mentioned it should be evaluated as USD. In general all values are written out in its full amount. In the cases of shortening the values this will be described specifically.

## 5. Preface

This master thesis was written by the undersigned in the spring of 2015. It was done during the final semester of a Master program in Business Administration at Business School at the University of Stavanger. We both specialized in Economic Analysis.

The chosen issue for this thesis is payment on time in Schlumberger. This was chosen as a subject for research as it is of high importance for Schlumberger and since there seemed to be very little research already done on this theme.

We want to give a special thanks to our supervisor Jan Frick, for valuable contributions which we found very useful. Jan Frick was available for questions throughout the whole semester, and meetings on a regular basis made the writing process focused and productive.

We also want to give thanks to all the people in Schlumberger who helped us in the process. A list of these people are provided in “20.References”. We want to give a special thanks to Madhavi Vagle, Youcef Belkhir, Jonathan Muir, Bjarne Klingsheim, Anne B. Skjæveland, Hege Regina Berre and Petya Youshanloo.

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Kristian Børsheim

Rebekka Kverneland

## 6. Introduction

### 6.1. Motivation

With experience from invoice monitoring, and other tasks related to finance in various companies, the researchers of this study have seen how pervasive the problem of paying invoices on time it is for different companies. It was therefore of interest to further investigate in this issue.

Since the researchers over a longer time have had a special interest in the oil and gas industry, and because the circumstances made it possible, the researchers chose to do this study in the well know oil service company, Schlumberger. The oil and gas industry is undoubtedly the one sector that has had the greatest impact on the Norwegian economy in recent decades, and the industry is particularly important in Rogaland, where the researchers also are residing. Schlumberger has been a major player in this industry, and investigating in a company like this gives a good chance to reach the core of the issue that is to be investigated.

A little change in such a large company can have a great influence on the company's growth.

By working in and with this company, the researchers wanted to take actions and give recommendations that could contribute to value creation for Schlumberger, both in the short run and the long run. The previous research on the field is limited, and the angle in this study is, as far as the researchers can see, groundbreaking. The researchers believe that the findings and methods for evaluating payment on time in this paper brings new light and value to this field of study. The study presents intriguing theory that can be helpful for companies who are facing comparable problems as investigated in this paper. It can also be of value for other similar studies in the future.

In a busy work day it is easy to be caught up in solving the tasks ending on one's desk, and lose the overall picture. The cases prioritized are naturally the cases seeming most urgent at the moment, but it can often be challenging to know which pending task it is most valuable to spend time on. One invoice paid late can often lead to additional work for the debtor. This is time and money spent which does not create any value, and it can cause a great deal of frustration for both debtor and creditor. The desired outcome from this case study is that it can contribute to implement and improve actions affecting payment on time and higher priority among management and other employees in all types of firms.

All actions done with the intention to increase the amount of invoices paid on time seems important, but the purpose of this case study is to specify which actions are recommended for Schlumberger to improve payment on time. The researchers will in this paper present different variables effecting payment on time, and are also saying something about the relative effects from each of these variables.

## 6.2. Research problems

The researcher's goal with doing this study is to be able to answer the following research problems:

1. How to conduct improvements on payment terms, and how effective is Slb's existing processes for doing these improvements?
2. How can the data tracked by Slb today help explain and improve payment on time?

## 6.3. Summary

The research questions above are answered through a literature review, an action research and some key analyses. The first part of this paper contains a corporate overview, outlines the background and history and then presents the current situation for the company. A history full of mergers and fast development builds up an understanding of Schlumbergers current situation. Under the presentations of today's Sclumberger the reader gets insight in how the company is organized and in the processes relevant in this case study.

The second part is a theoretical approach about payment on time and payment terms, where the writers state out important things all companies should consider when working on these issues. This is followed by a chapter about the methods used in the case study, where the writers amongst other points out strengths and weaknesses with the data used.

The following chapter give some of the main explanations for why Sclumberger does not manage to pay all their invoices within due date.

The consultants conducted an action research where they worked on improving payment terms from Schlumberger's suppliers. The way this was done, the weaknesses with the

systems and processes used are presented. This part of the research helped set the standard for how to go about when contacting suppliers to ask for improved payment terms. This was partly done through an analysis stating the direct financial cost of fees and interest and comparing this to Schlumberger's weighted average cost of capital. This resulted in working with the suppliers which Schlumberger spends most money on, not the suppliers which Schlumberger pay the highest amount of fees and interest to due to overdue payments. Some suppliers were contacted and asked for better payment terms, while some already had agreed to better terms, but an update was needed in the Schlumberger's systems. The researchers also did some calculations to estimate the value of these changes they did.

The researchers used Schlumberger's systems and sent 269 requests, which involved 223 different suppliers. They were able to track the changes actually implemented, and could then state what is the strengths and weaknesses with the systems and the work flows used today. It was found that over 20% of the requests sent out went to ERP sites not used by the Geomarket this research was done in, which is Norway and Denmark. And therefore these 20% will not affect their payment on time for Norway and Denmark. POT for NOR. The cause of this and other weaknesses is explained, and the researchers provide some suggestions of changes needed for the systems and the processes to be more efficient.

The next part is an analysis done on all invoices paid by Schlumberger in 2014. By running several regressions, investigating distributions and visualizing effects, the researchers increases the understanding of what affects payment on time. Based on this, the researchers give advices on what the company should focus on to be able to reach their goal for payment on time for 2015. Ultimately increasing payment on time from 77.7% in Q4 2014 to 81.6% in Q4 2015. In this part of the paper the researchers show that in terms of explaining and improving payment on time the logged data of paid invoices is of high value.

It is shown that for Schlumberger it is of surprisingly high value to get the credit time to start running from invoice received date instead of from invoice date. This change in date calculation has the potential to increase the time available to pay the invoices with around seven to eight days. The credit time had a surprisingly low  $\beta$  coefficient of approximately 0.62 days extra time to process the invoice for one day extra credit time. Comparing the date calculation with credit time results in the interesting fact that when working with improved payment terms the Schlumberger workers should weight invoice calculation from receipt date

approximately with the same weight as 11-13 days extra credit time. Thus with this data and supplementary data the researchers estimate that the possible improvement in payment on time coming from better payment terms is estimated at be 1.2% points in 2015.

The use of purchase order is also highlighted as a good way of improving payment on time. By investigating the usage of purchase order, the researchers found it reasonable to say that the possible effect on payment on time for 2015 from increased use of purchase order can be estimated to 0.4%. It is also pointed out that the Supplier Portal, an IT solution for invoices sent to Schlumberger, is not solely improving payment on time but possibly even harming payment on time. This is also very surprising.

With these findings and other supplementary findings it is concluded that for Schlumberger it is not sufficient to continue in the same manner of improving payment on time to reach the key performance objective for payment terms in 2015, but the company needs to consider new methods away from payment terms and use of purchase order. Other possible improvements were then looked into, like shortening the last part of the invoice payment process, called “payment lead time”. Here it was found that for all the invoices stated as “ready to pay” before due date, only missing a last control audit, 8.4% were not paid on time. This should be further investigated, and the researchers estimate the possible improvement on payment on time from this to be approximately 4% points. If Slb manages to shorten the time spent in payment lead time in 2015, and also reaches the goals set for improved payment terms and increased use of purchase order, the key performance objective for payment on time in 2015 should be more than reached.

## 7. Background

### 7.1. Corporate Overview

Schlumberger Limited is the largest Oil Service Supplier in the world, employing over 126,000 people from over 140 nationalities in approximately 85 countries.<sup>1</sup> Among the three main sections in the oil and gas industry, upstream, midstream and downstream, Slb operates in the upstream section. The upstream section is known as the exploration and production sector, and covers activity from the subsurface to the wellhead. The company “is the world’s leading supplier of technology, integrated project management and information solutions to customers working in the oil and gas industry worldwide” (Schlumberger, 2015c). Slb provides the widest range of services and products that extract value from integrated reservoir measurements. The activities Slb provides technologies to are the following:

- Finding the reservoir
- Characterizing the reservoir
- Accessing the Reservoir
- Producing the reservoir
- Optimizing the reservoir
- Integrated Project Management
- Reservoir Software, IT & Interpretation

### 7.2. Finance

“Schlumberger stock is listed on the New York Stock Exchange, ticker symbol SLB, on the Euronext Paris, Euronext Amsterdam, London and the SIX Swiss stock exchanges.”

(Schlumberger, 2015c). Despite downturns in the market, also 2014 was a good year for Schlumberger. Two financial highlights to point out from 2014 is revenue and net income:

Revenue	\$48,580,000 <sup>2</sup>
Net Income	\$5,506,000 <sup>2</sup>

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<sup>1</sup> (Schlumberger, 2014b)

<sup>2</sup> (Schlumberger, 2015b)



Schlumberger CEO Paal Kibsgaard commented on the financial year of 2014 and said “Full-year 2014 revenue of \$48.6 billion increased 7% year-on-year and grew for the fifth consecutive year” (Schlumberger, 2014c) “Free cash flow as a percentage of income from continuing operations before Non-controlling interests, excluding charges and credits, was 84% for the full year 2014.” (Schlumberger, 2014c) This shows that the company is backed by financial strength, and therefore short term business cycles do not affect a company in the same way as other smaller and weaker companies. With that said, also Slb had to terminate many workers in the last quarter of 2014 and first quarter of 2015, due to the recession in the market.

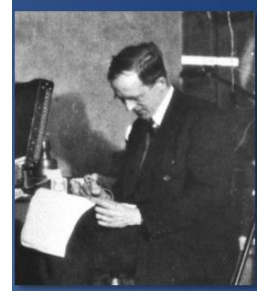
Despite the downturn now seen in the industry, Slb uses large amounts on research and engineering. This gives them a good foundation for further development and growth, and can give them a competitive advantage in the future compared to other companies now needing to cut down on their R&E. “Schlumberger invests more each year in R&E than all other oilfield services companies combined.”(Schlumberger, 2015c)

### 7.3. History

Conrad and Marcel Schlumberger founded the forerunner of what today is Schlumberger. The passion emerged in Conrad already in 1912, and Marcel joined him in 1919. But it was first in 1926 that they founded the first company. The company was called the Société de Prospection Électrique, and went under the nickname “Pros”.<sup>3</sup> The two Schlumberger brothers invented wireline logging as a technique for obtaining downhole data in oil and gas wells. The company have the longest history within the industry when it comes to delivery of innovative development and production technology. An important part of the strategy for the firm has been to strive to be the technology leader within their field, and this is also the reason why a large share of the revenues have been spent on research and development. In this way Slb can offer their customers the resources and expertise required to meet the challenges faced in the oil and gas industry. (Schlumberger, NA)



Conrad Schlumberger 1911



Marcel Schlumberger 1928

Figure 1 Conrad and Marchel Schlumberger

<sup>3</sup> (Schlumberger, 2015a)

## 7.4. The mergers

As many other companies in the same industry, Slb have been using mergers and acquisitions as a way to grow, develop and to create new technology. Especially from the early 1970's, when the oil industry started booming, and until today. Due to the size of Slb, there have been more acquisitions than mergers. But still, Slb have always been looking for best practices in the new companies, and the possibilities of implementation.

In the decades that have passed since “Pros” was founded, Schlumberger have merged and acquired over 40 different companies of considerable size. On the 21<sup>st</sup> of February 2010, Schlumberger announced a large merger with Smith International.<sup>4</sup> This merger is in writing time the biggest in the history of the Oilfield Services Sector<sup>5</sup>, and it increased Slb's lead as the biggest oil service supplier in the world. The merger also included M-I, a leading supplier of drilling fluid systems, previously owned 40% by Schlumberger and 60% by Smith International. Before the merger Schlumberger had 77,000 employees while Smith and M-I each had 21,000 and 13,000 employees each resulting in a post-merger company of over 100,000 employees<sup>67</sup>. The reason for the merger was in large a way to widen the product range offered by the same company, and heightening the competence by working together and using the corporate advantages of competences and patents. Much so because of grater challenges in the oilfield services industry in terms of more and more demanding oil exploitation services. And on August the 29<sup>th</sup> 2011, just one year after the merger, Schlumberger announced that “the business integration is complete. All of the segments and business lines are now refocused at 100 percent on meeting our customer's needs”. When Simon Farrant, the integration manager for the merger, for more than three years ago was asked if the integration was complete he answered with a resounding “yes”. The mergers Slb have faced the recent years, has understandably created some challenges along the way. The companies all had different organizational structure, procedures, routines, systems etc.

Depending on the type of business dominating in a company being acquired, there have been different levels of integration of the new company in to Slb. Internal conditions, product offered to the customer etc. has in some of the companies changed much when the company

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<sup>4</sup> (Gould, 2010b)

<sup>5</sup> (Schlumberger, 2011a)

<sup>6</sup> (Journal, 2010)

<sup>7</sup> (Gould, 2010a)

was bought by Slb, while other companies have continued almost as before the acquisition. Some of the companies acquired still operates under their initial names, like WesternGeco, M-I Swaco and Smith International. But they then have “A Schlumberger Company” in their title, e.g. “M-I Swaco, a Schlumberger Company”.

## 8. Schlumberger today

### 8.1.1. Schlumberger's Global Organizational Structure

Slb is to a large degree centralized, and several centers are created with limited functions. These centers conduct this function for all Slb companies worldwide. There are 125 Research, Engineering and Manufacturing Centers located in 15 countries. Other functions exist in every location, Geomarket or Area. The different segments use these centralized Hubs regardless of geographical location. Figure 2 below shows in which degree M-I and Smith have been included to the already existing structure of the company. M-I's function is marked in orange, and Smith's function is marked in green.

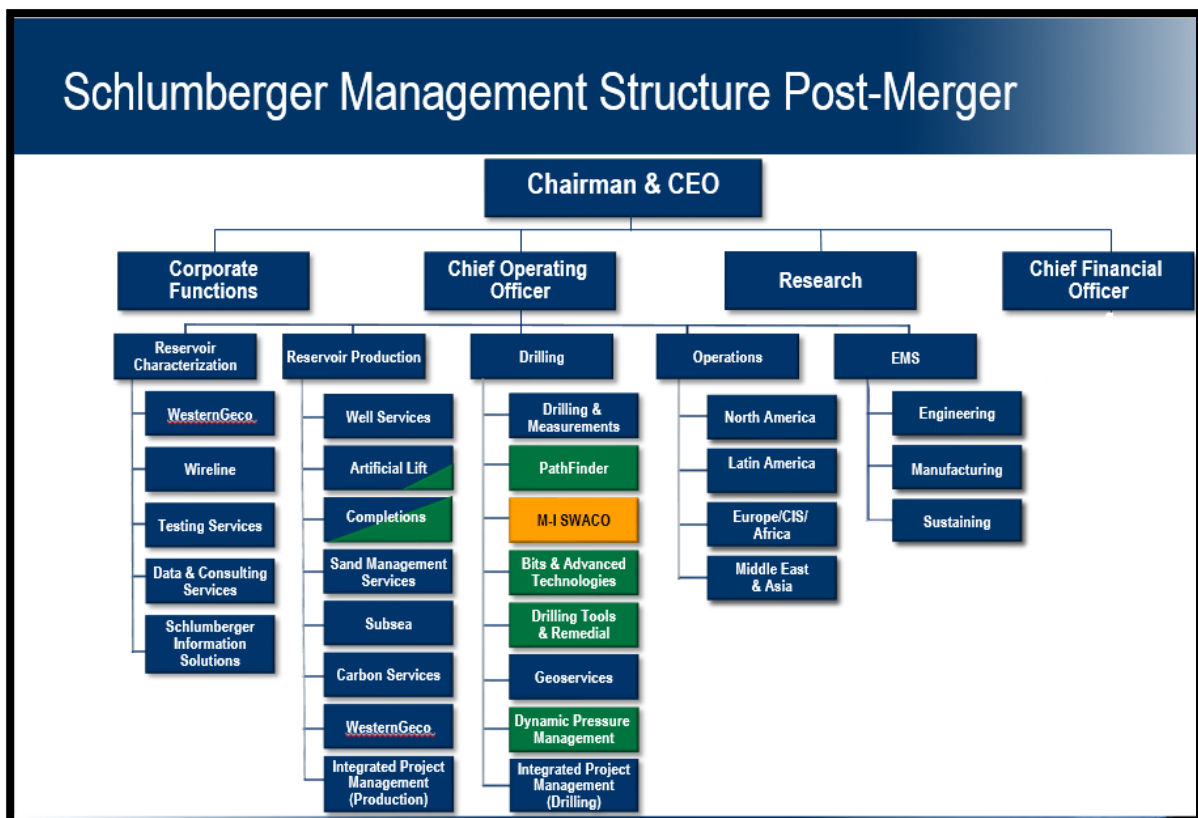


Figure 2 Schlumberger Management Structure Post-Merger <sup>8</sup>

Schlumberger has principal offices in Paris, Houston, London and The Hague, from which the executive management team (Noted as “Chairman&CEO” in Figure 2) directs all Schlumberger operations worldwide. As you can see, every function have a hierarchical line up to the CEO. This structure causes many to have two managers; one functional manager and one direct (hierarchically) manager. The reporting to the functional manager is

<sup>8</sup> (Schlumberger, 2011b)

assignment related, while the reporting to the hierarchical manager is more related to personnel issues, career planning and legal matters.

In addition to being in one of the functions in Figure 2, every operation also belongs to a global Area and Geomarket, see Figure 3.



Figure 3 The Geomarket Structure. (Schlumberger, 2015d)

There are 37 Geomarkets, “which are grouped into four geographic areas: North America, Latin America, Europe & Africa, Russia, Middle East and Asia.” (Schlumberger, 2015c) The work presented in this paper will be done for Area EAF and Geomarket NOR. The Geomarkets were reorganized in April 2014, Norway and Denmark became a separate Geomarket.

*“The Geomarket structure offers customers a single point of contact at the local level for field operations and brings together geographically focused teams to meet local needs and deliver customized solutions. Working together with the company's*

*technology segments, the Geomarkets provide a powerful conduit through which information and know-how flow to the customers, and through which Schlumberger engineers and geoscientists maximize technological synergies over the entire life of the field.” (Schlumberger, 2015c)*

Belonging both to a function and a geographical area, gives an organizational structure called matrix structure. The use of this structure involves the risk of becoming too complex, but it would be hard to make things work without a matrix structure in a company of Slb’s size.

This structure enables a good overview of the functions, and enables a clear identifiable distribution of the tasks. A clearly identifiable organizational structure is important for information flow and distribution of power, authority and responsibility. Due to the matrix organization structure, there are a lot of managers, when you sum up all the operational and functional managers on the different levels. The advantage of this can be that more workers come in personal contact with a manager, and the managers are able to be hands on. Despite this, Slb have a large focus on not letting the administration and the support functions be larger than what is necessary.

#### 8.1.2. Procurement & Sourcing

The work done in this study is done in a department called Procurement & Sourcing located in Risabergvegen 3 in Tananger, Norway. This is the NOR Geomarket headquarter. This department goes under EVP (Executive Vice President) and CFO (Chief Financial Officer) in Figure 2.

Procurement & Sourcing is established to secure control over costs, manage suppliers etc. This is especially important in a company of this size, and the size does also make it a very comprehensive task. The challenges looked in to will be challenges that the people working in P&S are facing. The consultants/researchers will be a part of this team, and their contribution will hopefully be especially useful for this department. Most of the people working in this team is either a sourcing leader, a sourcing specialist or a procurement specialist.

### *8.1.2.1. Sourcing Specialist*

The main work assignment for a sourcing specialist is to implement strategies and tactics to effectively manage the sourcing of a supplier portfolio. The goal is to get the best quality products and services to the lowest possible price. The supplier manager also needs to secure that the companies Slb is buying from is operating according to Slb's supplier requirements, and will conduct business review and supplier audit of the companies.

A sourcing specialist attempts to achieve:

- Minimized supply chain disruptions
- Locate and select a high-performance supply base in accordance with preferred suppliers
- "Leads the RFI/Q/P (Request for Information/Quotation/Information/Proposal) and bidding processes, minimizing risk and maximizing value in terms of quality, delivery and total cost of ownership" (Schlumberger, 2015e)
- Lead the contracting process. "Negotiates prices and terms with suppliers in order to meet specified quality, delivery and cost objectives" (Schlumberger, 2015e)
- "Responsible for delivering a top performing workforce - Identifies opportunities and implements actions to continually reduce wasted time, money and resources from assigned tasks" (Schlumberger, 2015e)

### *8.1.2.2. Sourcing Leader*

A Sourcing Leader would have almost the same job description as a sourcing specialist, only that the leader would be a person with longer experience, and often with experience from the segment that he works with. Responsibilities for a sourcing leader may include managing a team of Sourcing Specialists.

### *8.1.2.3. Procurement Specialist*

The Procurement Specialist in P&S works as a support function to the purchasing activities. They ensure that items and services are purchased from approved suppliers, and that the terms and conditions agreed on are adhered to by the supplier. They also try to make sure that PO is used when possible, and that all the orders are done correctly. The Procurement Specialist also prepares and communicates shortage and backlog reports, and provides visibility of other potential interruptions to internal customers. They also focus on trying to identify



opportunities and implement actions to continually reduce wasted time, money and resources from assigned tasks.

### 8.1.3. Categories

All the Slb's suppliers are divided into different categories. There are four main categories.

- Chemicals & Logistics
  - o Comprising of Chemicals & Logistics spends.
- Drilling & Evaluation consolidating
  - o Oilfield Equipment Services, Electronics, Raw Materials, and Machine Parts.
- Surface Equipment & Services
  - o Consolidating Manufactured Equipment, Marine, and Inspection Services.
- Indirect
  - o Consolidating Facilities, HR Services, Institutional Service, Travel, and IT.

All these categories have been split between the sourcing leaders and sourcing specialist in the P&S team.

### 8.1.4. Accenture

OFS outsourced their AP to Accn in June 2008, while M-I did the same in 2013. The outsourcing have been done for all countries except China, Japan, and Korea. Accn is a global management consulting, technology services and outsourcing company.<sup>9</sup> The expected benefits when the outsourcing was conducted was greater efficiency through a streamlined and standardized invoice process, and other scale benefits coming from centralizing AP. One of the main goals was to decrease the total cycle time for invoice processing, and thereby increasing POT. Slb also expected increased supplier satisfaction, due to a smoother and clearer process, which should be easier for a supplier to relate to. Another expected benefit was that there would not be any delays on reports reaching Slb employees (staff, approvers and managers). The systems which today is used by Accn and Slb are interacting, and that helps reports and requests reaching validators and approvers sooner. It is certain that this outsourcing has led to cost saving due to low wages in the country Accn is operating. But it is important for Slb to know the extent of the disadvantages coming from outsourcing a process like this.

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<sup>9</sup> (Accenture, 2015)



The field and country knowledge the people working in Accn have, is limited to information stated in documents from Slb. These documents are good, but it will in some cases require more field- and local-knowledge related to the invoices for NOR to be able to handle them correctly. This lack of knowledge might lead to mistakes done by Accn, or more steps are added in the process because Accn needs to send the invoice to Slb and ask for advice before they can process it.

## 8.2. The systems and programs used by Slb

Due to the approach in this case study, the most interesting systems and processes are the ones affecting POT. The following is a description of the most essential systems, followed by a statement of the processes for all incoming invoices. All big companies are largely influenced by the extent to which they have good IT solutions. The many mergers and acquisitions in Slb has made it particularly important to focus on these systems. For Slb these mergers have resulted in a large number of different IT systems which are interacting. A great work has been done, but still there are challenges in terms of communication between the different systems. In general, when merging companies the managers need to get a good overview of the different processes. But it will not be possible for them to get the full picture, and they needed to make some assumptions. First when the new systems and processes are running, the undiscovered discrepancies appear.

Slb are now working with implementing transformations on different parts of their company, and part of this transformation will be a huge IT restructuring. A new program will replace many of the programs used today, and this program is expected to be implemented after 2017. This will solve many of the current challenges. Nevertheless, it is necessary to focus on creating more efficient routines for the current systems before this implementation takes place.

### 8.2.1. ERP

Before the mergers, Slb used Lawson, while Smith and M-I used different versions of Oracle. This has resulted in there now being three different ERP systems in use for these three companies. ERP systems involved in this case study are therefore Oracle and Lawson.

Every ERP used for payments are set up with something called an ERP Clean. Every supplier has its own ERP Clean notation (a number or a combination of numbers and letters), which corresponds to a site in the ERP-program for this supplier. On this site is all information necessary to be able to pay the invoices correctly. If the supplier has different locations, bank accounts etc., it will be necessary to have more than one site for each supplier. Then there will be created something called a remit to code. All remit to codes for one supplier will be linked to the ERP Clean for this supplier. The remit to code is the same as some ERP programs call location codes. When the term “ERP site” is referred to later, this will include both ERP Clean and remit to codes.

### 8.2.2. ASL

ASL (Approved supplier list) is a program which is widely used by P&S, and other departments. The purpose of ASL is to manage and have a good overview of the suppliers used by Slb. With this site P&S can make sure that the best suppliers are used, and also make sure the information flow within the Slb companies is as well as possible. In this program every supplier has a site, with all information about this supplier, contracts, audit reports, business reviews etc. If Slb uses multiple suppliers in the same corporation, each supplier will get their own page, but all the sites for the given corporate will be linked together, and each suppliers will be defined either as parent or as child. In many of the cases the parent will be a global supplier, while the child will be a local supplier – but part of the parent’s corporation. Every ASL site that is correctly set up, have a link to every other system this supplier is involved in. In this way, it will be possible to change e.g. VMD, and then choose this change to be made in all the different systems.

### 8.2.3. DFM

DFM (Document Flow Manager) is a common platform to manage invoices for those Slb countries who have outsourced their AP processing to Accn. This is a web page where both Slb and Accn have access to all information about each invoice. Each invoice coming in to the system get a unique URN. URN is a number used to identify a batch of data within DFM. When searching by URN all information and history on the given invoice is available.

#### 8.2.4. SWPS

Schlumberger Web Procurement System (SWPS) is a program used by Slb to manage procurement of products and services. It is an effective tool, and can support many of the business processes necessary to manage procurement in a good way.

#### 8.2.5. Tableau

To be able to get a good list for the supplier with updated spend, Slb uses a program called Tableau. Tableau is a program intended to do analyses on huge amounts of data. It has a larger capacity than excel, and the program can retrieve data from many different program types. Tableau is a good tool for case study because it is a good tool when trying to discover patterns and trends. With its intuitive drag and drop functions, it is easier and have more features than many other similar programs. Information can be put together in endless numerous ways, and can be prepared in simple readable ways by use of tables, graphs and figures.<sup>10</sup> The Primary purpose of the use of Tableau for P&S is to publish the Global P&S KPOs.

#### 8.2.6. Other programs and systems

In addition to the ones above, there are other programs and systems used to be able to ensure good information flow, control and optimization of processes. There are different programs which enables retrieval of useful reports, among others a program called Oracle Reporter. The internal web page called “The Hub” is widely used by all employees, and are among others used for sharing of new, necessary and useful documents.

Also, there is a web page called Supplier Portal, hereafter called Portal, where the supplier can in a handy and easy way deliver their invoice. By signing in to <http://slb.mysupplierportal.com>, they can also check the status for the invoice, and communicate with Slb.

### 8.3. Invoice payment process

The treatments of incoming invoices is happening with an interaction between Accn and Slb. Slb tell their vendors to send their invoices to Accn for AP processing. If the invoice is sent to a Slb location, the invoice will in most cases be returned back to the vendor. Vendors have the

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<sup>10</sup> (Software, 2015)

choice to either upload invoices via the Portal, or send them by post to a Scanning Centre which Accn has in Prague. The scanned invoices are sent to India, where they are paid. The following presentation of the invoice process specifies some of the terms necessary for the analysis further on.

Some things to keep in mind is that up until 2008 invoices for NOR were sent to the office in Risabergvegen 3 in Norway and were manually punched into the ERP systems. Today this is done by Accn, where the transition has implied complications and reduced effectivity at first, but increasingly efficient up to now. Still there seems to be some business group differences where M-I has had a more effective transition than OFS, where M-I outsourced their AP dept. to Accn in 2013.

The PT in the Lawson and Oracle determines what will be the due date in DFM, regardless of what is stated on the invoice, and it is even more important to have data updated in these ERP systems. This has caused a lot of problems since the ERP system previously had not been regularly updated, and thus was in large not aligned with their supplier's existing PT. This has resulted in a large reduction in POT, and therefore one of the focus areas of NOR has been to make sure that the ERP systems are always updated. In reality this is a continuous working process.

Accn have two different teams, one called Processing team, and one called Payment team. After the invoice is scanned, the first steps are done by the Processing Team. The day the invoice is scanned is called "invoice received in DFM". Each invoice that comes is delegated to a worker in the Processing Team. The date the scanned invoice is picked up and distributed is called "sort date". They then do the bookkeeping, and this date is called "creation date".

When the bookkeeping is done, the further process vary depending on whether the invoice has a PO or not. When it is a Non-PO the invoice is sent to the person in SIb who requested the goods or services. This person needs to validate the invoice, and confirm that all the information is correct according to what he requested. If there is a PO corresponding to the invoice, Accn does something called a 3-way match. When they do the 3-way match they check that the PO number and the price is the same on PO and invoice. They also check if it has status "goods received". The PO gets status "goods received" when the person who receives the goods has checked that the description and quantity of the goods is according to

what was ordered. If the invoice passes the 3-way match, the invoice does not have to be sent to validation and approval, and the invoice payment process goes a lot faster. All PO invoices which failed the 3-way match will be routed to the PO requestor or buyer for a resolution.

Every invoice needs to be financially approved. This is with the exception of invoices with amount less than \$2 000 for Non-contracted rates and less than \$3 500 for contracted rates. When it is PO this is done before the goods are ordered, and if it is a Non-PO, this is done after Slb has received the invoice. When it is a PO, the 3-way match is done instead of doing the financial approval again. The financial approver is a person in Slb with a manager position. Based on the job code description, these approvers have different approval limits. These limits create the amount in something called Financial Approval Matrix. Each invoice is given a specific Financial Approval Matrix which determines who should approve the invoice. Every invoice is linked to a cost center depending on which segment is to take the cost for this given good or service. All cost centers have a different Financial Approval Matrixes depending on the management and geographical structure for the cost center. The first approvers are managers who normally have a limit of \$5 000, \$10 000 or \$20 000, while the approvers with the highest limits have \$1,000,000, \$2,000,000, \$50,000,000 etc. The differences between the amounts set as a limit is increasing rapidly when moving towards higher approval levels.

In many cases the Financial Approval Matrix will include many approvers, and an invoice with a high amount would have taken a very long time to get through the system. To decrease holdups and to make the process more efficient, avoiding unnecessary steps and work for the managers. There is a rule within DFM which sends the invoice straight to the second last approver. When the last approver required has approved the invoice, it gets the status “completed in workflow” and the Processing Team in Accn have done their part of the job on the given invoice.

Once the invoice is completed in workflow, the Payment Team will take over. They will start an audit, where they check if the currency, amount, vendor, bank account is correct and if the invoice has been approved. This audit is important to make sure there is no mistyping, and that there are no mistakes in the payments. This action is also implemented to increase security, as it makes it harder for Slb’s employees to abuse their position. One of the reasons

why Slb pay Accn to do this audit is to avoid that the person creating a payment, or a close colleague of him, also checks it.

When the invoice is transferred to the payment team, all the invoices are on hold, and the holds will be removed only when it has been checked. When the audit is done the invoice is ready to be processed for payment. How many days it goes from this day to the day the invoice is selected for payment depends on how many days it is until the due date. The due date is calculated in ERP and DFM, based on the payment terms entered in to the ERP program. The ones with status ready for payment will be picked out when it is close to due date, and then there is a payment file made in ERP based on the work done by Accn. This file is approved by a person in Slb. The payments are collected into batches, where all invoices due before the next payment run will be selected. These payment batches are placed twice a week.

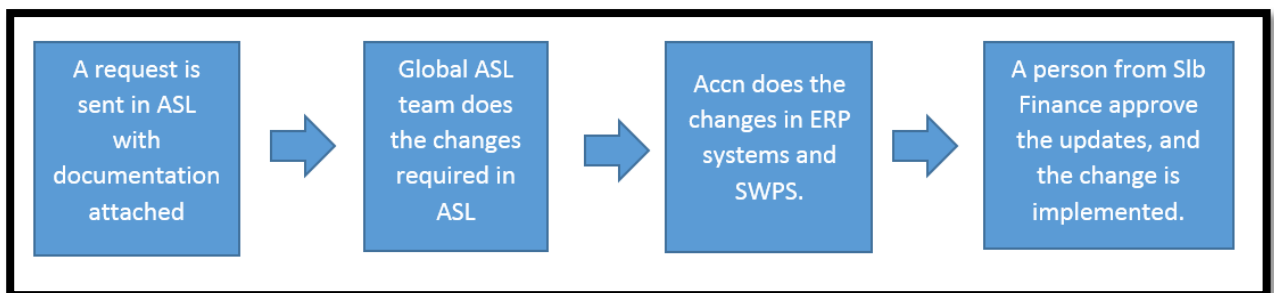
In addition to outsourced tasks done by Accn, Slb are performing some of the tasks related to AP itself. This is done by a team called AP Retained Team, and they operate as a support function for AP in Accn. Accn might not have enough knowledge of the local conditions to be able to know how to handle all matters, and they ask the AP Retained Team. The AP Retained Team is also handling many of the collection cases, urgent cases and cases that for various reasons has stalled in the system. The collection cases is handled by Slb only when Accn does not have the knowledge required to pay these invoices. They are also taking care of invoices who are to be paid within 3 working days or 24 hours. These payments are called urgent payments, and consists of invoices that for some reason got lost in the post or in the process, and needs to be paid as soon as possible. AP Retained Team is also handling manual payment, and this can be e.g. payments to the customs region or Norwegian Tax Administration. Slb cannot risk to pay these invoices too late. Also the payroll and payments to pension funds are done this way.

Regardless of invoice being an urgent payment or not, it will vary how many days from the payment is made by Slb to the supplier actually receive the money in their account. The date the supplier have their money in their account is called effective payment date, and normally it will take about two days for domestic invoices and three to four days for other currencies than NOK. This depends mainly on the type of account paid from and to, and which currency paid in. This is not something that Slb takes into account when deciding the timing of their

payments, and nor is it something that is taken into consideration in this case study. This is seen as a necessary simplification. Payment slightly after the deadline due these conditions will be accepted by most of the suppliers.

#### 8.4. Changes in vendor master data

In the ERP system there is a large amount of information about the suppliers Slb are using. Name, address, accounts, PT etc. are all examples of vendor master data. Considering how the invoice payment process is determined by DFM which uses information from ERP, the researchers understood importance of correct information in ERP. Changes in the vendor master data can be done by a global ERP team, but needs to be initiated based on someone's request. All Slb employees with access to ASL can send a request through ASL and describe the change in vendor master data desirable. When the vendor is correctly created in ASL and ERP, the request in ASL will lead both to a change in ASL and to a change in all the ERP sites for this given supplier. Below is a workflow showing the steps in a vendor master data change request.



*Figure 4 Work flow for updates on vendor master data*

If the request is rejected in some of the steps in Figure 4 an e-mail will be sent to the requester.

#### 8.5. Schlumberger's Key Performance Objectives

As in all other businesses, Slb's goal is to end up with the highest possible is to maximize net profits. With an innumerable number of investments, operations, costs, etc. within each Geomarket, it is necessary to break this goal down. Slb therefore uses KPOs as targets for measuring performance at each Geomarket. KPO was introduced as a methodology for setting objectives and measure the employee's performance.

*“Key Performance objectives are numeric and quantitative objectives that ultimately are aligned with the corporate objectives of the company and its four focus areas: Growth, Returns, Integrity and Engagement. They are results-oriented and allow each work to contribute to the company’s overall performance.” (Schlumberger, 2012)*

“The rationale behind the KPO framework is to align the activities and objectives of all employees with the company's objectives.”(Schlumberger, 2012). All of Slb’s KPOs makes a long list, for P&S alone there are many. Every year new targets are set, and based on what the company considers the most important at the given time, new KPO`s are made. In this paper, the researchers have chosen to include the three KPOs they believe are most relevant for POT. These KPOs are payment on time, the percentage of invoices with less than 31 days credit time out of total invoices, and the number of invoices where PO is used.

#### 8.5.1. Payment on time

POT is calculating the percentage of invoices paid on time, thus before the due date, out of the total invoices paid within one month. POT is a KPO for both P&S and Finance. It is one of the most important KPOs, and have a large focus within the company. The overall target for this KPO in 2015 is to have a payment on time improvement of 5% from Q4 in 2014. Due to large variations between the segments, different targets are set within one Geomarket, depending on segment, company etc. New goals will be created each month based on the previous month, and therefore this goal will change throughout the year. The reason that Slb wanted the consultants to help improve the POT is because of it being lower than they would want to accept, and in comparing the NOR office to the other offices in EAF, NOR scores quite poorly. EAF is a group of 10 Geomarkets, and for the first three of the four quarters of 2014 NOR scores in the lowest three on POT, and with the fourth lowest in Q4 with a POT of 77%.

#### 8.5.2. Credit time more than 31 days

Slb wants to get better credit time from their suppliers. They have set 31 days as a limit, and they want to work on improving the ones with less than 31 days. The target is less than 35% of their suppliers with less than 31 days credit time. There will always be some suppliers that for some reason are not willing to change the terms they give.



Institutional services and the governments are examples of supplier who normally provides poor payment terms. There is little point in trying to negotiate better PT with these.

Measurements done to see the performance on this KPO does therefor exclude the suppliers within the institutional services category.

### 8.5.3. Spend with use of PO

PO is of high value to the stakeholders because it ensures control due to approved invoices before instead of after the product is bought. A PO can be rejected by the buyer's manager, and the product will not be order. On the other hand, when a PO is not used, and the product is received, the manager have to approve the invoice since it must be paid. After POT, spend which have been managed by use of PO is seen as the most important KPO for P&S. PO spend is closely related POT, because PO accelerates the invoice payment process. The overall target is to have 80% of all invoices with use of PO.

## 9. Theoretical Approach

Payment on time should be of high interest for all companies. To be able to pay invoices in time, or to pay the invoices at all, plays a big role in determining whether the business will be a success or a failure.

### 9.1. Disadvantages from not paying on time

#### 9.1.1. Overdue payment invoices

In Norway the law for interest and late payments state that claimants may claim interest when the claim is not guaranteed at maturity. ("Lov om renter ved forsinket betaling m.m. (forsinkelsesrenteloven).", 1978). This law say how much the creditor is allowed to charge in fees and interest. It also states that the interest runs from the due date when this is determined in advance, and otherwise from 30 days after the claimant has sent the debtor a demand with a request to pay. When working with AP processes it is important to have this in mind and know that not paying on time will often lead to unnecessary costs due to fees and interest. It is also important to know what the law says about this to be able to detect if a firm is overcharging.

A global company can not only look at the law applying in the country it's operating in, but also needs to take in to consideration the law in other countries involved. As shown in Figure 5 below, the laws and practices when it comes to PT might vary a bit when comparing a sample of the different legal systems.

Legal System	Right to negotiate and fix terms in contracts	Default term (without contract)	Minimum payment term	Maximum payment term
<b>UK</b>	YES	30 days from delivery or execution	Should not be grossly unfair to creditor	As long as not excessive, but must not exceed 60 days
<b>France</b>	YES	30 days from delivery or execution	No minimum	45 days end of month or 60 days from date of invoice
<b>US</b>	YES	When the buyer is to receive the goods	-	As long as neither punitive nor excessive
<b>European Union</b>	YES	30 days from receipt of invoice	Should not be grossly unfair to creditor	60 days

*Figure 5 (Schlumberger, 2013b)*

### 9.1.2. Other disadvantages from not paying on time

- Spoiled reputation in the market
- Harmed the relationship with the supplier. This will make it harder to establish good relations with this and other suppliers in the future.
- It will be harder to get good prices, good PT and general good conditions from the suppliers in the next negotiation.
- Can give an impression that the company have financial difficulties (Cranfield University), and this might make the suppliers more reluctant to trade with the company.
- Creates unnecessary frustration and stress both for customers and the suppliers. The supplier might contact Slb regarding these invoices, and AP or the manager need to spend time on investigating why the invoice is not paid on time. Much correspondence back and forth with the supplier regarding these issues does not lay a good foundation for a good relationship with the supplier, and might ruin further cooperation. The total cost of this invoice can quickly get very expensive, when managers needs to use time on these cases. These invoices are usually not as straight forward as other invoices, and often it will be used more time to process these interest invoices compared to a normal invoice.

## 9.2. Advantages from paying on time

If a company manages to pay on time, they will avoid all the disadvantages pointed out in the chapter above. As stated in a journal article published by Cranfield University (Cranfield University), paying on time helps to create a good relationship to the supplier, which might make it easier for you to negotiate better contracts in the future.

Paying on time it affects the supplier's liquidity and thus their ability to expand and develop their businesses, and in the case of not paying on time it increases the risk of bankruptcy (Connell, 2014). This is especially true when Slb stands for a big part of the given suppliers income. Thus from a corporate social responsibility perspective, it is good when the customer prioritizes to pay the invoices on time.

### 9.3. Conditions to consider when improving payment terms

The trend in the market today is that more and more companies are trying to improve the PT they get from their suppliers. For some companies the improved cash flow and liquidity will be the main reason why they try to increase the credit time, and being able to pay on time will be a positive side effect. Other company has POT as the main motivation for starting this negotiation.

If a company is open with the supplier about the challenges they have with POT this will probably be better than if they do not say anything and the money is not on their account on due date. Other benefits for a company with agreements with supplier about better PT is that it removes much of stress and pressure on the different stages on the invoice payment processes.

Also when looking at the economy as a whole, there are clear benefits coming from improved PT that makes it possible for the firm to pay on time. Money used on fees and interest does not create any value. This will be under the assumption that the creditor and the debtor has an equal WACC.

#### 9.3.1. Who bears the cost for improved payment terms?

Normally improved PT is seen as an advantage for the customer, and a disadvantage for the supplier who gives these better PT. But there are many factors that come into play when looking at the overall effect from changed PT for both the supplier and the customer. The customer should be aware of these effects before negotiating better PT. There is no point in looking at a change in PT isolated, but it is important to see it in the context of the factors described below.

How long the business chain is for the supplier is affecting their willingness to increase PT. The number of players participating in the production process is essential. It is especially crucial to understand the extent the supplier is dependent on other suppliers, and to what extent they develop the products themselves. The PT suppliers get from their suppliers is affecting their ability to give good PT to their customer. The delivery time they have on the product ordered is affecting which PT the supplier is able to give. All rational suppliers would optimize according to delivery time and due date. Also, which PT they are able to give, is

closely connected to which PT they get from their suppliers. If they have suppliers giving them short credit time, this will limit their possibilities to provide long credit time.

A change in due date will be difficult for the supplier to implement without it affecting the time of delivery, the size of warehouse, price and other factors which in the next stage will affect the customer asking for the increased credit time. “9.3.2.Payment terms might affect prices” provides an example for how the price can increase as a consequence of getting better credit time. If the customer asking for better PT have a large share of the revenue for the supplier, the customer might experience that products which earlier was in the supplier’s warehouse, now have to be ordered in advance by the supplier as a result of lower liquidity for the supplier. The customer might realize that the production process does not have time to wait for this product, and they then have to increase their own warehouse to secure that this product is available when they need it. A bigger warehouse might be more expensive than the savings they make on the improved PT. Before it goes this far, the supplier will normally have the choice to improve their cash flow by obtaining new funding, try to increase the credit time they get from their suppliers, or they have to increase the prices they give to their customers. This last change might outdo the effect from the improved PT for the customer who asked for it. Therefore it is important to be aware what is beneficial to both parts in the transaction, since a losing part on one side might just as well mean a loss for the other part as well.

It’s worth to mention that every year many business failures are due to late payments from customers. Meaning that they would have been profitable, but missing liquidity make them fall behind on payments and they go bankrupt. In 2014 William Connell published a report through the European Commission called “The Economic Impact of Late Payments” where he conclude that in a B2B (business to business) relationship, a 1 point reduction in late payment is expected to reduce the number of firm exits from 2,8 to 3,4 percentage points.(Connell, 2014) These numbers are very sobering, yet the trend for permissible delays in payment seems to be pointing in one direction only, and that is towards longer and longer PT.

If a customer does not manage to pay on time, and the supplier does not charge overdue interest, the customer can in some cases benefit from not asking about better PT. The supplier might not have close control over who is paying on time and who is not. Without asking for better PT they might pay after the number of days they are asking for, or even later. By contacting the supplier and asking for better PT, the customer makes the supplier aware that

they are not paying on time, and the supplier might tighten up their account receivable processes. The fact that this customer have not been paying on time might set him in a bad position when asking for better PT, and the supplier might say no due to these late payments from this customer. Or if they say yes, the supplier is now more aware of the benefit they give to their customer, and therefore might want to increase the prices in the next period. And considering if the invoices in generally was paid late before, without being focused on by the supplier it has in a general sense had the credit time already without needing to pay for it, while now that it is been focused on it might be charged for.

If a company has a supplier which also is their customer, they need to have in mind what PT they give to this firm when deciding which PT to ask for. To assure good liquidity, the company should make sure that the net PT they get from their suppliers are the same, or better than the ones they give to their customers. One should also have in mind what the industry average is, and try not to get worse PT from the suppliers than the other companies get. No one will benefit from serving as a bank for their customers by giving them free credit, due to PT they give to their customers are better than the ones they get from their suppliers. Figure 6 below shows the distribution of number of days most common used as credit time. This is on a global level.

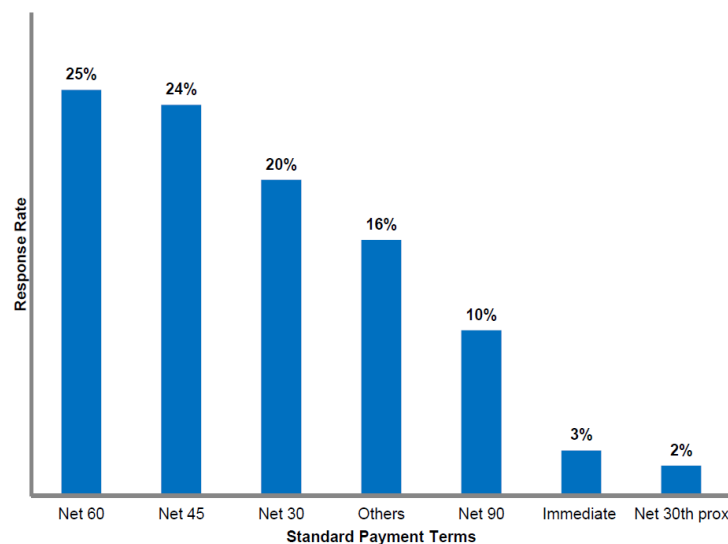


Figure 6 Most common payment terms on global level <sup>11</sup>

<sup>11</sup> (CEB, 2014)

According to the Spot Benchmark Report by CEB from October 2014, net 60 days is the most common payment time of all. (CEB, 2014) Net 30 days is the most common PT in Norway, but as shown in the figure above, this constitutes of only 20% on a global scale.

### 9.3.2. Payment terms might affect prices

Increased credit time can in some cases lead to inefficiency for the requester. Now consider that one company asks and receives longer credit time. At first glimpse this would look like a pure benefit to the debtor. Let's first consider an economy where all parts both receive and pay within 30 days, and this is leading to equilibria. An increase in credit time for the debtor company (requester), results in improved liquidity and ultimately higher profit. This as a result from fewer overdue payments and more available money for further investment and improved operation.

Now consider the other company working as a creditor, at first they were in an equilibrium in terms of money received and money paid out. Now they will reduce their liquidity because of the longer time it takes for them to receive payment for their product or service to the presumably bigger company. The chance of getting improved PT are higher when you are a bigger company with greater bargaining power. This improved PT for the largest company either lead to lowered profitability for the smaller firm (Martínez-Solano, 2007) or they will have to increase revenues in some way. One possibility could be higher prices resulting in a new equilibrium without there being one winning and one losing part. (Harrowing, 2009)

To clarify this an example of how this could look will follow. For a company A and B, where company A receives longer credit time while company B has the highest profitability.

Company A is the customer and company B is the supplier. Let's say that a price of a good Y is \$100 and that current credit time is 30 days and that it increases to 45 days. Also say that company A has a WACC of 10% and company B has a WACC of 20%.

This will then be the *long run* discounted price for the good considering a PT of 30 days:

$$= \$100 * (1 - (10\%/365) * (30)) = \$99.178$$

While for 45 days the *short run* discounted price of Y will be:

$$= \$100 * (1 - ((10\%/365) * (45))) = \$98.767$$

At first this looks to be a profitable deal for company A, since it from the 15 days increase in PT it now in reality pays \$0,411 or 0,4% (0.411/99.178) less. But now the supplier will be expected to raise prices accordingly, and considering his higher profitability it will change the picture.

First see how the first price of \$100 is a function of X, which would be the price given it was paid today and not 30 days from now, times a function of WACC and the PT:

$$X * (1+(20\%/365)*30) = \$100$$

$$X = \$100/(1+(20\%/365)*30)$$

$$X = \$98.383$$

This means that if the product Y was paid for at the time of delivery, the company would have been equally well off by charging \$98.383 dollar now or \$100 30 days from now. So it is the discounted value for the \$100 good for company B given 30 days PT. Since company B still would have the same incentive to earn \$98,383 on the sale now as before, it is then expected of them to increase the price. This formula calculates the new price for 45 days PT:

$$\$98.383 * (1+(20\%/365)*45) = \$100.809$$

And thus the new real price for the customer, company A, will be:

$$\$100.809 * (1-((10\%/365)*(45))) = \$99.566$$

Since \$99.566 is larger than \$99.178, the effective price is now higher with 45 days payment time compared to 30 days payment time. The opposite will be the case for a less profitable supplier. This calculation does not take in to account that company B could charge fees and interest for the late payments.

In many cases it can be hard to know if the price Slb get from their supplier is competitive. Even when many hours laid down on checking the different suppliers in the market, it can be hard to know if the price you get is the best price for a given product. When it comes to the PT, it is easier to tell if it is good or bad. But then working with price negotiations, it is then



important to not get fooled by good PT, but do the necessary research to find out if the offer in total is competitive.

### 9.3.3. The relationship with the supplier

When working on improving PT it is important to take into consideration the overall relationship to the supplier. The way a change in PT is asked for can be crucial, and it should be done with care. The part requesting the improvement needs to have in mind that when a firm is getting better PT from their supplier, they are actually increasing the cost, and the risk, for their supplier. PT can't be looked at isolated, and the bargaining power and the position the supplier and customer have in the market will affect if and how much the supplier is willing to change the PT. If the supplier is almost a monopolist, he might not be so afraid to lose his customer, and there might be less willingness to give better PT. The supplier may become a monopolist in the market due to unique product or price, but it can also be that this is the only supplier with the desired delivery time or delivery place.

Companies who over time are not able to pay their invoices on time, might want to contact their suppliers for better PT. The person contacting the supplier should then be aware of how they have harmed the supplier's liquidity by not paying, and the person contacting the supplier should have a humble appearance. One should remark how the cooperation is appreciated, and explain that with some help regarding PT this cooperation can continue. The supplier does not want to lose their customer, and are therefore in many cases interested in making this change if that's what it takes to keep the customer. If this process is not done in a proper way, the advantages from getting better PT might be washed out by a damaged relationship to the supplier. If the customer has numerous unpaid invoices, and has a bad history of not paying on time, the relationship might already have been damaged, and it can be harder to negotiate improved PT. Sometimes the same companies are both supplier and customer for each other, and then it is especially important to maintain a good relationship.

Therefore, when negotiating PT it is important to be aware of the short and long term effect. The benefits from improved PT might be clear in the short run, but in the long run the benefits might be eaten up by the suppliers need for higher payment due to their lowered liquidity. And considering the complexity of it, it could be very difficult to measure if this effect takes place in the real world. The researchers of this paper encourage other researchers to look into this matter.

#### 9.3.4. Risk

Changing the PT also shifts some of the risk from the requester over to the firm accepting. Example given; by changing the date calculation from invoice date to received date, the seller takes a higher share of the risk. If the invoice gets lost in the mail, or the invoice for some other reason comes late to the buyer's office, the seller then have to wait longer for their money. And if receiving the payment for this invoice was crucial to not fall back on late payments for the supplier, this could be one of the things pushing the supplier out of the market (Connell, 2014).

Given the same payment method and date calculations, SIb cannot say that increased credit time for the customer automatic for the supplier will lead to increased risk for not getting their money. Mainly this will be a question about how good liquidity the seller has, and if they have the opportunity to wait for the money. Better PT can therefore lead to a higher risk for the buyer, because if the seller gets in trouble due to bad liquidity, he might not be able to provide the same amount of products or service as before. If there are few providers in the market, this can harm the buyer's ability to maintain their production. E.g. if a supplier providing a unit to the oil production is late on the delivery of their product because of their inability to pay their supplier on time for some of the raw material for the product they are making. Resulting in the supplier's supplier holding the raw material back until previous payments have been made. In addition, all the other factors presented in the chapters above, like higher prices, bad relationship with the supplier etc. are risks which a customer needs to take in to consideration before asking for better PT.

## 10. Method

When looking into the different research methods, the researchers found that case study was the best match for the chosen design and method. In Schreamm's (1971, cited and emphasized by Yin (2009, p. 17)) words, a case study have the following definition: "The essence of a case study, the central tendency among all types of case study, is that it tries to illuminate a decision or set of decisions; why they were taken, how they were implemented, and with what result."

Case study is a common research method in business and marketing (Benbasat, 1987), and found in many economic papers. This case study have research problems which starts with how, and this is a good starting point for a case study. Much was unknown at the starting point of this study, and ahead of time it was impossible to say for sure which direction the study would take. Several times the researchers would start in one direction and then at a later stage with new insight, discard in favor of another direction. Having a case study as the main research method helped narrowing the challenges coming from changing directions in the middle of the study. The researchers recognize themselves in Yin's statement about case study: "Investigates a contemporary phenomenon in depth and within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (Yin, 2009). The challenge was often to be able to narrow the scope of the issue.

### 10.1. Approach

Both qualitative and a quantitative methods have been used in this case study. The work done on PT was to a large extent a qualitative job, while the analysis on POT was done with many observation, and has mainly a quantitative approach. Through a qualitative approach the researchers have had the opportunity to look at several factors that influence PT, and thus been given a deeper and better understanding of things affecting PT. To be able to get an understanding what is effecting POT a lot of data needs to be included, and not only look at few events.

### 10.2. Our design

When designing a case study it is necessary to define the case to study, and the unit of analysis. In this study the case is a typical problem in many companies, late payments. The

unit of analysis is Slb, limited to NOR Geomarket. The way this paper is built up, with a research question, a theoretical part, propositions, underlying issues, the a logic linking between the data to the propositions are typical for case study as a design.<sup>12</sup>

### 10.3. Our analytical technique

The part of the case study where the consultants are doing changes in PT is called an action research. This means that the consultants were part of the process which they investigated, and they affected the processes which they were investigating. Their contributions lead to changes, and they were able to measure their impact.

Our analytical technique used on the POT analysis is closest to the one called explanation building. POT is investigated and profound explanations and critical insight is presented from this investigation. The case study contents of both time-series analysis (since data from different time periods are used), and static analysis. The researchers believe they have done a research careful enough to be able to say something about how practice should be on this field they have studied, and they have therefor chosen a normative case study. As Routio states; “Normative research differs from descriptive studies because the target is not only to gather facts but also to point out in which respects the object of study can be improved” (Routio, 2007)

The research was conducted by two students who were hired as Interns in Slb. One of the researchers were employed in the company in advance, and also worked there in parallel with doing this research. The other researcher was hired only with this one purpose to write a master thesis in the company. Being hired as an Intern in the company, made sure the researchers had good access to confidential information. It is debatable in what way information would be different if they stood on the outside of the company. Being hired as a regular workers could also have changed the preparation and the informant’s willingness to share information. Informants in this case would mainly be employees of Slb and Accn. In essence, the consultants received the same access and restrictions as the other workers in P&S.

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<sup>12</sup> (Yin, 2009)

## 10.4. Population selection

The population the researchers want to say something about is in a general sense all the incoming invoices to NOR Geomarket. Since the focus is on the invoices, the credit notes needed to be excluded from the data sets used. It will not make any sense to evaluate the POT for the credit notes.

## 10.5. Data Collection

In this case study the researchers have collected data in many different ways, to ensure they build their evidence on multiple sources. From the very beginning the researchers have been open to what kind of results that would come from the analysis', and in this way they have not systematically excluded any data or findings. Multiple sources also made it possible for them to check their findings through other sources. The researchers have strived to use as many sources as possible to get an analysis of the highest quality. This created a triangulation of data, which again revealed some significant patterns about the issue.

Information picked out in the process is the information seen as relevant at that given point. How relevant it appeared, was impacted by the knowledge of the phenomenon at that given time. The relevance of information may therefore change. Often the value of reading theory and information led to an increase in own understanding. The theory also lead to new questions and new reflections. Since the consultants were in Slb throughout the period they completed the case study, they had the opportunity to ask new questions, elicit new information etc. as the data changed over time, and their understanding of the phenomenon's investigated increased throughout the time.

### 10.5.1. Sources of the evidence collected

#### *10.5.1.1. Data from Schlumberger's programs and systems*

In the time period of this case study a large amount of reports were exported from different Slb programs and systems. Most of it was from Reporter or Tableau, and the source was one or all of the three; Lawson, Oracle, SWPS, DFM and ASL. In the different steps there was a mixture of extracting reports with a high number of cases, and looking more qualitatively in to one specific case. The consultants had access to these programs and systems throughout the entire period, which was a big advantage. Some of the information in these systems are manually punched by a Slb or Accn, and the researchers found some typing errors and wrong

information in some of the data. Fortunately this was not to a large extent, and these errors are most likely not something that would alter the results significantly.

#### *10.5.1.2. Slb Internal documents*

All web page references starting with <http://hub.slb.com> are from an internal intranet web page, and are not accessible for people outside Slb. Since it is made by employees at Slb it can be reasonable to believe that these documents have a subjectively appearance. The researchers have been aware of this from the beginning, but with their discernments, they concluded with there being a relatively low degree of subjectivity in the documents. The employees are also perceived as honest towards the researches. The researchers believe that they in most cases managed to obtain objective information, and that impression was reinforced when controlling with a variety of sources inside and outside Slb.

Slb have good policy and procedures which ensures that the documents located on the internal website meets certain requirements. A weakness with these internal documents was that some of them where a bit old. The researched could not be 100% sure that they always understood the context in which these documents were made, because it was in some cases hard to retrace the history of the document. In cases where the researchers considered this uncertainty to be too large, the documents were not used

#### *10.5.1.3. Other documents*

In the process of collecting information the researchers collected a large number of documents and files, mainly to expand their own understanding. Especially in the process of gaining knowledge about the suppliers which they were dealing with. Examples of types of documents uses are e-mail correspondences, announcements, contracts, written reports, proposals, progress reports, formal studies, organizational record, maps and charts.

#### *10.5.1.4. Interviews with people at Schlumberger*

Throughout the process many interviews were done, and numerous people where talked to. Mainly this was people in Slb or Accn, but some of the subjects were also discussed with people outside these companies. The researchers also had some interviews with people outside Slb and Accn. All the interviews they had degenerated in varying ways. Some were arranged meetings where many questions were planned and formulated in advance. Others were more

informal and unplanned conversations. In the latter cases it was especially often that new questions appeared during the conversations, and that new issues were illuminated for the researchers. The researchers were able to ask questions about one specific issue, and to be able to get a respond directly from a person who is working within the field at the given time was of high value. This led the researchers to continually update and fill in new information where information was missing or inconclusive, and it also raised awareness of new issues within the given field. The researchers had the opportunity to interview people with high professional competence, and many with a long career within Slb. This was a good help when the researchers wanted to make their insight in the cases as complete as possible.

One disadvantage with talking to people the way it was done in this paper is that the answers might be formed by the question posed. These questions were formed by the insight and understanding the researchers possessed at the time the questions were asked. The interviews were done in such a way to hinder a suggestive undertone, but if some of them appeared as suggestive questions for the interviewee, the interviewee might have wanted to give the answers he thought the interviewer wanted to hear. A general assumption is that the interviewees want to make Slb appear as good as possible, and this may in some degree have affected their replies. Every interviewee have their own background, understanding and subjective opinions, which means that each interviewee provides unique answers. On the basis of this the interviewer strived to ask the same questions to different people in different positions within the company to cross check the information given.

#### *10.5.1.5. Internal and external meetings*

In the period of the case study, the researchers attended a lot of internal meetings, and some external. The researchers had in some of the meetings the role as participants, and in other meetings they were only observers.

#### *10.5.1.6. Direct observations*

While the case study was done the researched worked in Risabergevegen 3, an administration office and the head quarter for Geomarket NOR. The desks used was in an open landscape, between P&S and the AP Retrain Team. This gave the researchers a good opportunity for continued learning process and were able to improve their understanding of how these two departments are working on a day to day basis. Due to having the “reality” close to them, and

being involved in many of the issues appearing in the two departments. As Yin states it is a big advantage to be able to have reality cover of events in real time. (Yin, 2009, p. 102). One weakness with this data retrieval is that the researchers cannot be sure if the employees have intentions to fake the reality and make it appear better than it actually is. The researchers are students "from the outside" and SIb may wish to appear in the best way possible.

#### 10.5.2. Primary and secondary data

In this study, both primary and secondary data has been used when gathering information. All data obtained from one of the SIb systems is primary data, and this first-hand information created a good basis to build the analysis upon. Secondary data was mainly literature and research theory and when investigating the topics concerning the given case.

### 10.6. Data analysis

To analyze the data the researchers used Microsoft Excel frequently. Different formulas in Excel were used, and many calculations were done. Together with the use of filtering, the Excel function Pivot Table, VLookup and Solver was the ones most frequently used. The researchers also got great benefit from using different distribution analysis. SPSS was used to run the different regressions. The regressions and distributions were used to shed light on the different variables affecting POT and being able to evaluate the different variables against one another. The regression is a good tool because it is able to incorporate several variables at the same time and thus isolate the effect from the given variable. Otherwise it would be easy to give a certain variable an effect it in reality does not have. The distributions are helping to shed light in terms of giving a more nuanced picture of the different outcomes of a variable, and to get a better understanding of the underlying conditions.

### 10.7. Criteria for judging the quality of the research design

#### 10.7.1. Reliability

Checking the reliability of this study, is like having an audit on it. When the studies were done the researchers were highly conscious and tried to ensure that the results were not affected by their analytical approach or technique. The researchers wanted to conduct the research in such a way that the same study can be redone at a later time, and give somewhat the same results. Where any deviations would then have been due to changes in time.



#### *10.7.1.1. Defending that the findings are reliable*

The researchers think that the method and procedure in this paper makes it possible to go back and understand what has been done, step by step. Even though all of this is not relevant for this paper, and therefore not included, it can be provided upon request. There is good documentation on everything that has been done, and the researchers have a database where they have kept everything, not publicly available; like analyses made, documents used etc. The researchers worked closely together, where each of the researchers had to defend to the other what s/he did, and this helped to ensuring that correct research methods and procedures were done at every step. The researchers discovered each other's minor errors, and avoided unnecessary mistakes. The study includes to a large extent the use of time series data, which makes the analysis more reliable.

#### *10.7.1.2. Reasons why findings may be unreliable*

It cannot be denied that the findings in this paper to some extent are formed by the people talked to, and the understanding they had. It is not for sure that if other people in another period would have been talked to instead, that the findings would have been exactly the same. But to the extent possible, the researchers have tried to exclude subjectivity in document, interviews and so on. And for the data analysis part at least the data has been reliable, yet the methods used could possibly be discussed. For some of the analysis the researchers were very sure of their approach, yet other analyses were more difficult to conduct and in these cases the researchers concern has been clearly expressed.

### *10.7.2. Validity*

If this study is to have value in the future, one of the main criteria is to which extent it is valid. As Yin writes, validity is to identifying correct operational measures of the concept being studied» (Yin, 2009, p. 40) In this study the main focus has been on conceptual, internal and external validity.

#### *10.7.2.1. Conceptual validity*

Conceptual validity is a questions about the extent of what is wanted to be measured has been measured. Concepts and terms used in this study are reasonable tangible and concrete, and there is a large degree of conceptual validity in the study.

### *10.7.2.2. Internal validity*

Internal validity says something about whether or not there is ground to draw conclusions from the findings or not. Even though there are some errors in the data used, the data collected is of such a tremendous size that it is possible to draw conclusions from the findings.

The people interviewed were in most cases chosen based on their job description. In some of the cases the person answering the questions from the researchers was based on coincidences, such as who were available, and who was located nearest. Even though multiple sources were used in all the issues investigated, one cannot say that the people interviewed are a representative sample of Slb NOR Geomarket. There were some informants that were used frequently throughout the process, and the characteristics of their disclosure may have affected both the processes and the results of this paper.

### *10.7.2.3. External validity*

The degree of external validity helps explain to what extent it is possible to generalize from the results. The main goal with this case study was to investigate POT for Slb. This is a single-case study, meaning that it did not compare multiple cases e.g. in different firms. But even though external validity was not the main agenda, the researchers believe that parts of the case study can be generalized, and be useful for similar companies and or future research. The parts found valuable for other units might be both methods used and the results. But if findings are used in other units, this must be done with caution because there are characteristics of Slb affecting the findings. It's hard to know what is unique for Slb, and which similarities Slb have with other companies. Bear in mind that since the study is conducted as a case study, the concerns of the particular situation is what the researchers want to extract, and not primarily the possibility of generalization of the results.

## **10.8. Confidentiality**

Before the study began the researchers and mentors at Slb discussed, evaluated and decided how data and information from Slb should be handled. Researchers also signed a "Non-disclosure agreement", which states "The employee agrees to keep any company or business information and secrets that may be revealed to him during the employment period confidential from third parties, both in the duration of employment and after the employment has terminated.". The researchers did not want to harm the business, and together with Slb

they found out that the best thing was to apply for five years of restricted access to this research paper at the University of Stavanger.

## 10.9. Reasons why Schlumberger does not always pay on time

While investigating the POT issue, the researchers realized that there are many reasons why Slb does not pay all their invoices on time. Although this will not be an exhaustive list, the following are the most recurring causes why Slb does not manage to pay on time:

### 10.9.1. Internal Schlumberger issues

- The Invoice payment process used today is too long.
  - o A complex work flow due to many mergers and acquisitions
  - o It is a very large and complex organization
- One invoice might involve a large number of segments, and this expands the time needed for validations and approvals.
- Sending the invoices by post, often across country borders is consuming a lot of time
- After the invoices have been entered into the system, the invoices have to be approved by one or more approvers before it can be paid.
- The people working in Accn do sometimes have questions regarding how the invoice should be processed, partly because they do not have the same knowledge as people closer to the operations. Language and cultural knowledge might also lead to misunderstandings. DFM is used to make communication between Accenture and NOR simple, but it is time consuming when there are many actions that need to be cleared before they can take place. Based on these challenges, mistakes are sometimes made, and these takes time to correct.
- The person who has received the ordered item has not registered the item as received, and the invoice will therefore not be paid. This is only for PO invoices.
- The person ordering a good did not provide sufficient information to the supplier, like full name of the Slb employee ordering the goods or services, Slb cost center number, etc. Then the invoice from the supplier will not be compliant, and cannot be paid by Accn. This is for Non-PO invoices. The vendor is not approved
- Vendor Master Data errors
  - o Vendor master data is missing

- For many of the suppliers, there is a mismatch between the PT stated in contract or used on the invoices, and the PT in the systems Slb use. One of the main reasons for this is that errors have been inherited during the mergers. The people working in P&S are aware of this, but due to other work tasks with higher priority, have not managed to correct all of them.
- PO made incorrectly
  - The invoice does not pass the 3-way match, due to mistakes on the PO or invoice
  - The PO has been closed by error, and the invoice will not be paid until the PO status changes
- IT/program/system issues
- Restructuring of departments and positions
- Unclear areas of responsibility
- Too large work load for the validators, approvers and AP
- The validator or approver is on vacation or have left the company, and did not delegate authority.

#### 10.9.2. Issues caused by Accenture

- Accn have launched the invoice with the wrong parameters, and therefore not picked up in the system
- Accn is located in India, and if the supplier is not willing to use the portal, it has to send the invoice abroad. This will normally take longer time. It could also be that the supplier has other routines with mail which are to be sent abroad compare to domestic mail. Because of this, mail to be sent abroad may remain longer at the supplier's office before it is posted.

#### 10.9.3. Payment terms

- Credit time is too short
- Date calculation is from invoice date instead of received date:
  - For the suppliers who send their invoices with the mail, and give Slb PT with date calculation from invoice date it is a disadvantage for Slb that the mail needs to be sent all the way to Prague. In some companies the mail going abroad are sent with fewer intervals, compared with the domestic post, and this

will negatively affect Slb's POT even more. In Norway it is very common to set date calculation to invoice date.

- In some cases the invoice are first sent to a Slb location, and then invoice is returned to the supplier who is informed of the correct billing address.
- If it is the supplier's fault that the process of the invoice starts very close to due date, the supplier would in most cases allow Slb to pay a bit later. The thing is that in practice it is not so often that a person in Slb or Accn take the time to contact the supplier and confront them with this. And even though this call is made, in some cases the overdue interest invoice comes anyway, because the message is not forwarded to the right person or company sending out the invoices with fees and interest. After all the process for both Slb and the suppliers are mainly automated so even though the fault might lay with the supplier, in the end it might turn out to be an extra cost for Slb regardless of their handling of the case.

#### 10.9.4. Issues caused by the supplier

- Incorrect SLB Legal Entity billed
- Information on invoice not correct
- The supplier wait before sending the invoice after it is issued. This delay in invoice submission is especially harmful for Slb when date calculation is from invoice date.
- The supplier have given Slb good PT, but have not updated it in their system. This will not harm POT for Slb's KPO, but it might lead to an overdue invoice from the supplier since they are not aware of the inconsistency. In some cases the supplier's system are not able to handle the agreed or desired PT.
- The supplier send duplicate invoices.
- Slb is waiting for a credit note corresponding to the invoice, and do not pay the invoice before it has been matched with the credit note.
- Wrong currency on the invoice

#### 10.9.5. Special cases

- Paying on time for building rentals are often a challenge. In many of the rental contracts, the payment is due the "1st of month every quarter." What many of the landlords does is that they set the invoice date and the due date to be the same date. To

give Slb a chance to pay before due, they send out the invoice one month before due date. The problem is that Slb's programs are not able to pay an invoice before invoice date. Therefore these invoices will always be paid too late. The landlords needs to pay VAT according to invoice date, and they therefore maximize their cash flow by not changing invoice date to the month before.

## 11. How to improve payment terms in Schlumberger

When focusing on improving POT, it is important to look at both internal and external factors. “15. Variables explaining payment on time” will provide a good picture of how different variables are effecting POT. As a part of this case study, the two consultants where to affect POT as much as possible. After some investigation and discussions, they decided to look into the PT, and try to improve them. PT is one of the external circumstances that Slb easiest can change to impact POT without going in to more complex contract negotiations with the supplier.

As described in “8.3. Invoice payment process”, the invoice payment process is time consuming, and this makes it hard for Slb to pay their invoices on time. The most common PT in Norway is 30 days from invoice date, and this is often too short for Slb.

As described in “7. Background”, a company should strive to have operations which can finance themselves, meaning that the PT they get from their suppliers are as good as, or better than the ones they give to their customers. Slb therefore strive to have as low as possible Days Sales Outstanding (DSO). DSO is a financial health indicator that shows the age in terms of days outstanding of a company’s accounts receivables. DSO is calculated like this:

$\frac{\text{Receivbles} * 365}{\text{Total revenue}}$  (Schlumberger, 2014a). The case for Slb is that they often have projects which they cannot charge before the project is completed. But in the process of completing the project they need to buy products and services which are invoiced at the time the product is bought or delivered. If the project goes over several months, it is challenging to have projects which does not negatively affect the working capital. Therefore, an improvement in PT is highly desirable for Slb.

### 11.1. Which supplier to prioritize

The following is a description of the procedure used by the two master students, hereinafter referred to as consultants, when a decent piece of work was done to improve PT in Slb. To start with, it was necessary to use time to get a good understanding of how the organization, processes and systems works. They also familiarized themselves with the current issues for PT, and what was already done and currently worked on by the people working in P&S.

A discussion was held to decide which suppliers to start with. The three following approaches was discussed:

- Start with the suppliers which Slb uses the highest amount of fees and interest on
- Start with the suppliers with worst PT
- Start with the suppliers which Slb spend most money on

To be able to choose the best procedure for the execution of the task, the consultants wanted to find out what the direct financial cost of fees and interest (DFCFI) was in 2014. This to be able to say if the cost from fees and interest in reality is large enough to throw of the benefits from value added for improved PT for the suppliers with highest spend.

### 11.1.1. Direct financial costs from fees and interest

When deciding which suppliers to focus on when improving PT, the implication of fees and interests from overdue payment naturally appeared. This is because it is a very tangible and visible cost. With that said it is not so that all firms, suppliers in this case, will charge late fees and interest on their overdue bills. In Slb it is said that very few foreign companies charge fees and interests from overdue payments. To which extent this statement is true will not be further investigated in this case study.

Slb keeps good track of their transactions and this make it possible to take out large amounts of data to analyze. The data is the tracked “life” of the invoice where every important action in the process of the invoice, from invoice date to payment date, is logged and accessible in real time. The dataset that has been used includes all invoices paid by Slb NOR Geomarket in 2014. In 2014 over 60,000 invoices were paid. All of these invoices sum up to just over \$930,000,000 USD. With all that said, it is clear that the there is a lot to keep track of and the possibilities of large overdue payments are evident, and are already to some degree a fact.

Throughout 2014 for Slb NOR, the payments that were not paid in time mounted to \$259,992,000 USD. Off course most of the invoices were paid shortly after the due date, and some of the amount is beyond Slb`s control. Still when considering the scale of the late payments, the potential interest and fees for late payments is high. And considering how this could affect Slb`s reputation and negotiation power it is clear that the focus on payment on time is important.



The data extracted from this dataset for this analysis was spend on the overdue payments and how many days overdue. This information was used together with the maximum allowed interest of 9.25%<sup>13</sup>. The law also states how much a firm is allowed to charge in fees, but fees were excluded from the calculations for this time, since it would be very time consuming to extract from the data, and is probably the lesser part of the cost from overdue payments. And if the findings show a big difference between actual cost from both fees and interests and the possible interest from the same overdue amount, it is safe to say that the difference between real and possible cost would only be magnified by adding fees. This will be explained more clearly later.

The way the possible cost was calculated was by using this formula:

$$\sum_{i=0}^n (\$Spend \times \frac{days\ overdue}{365} \times 0,0925)$$

Here are some examples of invoice calculations taken out of the dataset. These are not representative for the general population of invoices. See “Table 1”.

Calculation examples of possible interest on invoices level					
Examples	Paid On Time	Base Investment Amount	Days from due date to payment date	Interest	Possible interest cost
Example 1	On time	\$1,888.07	-288	9.25%	0
Example 2	On time	\$1,072.54	-13	9.25%	0
Example 3	Late	\$106.93	13	9.25%	0.35
Example 4	Late	\$24,167.77	243	9.25%	1488.30
Example 5	Late	\$372.13	80	9.25%	7.54

*Table 1 Calculation examples of possible interest on invoices level*

When this was done for all the invoices in the dataset, the possible interest cost sums up to over 2 million dollars for 2014. See table “Table 2”.

<sup>13</sup> ("Lov om renter ved forsinket betaling m.m. (forsinkelsesrenteloven).", 1978)

Sum possible interest cost	
Interest	9.25%
Days in in Year	365
Sum possible interest cost:	\$2,067,165.57

*Table 2 Sum possible interest cost*

This number might not be a perfect indicator of the possible cost from the late payments, considering that some of the late payments may be caused by the supplier not doing their job right, late invoices etc. Still it is a somewhat description of how the picture could look. Now in reality the real cost of the late payments in the same period (Jan – Des 2014) summed up to \$191,355. This is the number that will be used for the main objective here, to see how much on average Slb have to pay in interests and fees per dollar per year. To do so, excels solver tool was used and said that instead of using the interest of 9.25%, what should the interest be to get the total spend to be \$191,355. This resulted in an interest rate of 0.86% for the DFCFI. Be reminded that this is not the interest of the invoice alone, but also includes the fees.

When looking at the suppliers with the lowest credit time it was seen that a lot of these were very rarely used by Slb. Still it was shown that if dividing the groups between those with less than 31 days credit time and those with 31 days or more, the one group below is the greatest. So this points in the direction of a good possibility to move suppliers from this group over to a group with higher credit time, preferably with 50 days credit time.

If all Suppliers were to charge interests from day one on late payments, according to the numbers received from the finance department in Slb, it would in total amount to approximately \$2,067,000. This is without the fees that would increase the amount. This would be a very costly way of financing late payments. To shed more light on this the cost is compared to a normal WACC from a similar company to Slb, since Slb`s WACC is secret. This is the WACC for “Det Norske” for Q1 in 2015, set at 9.1% (Norske, 2015), and the difference between only interest costs and the WACC is negative. Adding fees to this amount would only increase the potential loss from going over due on the payments in terms of financial cost. And this is without considering the consequences it has for Slb`s reputation and possibly harmed negation power etc.

Now, it is not so that Slb received this high cost on its late payments, in fact 2014 charges of both fees and interests was “only” \$191,355. When considering this amount and then use it to find the “real cost of overdue payments” it shows that the DFCFI is close to 0.86%. A cost of under 1% for delayed payments is very low and can if viewed isolated be a good way of financing the operations. Off course this is just one aspect of the picture, and as mentioned before there will be very many factors affected by Slb`s ability to pay their bills in time. It could be that the suppliers most eager to collect their receivables and charge fees are the most vulnerable relationships. One could also argue that the suppliers with the highest spend is the suppliers most important to keep a good relationship to and maintain negotiation power with. The researchers also considered that the fees and interests could have been a lot higher if the AP-team was not so focused on it, and thus the “threat” of fees and interests might be understated.

Now when considering the WACC together with the DFCFI it is clear that the direct financial benefit of paying late is a lot higher than the cost. Where  $9.1\% - 0.86\% = 8.24\%$  is the difference between the direct cost of paying late as opposed to the direct benefit, not considering all the negative side effects. And one supplier with improved PT will still improve Slb`s ability to pay this supplier on time, and thus contribute to Slb`s future negotiation power and reputation. So in reality the main difference between the two focuses will be the DFCFI, which in large is overthrown by the WACC.

Also considering the distribution of credit time where a great deal of the invoices have 31 days credit time or less, this gave the researchers the incentive to try to start from this group when improving payment terms. The reason for it is that although one might find higher spend for some of the suppliers with more than 31 days credit time, there will be less effect to increase from say 45 days to 50 than from 30 days. So the researchers consider it to be a good thing to go for the suppliers with less than 31 days credit time.

As a side note the researchers were wondering why it so that Slb`s suppliers in a large scale does not use their opportunity to charge fees and interest? Here there could be national differences as mentioned before, and these could be due to financial traditions or just practices saying that one does not charge foreign companies with fees and interests due to low effect. Without the numbers it will all be speculations. Other factors that could affect this is that

Slb's suppliers are not charging fees and interest to make sure they don't harm the relationship. One might think that this would be especially evident for the companies with high competition where one supplier could easily be replaced by an equal company. So they may be more reluctant to charge fees and interest in order to keep Slb as their customer. Vice versa the researchers would also expect the suppliers with a "monopolistic" position to be more inclined to charge fees and interests, due to their less price elastic demand. This is an interesting phenomenon worth looking into and the researchers encourage others to investigate the matter further.

### 11.2. Procedures for improving payment terms

When considering the three different procedures to sort through the suppliers the researchers found that two will be focused on. First and foremost the main differentiation is whether go after the one with high spend or high cost on fees and interest. Because of the arguments presented in the DFCCI analysis the researchers consider that the benefit of sorting after spend overthrows the benefit of sorting after cost from fees and interest. This is based on the fact that the real cost of late payments is quite low, while the benefit of improved PT for high spend suppliers is very high. And for the more "qualitative" aspects of harmed relationship and negotiation power, the researchers consider the suppliers with highest spend to also be the suppliers where it is most important to maintain or improve the relationship. Also the researchers do not think it is a good idea to just go after the suppliers with the lowest credit time since a great deal of them are rarely or never in use. While the category with less than 31 days is very large, and the benefit from moving a supplier from this category over to 50 days is larger than from a high credit time category.

Based on these conclusions, the improvement on PT is generally done by selecting all the suppliers with less than 31 days credit time and then sort after spend. The job consisted of contacting the suppliers with the highest spend, and try to make them sign T&C. The work was done in the period from October 2014 – March 2015, and at regular intervals the list was updated with the latest figures. Which supplier the consultants worked on was mainly determined by these lists, but there were some rare exceptions where there was put down effort on suppliers aggressive in charging fees and interest.

Slb has decided to have 50 days from invoice receipt as Slb standard. They need a PT standard that will function well on a global level, even though it might not be optimal for every country. Setting date calculation as “invoice receipt” reduces the risk for Slb. If a supplier submits their invoices by mail, the customer always takes some risks by allowing the payment clock to start from invoice date. There might be lost a few days when the invoice is in transit, and there is always a risk that the invoice never is received. Slb avoids this risk by setting date calculation as “invoice date”. (Schlumberger, 2013b) This Slb standard of PT, 50 days from invoice received, is stated in a standardized a Supplier Agreement called T&Cs.<sup>14</sup>

When starting to work on one supplier, first the researchers had to acquire knowledge of the supplier and the current situation, first stating if a contract or T&Cs in was in place. If there already was a contract or T&Cs in place stating that the PT should be e.g. 45 days or 50 days, there was a request sent through ASL to get the PT updated. Slb will in many cases use the same supplier worldwide, and there will then be a Master Service Agreement applying to all Slb’s companies. These Master Service Agreement often have good PT. That said, it will often be hard to impact the PT for a global supplier if the PT is bad. There a much larger process needed to be able to change PT for a global supplier. The consultants experienced that the suppliers which Slb use the moast money on are often large and complex, and then process of getting the suppliers to change a PT is long and takes a considerable amount of time.

Some suppliers might have a contract with Slb, but the PT is poor. In these cases it is important to know all the conditions in the contract which involves PT, and be careful with letting the supplier sign a contract amendment or a T&Cs which harms the initial contract. If there was no contract in place, or for some other reason the PT was below 31 days, the consultants investigated to see if there was any reason for the current PT, and asked supplier manager, and others if necessary, to find out if they have already asked for improved PT. The consultants had in mind the important conditions described in “9.3.Conditions to consider when improving payment terms” and made judgments in each case. A lot of research was done to get an understanding of the overall picture of the relationship between Slb and the different suppliers. When enough research was done, the consultant contacted the suppliers. They contacted the person in the firm with the authority to make the changes in PT which Slb

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<sup>14</sup> (Schlumberger, 2013a)

desires. The situation about the difficulties Slb have with POT with the PT from the supplier was explained. The explanation consisted of the size of Slb's companies, and the complex processes which Slb must adhere to. The supplier was informed that Slb is only interested in retaining suppliers with good PT. Also, it was expressed that Slb appreciate the supplier, and would prefer to keep it. Since it is a supplier with high spend, it is a supplier with many abilities which is beneficial for Slb.

The most advantageous for the supplier would be to get payment in advance. The difference between this and payment terms of 50 days from invoice receipt is quite huge. This will have a major impact on their cash flow, especially if Slb generates a large share of their income. The consultants had this in mind when working on the different cases.

The goal when contacting the suppliers was to make the supplier sign the T&C, and by that agree to PT of 50 days from invoice received. If the supplier was not willing to sign this agreement, but could give better PT than current PT, an oral or written agreement was made. T&Cs is favored by Slb because it gives very good PT, and also because it clarifies several other conditions except for PT, and this lowers the risk for Slb. If desired change in PT was agreed on, a request for change and update was sent through ASL. Also documentation on the agreement was uploaded to ASL.

The consultants were surprised by the great willingness to accept the request for better PT. The consultants assume that the creditworthiness of Slb makes it easier for supplier to accept PT of 50 days from invoice received. The supplier knows that even if the money comes somewhat late, there is a very low risk of the money not coming at all.

Some suppliers were a bit skeptical to change date calculation to be from invoice received. This makes it more challenging for the supplier to do the follow-up work related to outgoing invoices. Regardless for whether they do it themselves, or uses a external company to do this work. Slb does not tell the supplier that the invoice is received and on which date. That said, if the supplier use the Portal, the received date will be the date that the supplier uploads the invoice, this way the supplier can keep track of the due date. In some cases the supplier was not willing to increase PT, without making any changes in prices or discounts.

With all this in mind, it might be wrong by Slb to ask all their suppliers for 50 days. Maybe it would be better to create a vendor profile for each vendor, containing a PT suitable for the given supplier. Slb would then ask for different PT depending on which supplier they are negotiating with. Factors affecting which PT would be optimal:

- Our barraging power
- The size of the supplier relative to Slb`s size
- The PT this firm gives to us
- The spend Slb have on this supplier
- The prices this supplier gives to us
- The profitability of the supplier
- If the supplier is monopolist/sole supplier or in hard competition
- The supplier might face the different Slb companies, have different relationships with them, then it might be necessary to ask for different PT for the different Slb companies.

That said, working on finding a unique PT for each supplier would be very time consuming.

## 12. Payment terms changes implemented

In the period from September 2014 to March 2015 the work on improving PT was done. In this time there was a total of 269 requests sent through ASL, involving 223 different suppliers. These requests updated the information in ASL, and due to the linking in ASL, these have led to requests for changes in a total of 1050 sites in 29 different programs. What is most relevant when it comes to payments is the changes done in the ERP systems. All together there was a request for change on 734 ERP sites.

The total number days of credit time improvements, sum up to a total of 10 716 days when all changes on the suppliers involved are added together. And the average number of days change on every site will then be 14,6 ( $\frac{10.716 \text{ days}}{734 \text{ ERP sites}}$ ). As a part of the follow up after the work done on PT, some analysis was done to see the effect of the changes. This was done when the figures for April 2015 was ready, because there was made an assumption that very few request would take over one month to implement.

In this case study it was found that not all requests sent in ASL were implemented, and the following is a presentation of the main reasons for that. In the process of finding out what current agreement regarding payment terms was, the way to find a contract was often to go to parent in ASL. Often it appeared that there was a contract in place on a global level, but this was not reflected in the ERP sites for NOR. In the first period the consultant did not know that this parent ASL are often not linked to any ERP sites. Therefore a lot of requests were sent, and the only effect was a VMD update in ASL, but not change in ERP for this supplier.

Another reason why this is not higher is that all the ASL requests have not been approved by ASL manager. From a total of 269 requests sent, 254 have been approved by ASL manager. Even though it is only 15 ASL requests, it can be a loss of impact because often there are many ERP sites under one ASL. The reasons why this request have not been approved by manager might be that the work load for the supplier is too big, and or that the manager is responsible for too many suppliers, and does not feel that they have the basis to know if the request is correct. In one case the consultants experienced that a manager did not know how to approve the request, but the consultants have the impression that this a rare exception.



Another problem, which might be the biggest problem is that the ERP sites are not always linked correctly to the ASL site. So even if a request is sent through ASL, the change will never be implemented in the correct ERP sites, thus the payment will still not be paid on the correct date. In this calculation the consultants also assumed that the sites in use by NOR in the time period August 2014 – March 2015 are the ones that will be in use in the future. There is no positive effect for NOR if the updates are on sites NOR is not using, and the consultants found that 175 of the 734 ERP sites was sites which was not in use by NOR. Due to this linking in ASL, the value of the work done on PT have been markedly lower than what it could have been. This is mainly an internal issue for Slb and has little to do with Accn.

## 12.1. Exploitation with current systems

One important reason why the work on PT was done, was to find out how good the process of updating VDM (PT in this case) is today.

The figures from the work done on 223 suppliers gives the following findings:

- 5,6 % of the request sent through ASL did never get approval/rejected by the supplier manager in ASL
- The why the linking between ASL and ERP is today, 23,8 % of the ERP sites updated are sites which is not used by NOR.

Also, the effect of the change in PT might not be complete due to some missteps in the process of implementing a vendor master data change, ref. 8.4.Changes in vendor master data. A more complete list of issues related PT in Slb to this can be find under “14.14Internal improvements needed”.

## 12.2. Improvements on the KPO for credit time

The work done on PT affects the KPO Slb has for credit time. Figure 7 below shows how the percentage of suppliers with less than 31 days have decreased. The work done by the consultant have affected the figures from October 2014. Going from 72.20% in the group of less than 31 days credit time in September 2014, down to 62.36% in April 2015 is a good improvement ( $72.20\% - 62.36\% = 9,83\%$ ).

	Credit time <31 days	Credit time >31 days
<b>2014</b>		
September	72.20%	27.80%
October	69.84%	30.16%
November	69.29%	30.71%
December	67.68%	32.32%
<b>2015</b>		
January	65.53%	34.47%
February	67.13%	32.87%
March	65.97%	34.03%
April	62.36%	37.64%

Figure 7 Percentage of suppliers with credit time >31 days or < 31 days

Figure 8 below is a graphical representation of the number in Figure 7.

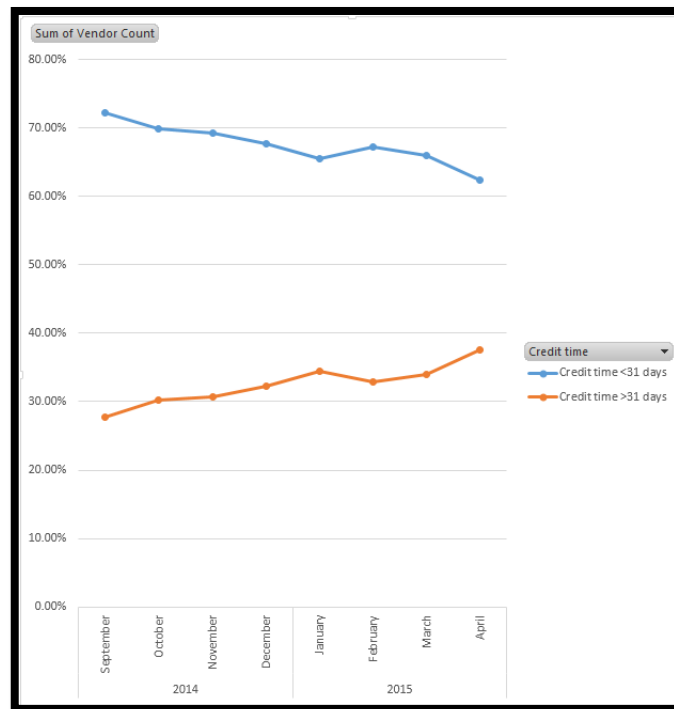


Figure 8 Percentage of suppliers with credit time >31 days or < 31 days

As stated background 8.5. Schlumberger’s Key Performance Objectives, the KPO goal is to have less than 35% of the suppliers with less than 31 days payment terms. This means that the company still have a long way to go (from 62.36% to 35%), and they will probably need more than May 2015 to December 2015 to achieve this goal.

## 13. The value of the changes in payment terms

Slb uses the KPO “<31 days” to see how good PT they get from their suppliers. The consultants found it valuable to link PT to spend and see how this is impacting the cash flow. This is done in the calculations below.

### 13.1. Credit time

The following is a calculation estimating the effects on the cash flow and liquidity coming from the changes in the ERP systems. Based on spend in 2014, the calculation provides the value of being able to pay later, due to improved PT. Assuming the spend and the WACC remains the same, these changes will give this added value every year. The formula used is the following:

$$\left(\frac{WACC}{365}\right) * change\ in\ PT = x$$

*Value increased: 2014 spend on the given supplier \* x*

$$X = \text{benefit/rent from the days}$$

When payment terms are increased it frees up capital. Say if a supplier had 30 days credit time initially, and by negotiation gets 50 days. Slb can now keep the capital 20 days longer. In the calculations done by the consultant WACC for Slb is used. Due to confidentiality, this number will not be stated in this paper. If this supplier have a yearly spend of \$100.000, the estimated value creation from this increase in Credit Time from the change in PT is:

$$\left(\frac{WACC\ for\ Slb}{365}\right) * 20 = X$$

*Value increaed: \$100.000 \* X = Y*

When using this formula for all the 223 suppliers, the total sum off value added is \$1.363.770. This is a high number, and this makes sense because it was the suppliers with highest spend most of the changes in PT was done to.

It was discussed to track the hours the consultants used when they worked on improving the PT, and compare this number of hour with the value created from these changes. The purpose

of this would be to know the value of each hour invested in the project. It was decided not to do this, because the hourly value would have been an incorrect amount, with the information available. This is because there is many people involved in each request sent, and it would not be correct to only measure the hours spent by the two people working with this case study. One cannot work in a global company and think like an individual, in terms of value creation. For instance, when a change is to be implemented in ERP, many people needs to be involved in the different stages of the VMD work flow. Also, there are many people sitting in the same office as the consultants, and they have all been aware that the consultants have been working on PT. Just the fact that the consultants come in, and are setting focus on POT and PT have its synergy effects. Slb will in the future most likely have advantages from both the direct and indirect effects coming from the case study done on PT.

One important thing to have in mind is that the improvement on credit time`s effect on liquidity is not a one-to-one relationship. Consider a supplier that intitially has 7 days credit time, and say that Slb on average go 3 days overdue with this supplier. An increase to 30 days credit time is not in reality creating an extra liquidity of 23 days but 20 days since Slb would usually sit on the money for the 10 days anyways. So the effect from increased credit time will therefor be a little lower than in this calculation, but still it will not be to far of.

## 13.2. Date calculations

It is of interest to see how many improvements there have been in date calculation in the ERP system. The number of ERP sites which had a change in date calculation from invoice date to receive date was 46. The changes in data calculations was because the consultant managed to get the supplier to agree on date calculations to be changed to invoice date, or because date calculations was stated in the contract to be from received date, but it was from invoice date in ERP. The consultants take self-criticism of not being specific enough regarding date calculation in the first requests that were sent.

From the end of November 2014 this was always specified in the requests. When looking at the ERPs which had been changed in some way in the period from November 2014 to March 2015, 37,8 % had also a change in date calculation. In the period October to November 2014, this was less than 4.7%. Another reason why the total number of changes in date calculations is not higher is because the people handling the request have not been sufficiently aware the necessity of having date calculation correct in ERP.

## The value of the changes in payment terms

From “15. Variables explaining payment on time”, it can be seen that effect of going from invoice date to received date has a  $\beta$  of 6,66. This is when 6% of the invoices received latest is removed, to make sure that the effect of date calculation is not overestimated. If an improvement in date calculation is the same as getting 6,66 days more in credit time, the same formula as above can be used, and the liquidity values coming from these improvements can be calculated. The formula will then be as the following:

$$\left(\frac{WACC \text{ for } Slb}{365}\right) * 6,66 = x$$

*Value increased: 2014 spend on the given supplier \* x*

When this formula is used, and the amount from the 46 changes is added, the total added value from the changes in date calculation is shown to be \$47.540.

## 14. Internal improvements needed

Slb can with some changes get higher values out of every improvement done on PT from their suppliers. When working with improving PT the consultants found some things which they recommend to be enhanced. The list below are systematic issues which they point out as the main issue points, and the things they recommends Slb to start working with.

### 14.1. Systematic issues

- It is a problem that the PT for one supplier is the same regardless of what kind of invoice it is. Say if there is an agreement with a supplier that they shall give Slb 45 day's credit time from invoice received, and this is used by the supplier on the regular invoices. Say if Slb does not manage to pay one invoice from this supplier within due date, and they send an interest note. This interest note will then normally have 14 days credit time from invoice date. The PT is still 45 days in the system, and the interest note will also be paid to late too, and the issue will escalate.
- There should be an easy way to see the comments written on the requests sent in ASL. In many cases important information about why the changes is necessary is added as a comment in the request. This information, and when the request was sent would in many cases be convenient to see for other people working with the same supplier.
- In every ASL there is a cell called "Payment terms", but only credit time can be added here. ASL does not distinguish between the two different date calculations; invoice date and received date. It is not possible to specify date calculations, and this leads to lack of important information. It is possible to write this in something called "Supplier Note", but in reality this is often not done. A change should have been made in the programming for the ASL page so that it is possible to specify not only credit time, but also whether this credit time should be calculated form invoice date or received date.
- When working on improving PT, it is necessary to get lists of all the active suppliers. To know which supplier to prioritize, one need to filter by spend, and also add filter on PT. All the different systems makes it challenging to export one list with all the information needed to do this work on PT. There is not one report which includes both spend and all other information needed.

By some merging of lists and use of excel functions, the consultants managed to make a usable list. To improve the efficiency of the work on PT, it should be possible to extract all this information easily in one report.

## 14.2. Lack of awareness

Below is a list of essential points which the consultants think is necessary to know for all the people working with Slb's supplier's PT. This is points which the consultants have experienced lack of awareness among the Slb employees involved in changing supplier's PT. One solution to this problem would be to make a hand guide which states out things necessary to know for people who are going to work with this in the future, which mainly will be people working in P&S. This hand guide would at least need to contain the following:

- Information about the differences between ERP Clean and remit to code, and how these two are used. This is needed to make sure that people in P&S are sending the correct requests in ASL. Not all the people working in P&S are well known with how Oracle and Lawson works. It is necessary to know how to check which sites the change will be implemented in, to make sure that the right requests are sent. Sometimes different PT will apply to different child within the same supplier, then this is especially important.
- It is important to be aware that it is not possible to change date calculations for remit to codes in Lawson. Date calculations can only be changed in ERP Clean, and this will apply to all remit to codes. This means that date calculations for every remit to code will be the same. In Oracle every remit to code can be changed, and a change in ERP Clean will not apply to every remit to code. It is therefore important to know that one need to check every single remit to code in Oracle.
- People need to know how to create a link between an ERP Clean and an ASL site or between a remit to code and ASL. When people are aware of how the linking should be, and how to change it, all the mistakes which is a fact today can be corrected as they are discovered. When people do not know how it should be, it will not be discovered and corrected.
- In general it is important that everyone is aware of what their own role is intended to capture, and who to talk to obtain relevant and necessary information to do their job.

- This hand guide should also include 9.3. Conditions to consider when improving payment terms.

Following now will be the analysis of how tracking of the data can help explain and improve payment on time. This is done by several regression- and distribution-analysis's.



## 15. Variables explaining payment on time

Because Slb is a large firm lot of different factors affect the POT, some factors are outside Slb`s control and some are directly or indirectly affected by Slb. For instance the time an invoice spends from it is created until it is received in the mail is not under Slb`s control, but Slb can to some extent affect the PT, and get the invoice to be calculated from invoice receipt date instead of invoice date. In this way Slb can indirectly influence the effect that time spent in the mail have on POT through its actions. Other factors is the time spent by Slb or the Accn team from the receipt of the invoice until the invoice is ready for payment and gets paid. There are also many other factors, both controllable and Non-controllable.

To know how much each of these different variables will effect POT would be of good help as guidelines when improving PT or possibly help see the need for routine changes within the Slb system. Ultimately to improve payment on time. First one would need to evaluate these different variables in relation to each other, and a good way to do so is to set up a regression analysis together with other tools as averages and distributions of the variables. The outlining for the coming chapter will be based on the regression, where it will outline the setup of the chapter and the specific variables additional analysis will be a continuous part of the regression analysis. The regression is run on the basis of individual invoices Slb have received from their suppliers, and these invoice`s logged information. One observation in this regression will represent one invoice.

The dataset used in this regression is information from all invoices received by Slb in NOR for all of 2014. Before the dataset was put in use, some changes were done to the raw dataset.

1. Credit notes were taken away, since they are not to be paid
2. Invoices where the dates for some of the variables had been misspelled were removed

The researchers did not find any systematic similarities in the excluded observations, and they only accounted for a relatively small part of the dataset. The raw data existed of approximately 61.000 invoices while after these adjustments the full dataset existed of 60.317 invoices.

Further adjustments were also made along the way when doing the analysis, to better understand the different variables. These adjustments will be explained for each respective variable. One example of such removals are the removal of Slb and Accn cycle time when

explaining the effect of PO since PO is generally lowering these variables, and thus the effect will be eaten away from the PO if not excluding these cycle times.

### 15.1. Dependent variable

What the regression ultimately is meant to explain is Slb's ability to pay on time, given certain variables. Two different depending variables are chosen in the following analyzes. These are; the dummy variable "paid on time or not" and the numeric variable stating "how many days from payment date vs due date". The latter one is the best because, while a variable might not show a significant effect to push an invoice over from Not-POT to POT, it can still be able to push it in a day or so faster/slower in the process. This is not as easily captured if the dependent variable is a dummy variable for POT or Not-POT.

For the use of the different dependent variable's a negative  $\beta$  explaining the number of days from payment date to due date is associated with a positive effect on POT, since it increases the difference from payment date to due date towards the present. Saying that if an invoice is expected to be paid three days late with 7 days credit time, with a  $\beta$  of -0.6 for credit time an increase from 7 days to 14 days in credit time is causing the expected Payment Date to be set to approximately 1 day before the due date all else equal.

When using the dummy variable for POT as dependent variable it will not show the number of days it affects, but it states more clearly if it has an effect on POT or not, since it captures the degree it helps improve POT. So if a variable gets a  $\beta$  of 0.5 it means that it positively improves POT, since a value of 1 is associated with POT. But to what degree is more difficult to say. One can say that a  $\beta$  of 0.5 is higher than 0.4 and thus the first variable affects POT more than the latter. This because it does not make sense that a variable helps an invoice being 50% POT, because it is either paid on time or not.

The goal for this regression is *not* to predict single invoices processing time or POT for one single invoice, but rather to predict the effect in sum of say moving 10% of the invoices from Non-PO to PO invoices etc.

### 15.1.1. Payment date VS due date

Measures the number of days from due date to payment date, so if the payment date is the 1<sup>st</sup> of January and the due date is the 11<sup>th</sup> of January, this value becomes -10. Meaning that the invoice was paid 10 days before the due date. So a positive  $\beta$  is associated with a negative effect on POT and vice versa. Noted as: “*PaymentD2DueD*”

### 15.1.2. Payment on time

States if the invoices is paid on time or not. E.g. a  $\beta$  of 0.5 means that this variable positively effects POT, yet to what extent is not so easy to say. Yet it is comparable to other variables  $\beta$  values. Noted as: “PaidOnTime”.

## 15.2. Independent variables

To decide which independent variables to include there are several factors to consider. The main goal is to include all variables affecting the dependent variable to the extent that they add to the explanatory part of the regression, without harming the significance to much. They therefor should not be closely correlated to each other, mainly correlating to the dependent variable. This is because one independent variable that is closely related to another will then to some extent predict the same changes in the dependent variable. This will be analyzed later through a correlation matrix.

Other factors to consider is the data in the dataset, and see if variables are either numeric values with either continuous or discrete number ranges. As example Credit Time in days is numeric and discrete while Accenture Cycle time is numeric and continuous, meaning it can include decimals as well. These are the most straight forward values when it comes to putting up the regression, while in the categories where you cannot range the different categories according to each other, such as usage of PO or not, a dummy variable is the way to solve this, where 1 could mean that PO is used and 0 is Non-PO.

Now to consider the different variables to be included in the regression. First they will be described shortly and then later in the paper there will be a more thorough analysis of both the variable and what the results from the regression says about this independent variables effect on *PaymentD2DueD/POT*. All time consuming variables are calculated by subtracting the

first date (time) from the last date (time), example if one variable is calculated from between 1<sup>st</sup> of January to the 6<sup>th</sup> the number for this time consuming variable would be 5.

### 15.3. Invoice date to receipt date

Measures the number of days from the invoice creation date to the invoice is received at Slb`s scanning center in Prague, Check republic. It is calculated by subtracting the invoice date from the receipt date, so if the invoice is created on the 1<sup>st</sup> of January and is mailed on the 3<sup>rd</sup> and received on the 11<sup>th</sup> this value will be 10, thus it is not showing if the time spent is due to the supplier waiting before sending or time spent in the mail. This variable will contain the time spent by the supplier from creation of the invoice until it is mailed, and the transport time from supplier to Prague. This variable will in this context mainly be of interest when it comes to the invoices calculated from invoice date, since this time is “eating away” the time Slb could otherwise have used to pay the invoice on time. Noted as: “*InvoiceD2ReceiptD*”

### 15.4. Receipt date to scan date

Measures the time from the invoice is received until it is scanned. Here you subtract the receipt date from the scan date and so if the receipt date is on the 11<sup>th</sup> and is scanned on the 12<sup>th</sup> this value will be 1. For most of the time the invoices are scanned the same day that they are received. This job is done by the Accn team, and is the first action directly “controlled” by Slb. Noted as: “*ReceiptD2ScanD*”

After the invoice is scanned it goes into DFM where both Slb and Accn is handling the invoice different parts of the time.

### 15.5. Accenture cycle time

A measure of how long time in the DFM Accn has the responsibility and next action of the invoice, such as distributing the invoices between the workers. Time spent here is measured in days and hours, giving numbers with decimals counting from the invoice is scanned. As long as the invoice is waiting for response from or being worked on by Accn this time will run. Noted as: “*AccnCT*”

## 15.6. Overall Slb cycle time

This is the time spent in DFM which is not spent by Accn. What takes time here is waiting for validator to validate, approver to approve etc. This value is also with decimals accounting for the hours and minutes of the day as well. So if this variable has a value of 2.5 it means that Slb used two and a half days processing the invoice in DFM. Noted as: "*SlbCT*"

## 15.7. Payment lead time

In Accenture cycle time and overall Slb cycle time, the invoice is processed in DFM, and it is thus possible to track if it is Accn or Slb who is using time. When this period is over, the invoice gets the status "Completed in workflow", and from this stage it is unfortunately not possible to separate Slb or Accn time spend. This is because it is done in ERP, Pay Hub etc, which does not have a tracking system. Payment lead time is from "Completed in workflow", until the invoice is paid. This payment date is what defines if the invoice is paid on time or not, but is not the same as the effective payment date. The difference between these two is that when the invoice is set to payment it is stated as paid, only waiting for the transaction to take place. Depending on the currency of the invoice and the banks being used the difference between the two will vary from one to four days.

In this period is the payment file needs to be approve by a Slb worker. If necessary, the invoice goes to payment as fast as possible, but if the credit time remaining until due date allows it, the invoice can wait until it is closer to the due date. The variable Payment lead time can be determined by many different factors, and does not alone have a clear prediction. But what can be said is that in almost all of the cases, there will be more time spent by Accn than by Slb. Noted as: "*PayLT*"

All the independent variables leading up to here sums up to the invoice total cycle time, from the invoice is created until it is paid all actions are either represented or a part of the categories above. There are still many other measurable factors affecting the payment time of an invoice, those added in the model are following here.

## 15.8. Credit time

States the credit time the certain supplier is registered with in the ERP program to Slb. So if the supplier has a 45 days credit time to a supplier, this variable will simply state 45. Credit Time is expected to have a large impact on the POT since short time to pay makes it more difficult to pay on time than for longer credit periods. This is also one of the main focuses in this paper when improving the POT. Noted as: “*CredTime*”

## 15.9. Payment terms calculation

This variable states if the invoice is calculated from invoice date or the date of receipt of the invoice. This is a dummy variable where 1 states that the invoice is calculated from receipt of invoice. It is expected that to calculate the invoice from receipt date should improve POT through it not being affected by the variable invoice date to receipt date. Noted as: “*Receipt*”

## 15.10. Purchase Order

This variable only states whether or not the invoice was created with a PO. The reason for adding this variable is that it is expected that the PO will decrease the time processing time since it already has been approved. This is done through the use of either the 1-click site or through other agreed prices and quantities. It also simplifies the control since prices often will be settled in advance thus reducing the need for controlling and checking if the invoice is as it should be, only needing to be checked against the already approved PO. Noted as: “*PO*”

## 15.11. Invoice submission type

Invoice submission type defines how the invoice is sent, and the most common is by mail, and is thus used as the base for the regression.

### 15.11.1. Supplier portal

The Portal is expected to shorten the time the invoice spends from invoice creation date until it is received since it is scanned and sent over the internet. Thus it should help increase the time available to process the invoice and thus improve POT. The effect from Portal will be biggest when date calculation is invoice date. Noted as: “*Portal*”

### 15.11.2. Urgent

The third submission type is when the invoice gets status urgent. This is invoices received to a Slb location, and will be taken care of by AP Retained Team. The “Urgent” dummy variable states if an invoice is especially important to pay on time, and thus either getting the status three days urgent or one day urgent, stating that it should be ready for payment within one or three days. This will affect the payment of the invoice by shortening the processing time, yet often the invoice will get the urgent because there is short time left, so this variable might not be very representative. Noted as: “*Urgent*”

## 15.12. Business group

Here the variable is divided between the three business groups that Slb exists of, MI-Swaco, Smith and OFS, where the largest group is OFS and thus is the base.

### 15.12.1. M-I Swaco

The second largest business group in the company. Differences might be caused by structural differences in the firms competence etc. Noted as: “*MP*”

### 15.12.2. Smith

The smallest business group in the company. Differences might also here be caused by structural differences in the firms competence etc.. Noted as: “*Smith*”

## 15.13. Country

States which country the cost belongs to, and here Norway is the base group. This variable is divided into two dummy-variables, DK or GB stating either Denmark or Great Britain. Great Britain is wrongfully used as a country for NOR, and only accounts for 300 invoices or 0.5% of the dataset and is thus kept out of the analysis as inapplicable. So if the country code is DK then the cost belongs to Slb Denmark. In advance there is no general assumption that any of the countries have any significant effect on the processing time of an invoice. Still there could be differences between practices of the invoices when it comes to being more or less effective in the process of the invoice, or more or less educated in including all necessary elements to the invoice etc.

15.13.1. Denmark

All the invoices where the spend is linked to a cost center in Denmark. Noted as: “DK”

15.13.2. Great Britain

Not applicable. Ref: “15.13. Country”

15.14. Base investment amount

This category gives the spend size of the invoice in dollars, and the reason for adding it is to evaluate if the size of the invoice will affect the probability of the invoice being paid on time. One could argue that a large invoice might take longer time because of its importance and thus taking more time to evaluate, on the other hand it could take shorter time because it might be prioritized because it is an important supplier which SLB does not want to damage the relationship with. At first the regression was run with spend as a continuous variable. When running the regression in SPSS these results came out:

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.801 <sup>a</sup>	.641	.641	21.9831

a. Predictors: (Constant), ScanReceived, Smith, Paymenttermsindays, BaseInvAmount, Receiptdate, Accenturecycletime, Urgent, DK, GB, DummyPO, ReceiptDateinvoicedate, MI, OverallSLBcycletime, Portal, PaymentLeadTime

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	52018370.710	15	3467891.381	7176.109	.000 <sup>b</sup>
	Residual	29140767.708	60301	483.255		
	Total	81159138.419	60316			

a. Dependent Variable: PaymentD2DueD

b. Predictors: (Constant), ScanReceived, Smith, Paymenttermsindays, BaseInvAmount, Receiptdate, Accenturecycletime, Urgent, DK, GB, DummyPO, ReceiptDateinvoicedate, MI, OverallSLBcycletime, Portal, PaymentLeadTime



Coefficients<sup>a</sup>

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.375	.367		-1.022	.307
AccnCT	.943	.008	.300	115.568	.000
BaseInvAmount	-1.159E-006	.000	-.004	-1.545	.122
MI	-1.909	.199	-.026	-9.596	.000
Smith	.496	.376	.004	1.320	.187
Portal	1.231	.202	.017	6.086	.000
Urgent	2.889	.569	.013	5.082	.000
1 DK	-3.093	.365	-.024	-8.472	.000
GB	-5.556	1.260	-.011	-4.408	.000
SlbCT	.972	.008	.329	122.254	.000
PO	1.235	.195	.017	6.345	.000
PayLT	.757	.009	.236	84.498	.000
CredTime	-.624	.009	-.202	-72.828	.000
Receipt	-13.669	.192	-.183	-71.143	.000
InvoiceD2ReceiptD	.526	.002	.637	248.264	.000
ReceiptD2ScanD	.577	.007	.200	78.334	.000

a. Dependent Variable: PaymentD2DueD

Running the regression this way the “Base investment amount” is not significant at the 90 percentage level, and the  $\beta$  coefficient is naturally very low because of the very wide spread of spend on invoices with low increments. Because of this the regression was redone with buckets for the spend.

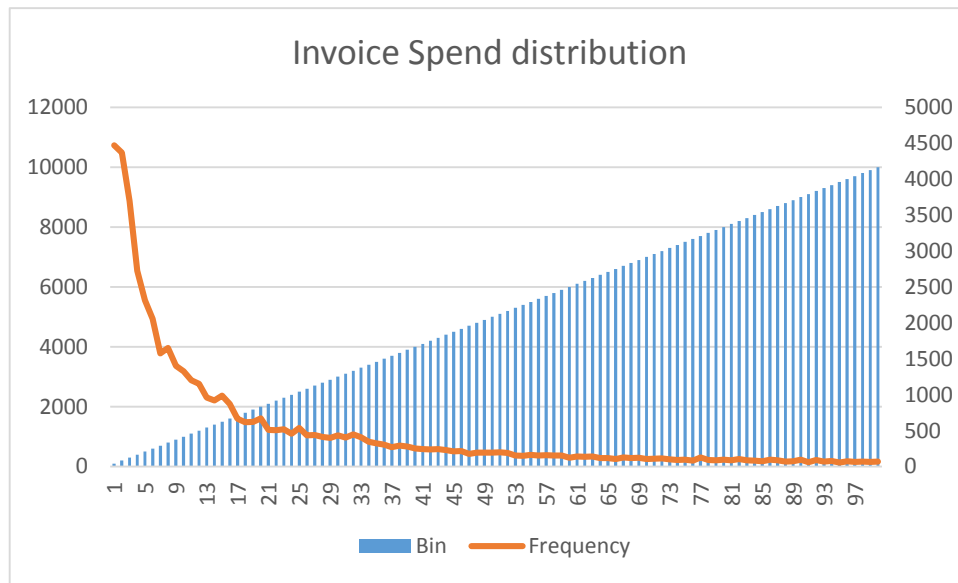
#### 15.14.1.1. Spend buckets according to the Finance Approval Matrix

At first the buckets were made based on the most common amounts in the Finance Approval Matrix. The goal with using the amounts in the matrix was to find out if there was a high correlation between the invoices which needed more than one approver, and whether or not this invoice was paid on time. The buckets were made in the sizes of 0-5` (base) and 5`-10`, 10`-20`, 20`-50`, etc. up to 2 million to 50 million and one for 50 million and above. See appendix “21.1SPSS Output – Approval matrix spend buckets – Dependent variable PaymentD2DueD SPSS output.”

Here the above 50 million category was subtracted because there were no invoices with higher than 50 million in spend. Other than that the significance level shows that none of the higher spend buckets are significant, neither for several of the lower buckets. These findings could point in the direction of the different approval stages not having a significant effect on POT.

*15.14.1.2. Frequency spend- buckets*

To try another angle to the question a last bucket solutions was tried. By using the distribution of spend, as shown in Figure 9, new buckets were created.



*Figure 9 Invoice spend distribution.*

In Figure 9 the frequency in orange is shown on the right axis and spend (bin) size in blue on the left axis. So to explain, where the orange line crosses the blue incline around the 17<sup>th</sup> bin (bottom values), this is associated with invoices with spend from approximately \$1700 (left axis) and there will be around 700 or so invoices within this spend interval (right axis).

What can be shown from this model is that there is a very smooth curve of the invoice sizes, where the slope is decreasing at a decreasing rate and then flattening out over the vast number of invoice spend sizes. The graph could have gone even further, but for the sake of this illustration it is not important. Out from this it is clear that the important range in terms of POT in total it is to look at the categories within the spend range from \$1 up to \$10,000. These first invoices up to \$10,000 accounts for approximately 80% of all the invoices in

NOR. With this in mind the buckets made for the new run of the regression is set lower ranges, were the vast majority of the invoices are. The result was these groups in hundreds;

1-2, 2-4, 4-7, 7-10, 10-15, 15-25, 25-35, 35-50, 50-100 and >100

Where all invoices below the bucket 1-2 (less than \$100) are set as the base, the SPSS output is shown under running the regression after the correlation matrix. Now only three of the buckets were insignificant and one of them was barely insignificant with a P-value of 0.107. Here also the largest sized buckets became significant as opposed to the previous buckets. These values are satisfactory for this research and is kept for further analysis. This gives these different dummy variables, noted as;

15.14.1.2.1 @1to2

From one to two hundred in spend on the invoice.

15.14.1.2.2 @2to4

From two to four hundred in spend on the invoice.

15.14.1.2.3 @4to7

From four to seven hundred in spend on the invoice.

15.14.1.2.4 @7to10

From seven hundred to one thousand in spend on the invoice.

15.14.1.2.5 @10to15

From one thousand to one thousand five hundred in spend on the invoice.

15.14.1.2.6 @15to25

From one thousand five hundred to two thousand five hundred in spend on the invoice.

15.14.1.2.7 @25to35

From two thousand five hundred to three thousand five hundred in spend on the invoice.

15.14.1.2.8 @35to50

From three thousand five hundred to five thousand in spend on the invoice.

15.14.1.2.9 @50to100

From five thousand to ten thousand in spend on the invoice.

15.14.1.2.10 @gt100

Greater than ten thousand in spend on the invoice.

Now that all the different variables in the regression have been stated, the first thing to find out is if the variables are correlating or not. To do so the best thing to do is to create a correlation matrix.

### 15.15. Correlation matrix

This correlation matrix, “Table 3” states to what extent all the different variables are correlating, meaning it states to what extent two variables are saying the same thing. As in the top of all the columns the value is 1, meaning that there is a perfect correlation between a certain variable and itself, which makes sense. And for the other variables this matrix shows that there are no very highly correlated independent variables, which is good. The ten highest correlations found are marked with thick borders and bold numbers in the table:



15.15.1. Portal vs. DK

Correlation of 0.33. First of all the highest correlation is 0.33 which is not very high, it still says that they vary with two thirds different from each other. With that said, both of these variables are Dummy-variables and therefore it is difficult to capture the correlation between them. This states that that DK probably uses more portal than NO.

15.15.2. PayLT vs. CredTime

Correlation of 0.30. Once again the correlation is not very large but it does state that if you have longer credit time it is expected to result in the payment lead time lasting longer. This makes sense since the company can wait with the payment in the cases with long credit time.

15.15.3. AccnCT vs. SlbCT

Correlation of 0.29. An invoice spending more time with Accn is also expected to be an invoice spending more time with Slb, this makes sense since a “complicated” invoice either with unclear information or needing several approvals will probably lead to more time spent for both Accn and Slb. Still the value is not very high.

15.15.4. InvoiceD2ReceiptD vs. ReceiptD2ScanD

Correlation -0.28. If an invoice is spending more time from invoice date to receive date it is expected to reduce the time spent scanning the invoice. First of all this value is probably not of interest or very representative, since the distribution of scanning time is almost always around 0 days (scanned same day as received, distribution follows later in the paper) and thus it could seem like this value is somewhat coincidental.

15.15.5. Smith vs. GB

Correlation of 0.26. GB is not applicable so this value is not of interest.

15.15.6. M-I vs Smith

Correlation of -0.25. This correlation is only evident since they are both from the same variable, so every time either one of them are chosen, the other one will not be chosen, because M-I means not Smith or OFS, and Smith means not M-I or OFS.

15.15.7. SlbCT vs. PO

Correlation of -0.23. This finding is of interest, even though it is now not higher than -0.23. Yet it is of importance for later analysis, when evaluating the PO-effect on POT. And what is stated here is that if the invoice is made with a PO, it is expected to lower the time spent by Slb in the DFM. Because of this it would be good to exclude the Slb Cycle time from the regression when analyzing the PO effect on POT.

15.15.8. CredTime vs. DK

Correlation of -0.21. This number states that Denmark has lower credit time than Norway, which can be true, but it is now down to just over 0.2 and is not of any “threat” to the model at all.

15.15.9. SlbCT vs. PayLT

Correlation of -0.21. This states that if Slb uses more time on the invoice it is expected to use less time in the Payment Lead Time. This can be true, and the reason for it could be that an invoice spending a lot of time in Slb can possibly be “rushed” for payment when completed in workflow in DFM. Still, low correlation and no added value makes it uninteresting.

15.15.10. PayLT vs. PO

Correlation of 0.20. This states that a PO invoice in general is expected to increase the time spent to pay the invoice. This could be the case but in general there seems to be no reason for it to be so.

For all the other independent variables their correlation is below 0.2 and this ensures that the correlation found in the correlation matrix is quite low.

## 15.16. The regression

Based on the correlation matrix, the regression model seems to be a good model to determine the outcome in terms of not including variables that in large states the same thing.

The regression is stated like this:

$$\begin{aligned}
 PD2DD = & \beta_0 + \beta_1(InvoiceD2ReceiptD) + \beta_2(ReceiptD2ScanD) + \beta_3(AccnCT) \\
 & + \beta_4(SlbCT) + \beta_5(PayLT) + \beta_6(CredTime) + \beta_7(Receipt) + \beta_8(PO) \\
 & + \beta_9(Portal) + \beta_{10}(Urgent) + \beta_{11}(MI) + \beta_{12}(Smith) + \beta_{13}(DK) \\
 & + \beta_{14}(GB) + \beta_{15}(1to2) + \beta_{16}(2to4) + \beta_{17}(4to7) + \beta_{18}(7to10) \\
 & + \beta_{19}(10to15) + \beta_{20}(15to25) + \beta_{21}(25to35) + \beta_{22}(35to50) \\
 & + \beta_{23}(50to100) + \beta_{24>(> 100)
 \end{aligned}$$

When running the regression with PaymentD2DueD as dependent variable this is the output from SPSS:

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.801 <sup>a</sup>	.641	.641	21.9782

a. Predictors: (Constant), @1to2, PaymentLeadTime, ScanRecieved, GB, @25to35, @35to50, DK, @50to100, gt100, @7to10, @15to25, Urgent, @10to15, Recieptdate, Accenturecycletime, @4to7, MI, ReceiptDateinvoicedate, DummyPO, @2to4, Smith, OverallSLBcycletime, Portal, Paymenttermsindays

**ANOVA<sup>a</sup>**

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	52035531.700	24	2168147.154	4488.521	.000 <sup>b</sup>
Residual	29123606.719	60292	483.043		
Total	81159138.419	60316			

a. Dependent Variable: PaymentD2DueD



Variables explaining payment on time

b. Predictors: (Constant), @1to2, PaymentLeadTime, ScanRecieved, GB, @25to35, @35to50, DK, @50to100, gt100, @7to10, @15to25, Urgent, @10to15, Recieptdate, Accenturecycletime, @4to7, MI, ReceiptDateinvoicedate, DummyPO, @2to4, Smith, OverallSLBcycletime, Portal, Paymenttermsindays

**Coefficients<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.287	.374		-.765	.444
InvoiceD2ReceiptD	.526	.002	.636	248.208	.000
ReceiptD2ScanD	.577	.007	.199	78.333	.000
AccnCT	.944	.008	.300	115.618	.000
SlbCT	.974	.008	.329	122.327	.000
PayLT	.758	.009	.236	84.514	.000
CredTime	-.623	.009	-.202	-72.620	.000
Receipt	-13.706	.192	-.183	-71.277	.000
PO	1.320	.198	.018	6.669	.000
Portal	1.293	.203	.018	6.375	.000
Urgent	3.034	.569	.014	5.332	.000
MI	-1.890	.199	-.026	-9.492	.000
1 Smith	.415	.376	.003	1.102	.270
DK	-3.215	.367	-.024	-8.763	.000
GB	-5.576	1.260	-.011	-4.425	.000
gt100	-1.539	.599	-.006	-2.572	.010
@50to100	-1.266	.624	-.005	-2.030	.042
@35to50	-1.521	.614	-.006	-2.476	.013
@25to35	-1.482	.614	-.006	-2.414	.016
@15to25	-.749	.465	-.004	-1.610	.107
@10to15	-.075	.454	.000	-.164	.870
@7to10	-.820	.458	-.005	-1.792	.073
@4to7	.117	.343	.001	.341	.733
@2to4	-.703	.284	-.006	-2.476	.013
@1to2	.532	.276	.005	1.929	.054

a. Dependent Variable: PaymentD2DueD

15.16.1. General observations from SPSS output

With these results and an adjusted  $R^2$  of 0.641 the model gives a good prediction of the expected time from payment to DD. The fact that the adjuster  $R^2$  is equal to the  $R^2$  also helps ensure that all the variables used are improving the regression, since an adjusted  $R^2$  will adjust for added uncertainty, or variation. The reason for the similar  $R^2$ 's is the number of observations making the findings very solid. In this regression there are 60.317 invoices with

the data added in the regression, making it an exceptionally good data-base to draw information from.

The whole model is highly significant with a P-value of 0.000 or an F-value of 4488 stating that it is highly significant, much due to the large number of observations as mentioned earlier. The way the  $\beta$ 's are to be interpreted is that an independent variable with a negative  $\beta$  indicate that this independent variable contributes to improved POT.

## 15.17. Results with comments

### 15.17.1. Constant

The constant alone with all the other variables are stated as 0, will in this regression not really make much sense, since it would mean that the invoice is with no credit time, no cycle time, sent by mail yet no time spent in the mail etc. And it is also not significant, so it's not worth looking more into.

### 15.17.2. Invoice date to receipt date

Invoice to receipt date,  $\beta_1$ , is the average time spent from invoice creation until it's received by post at the scanning center in Prague, through the Portal or at the different Slb location (in the case of urgent). Quite a few of these values are high, so to give a more nuanced picture of this variable a distribution from 1 to 20 days is created, where the "more" column depicts the invoices arriving more than 20 days after invoice date. See "Figure 10" for distribution.

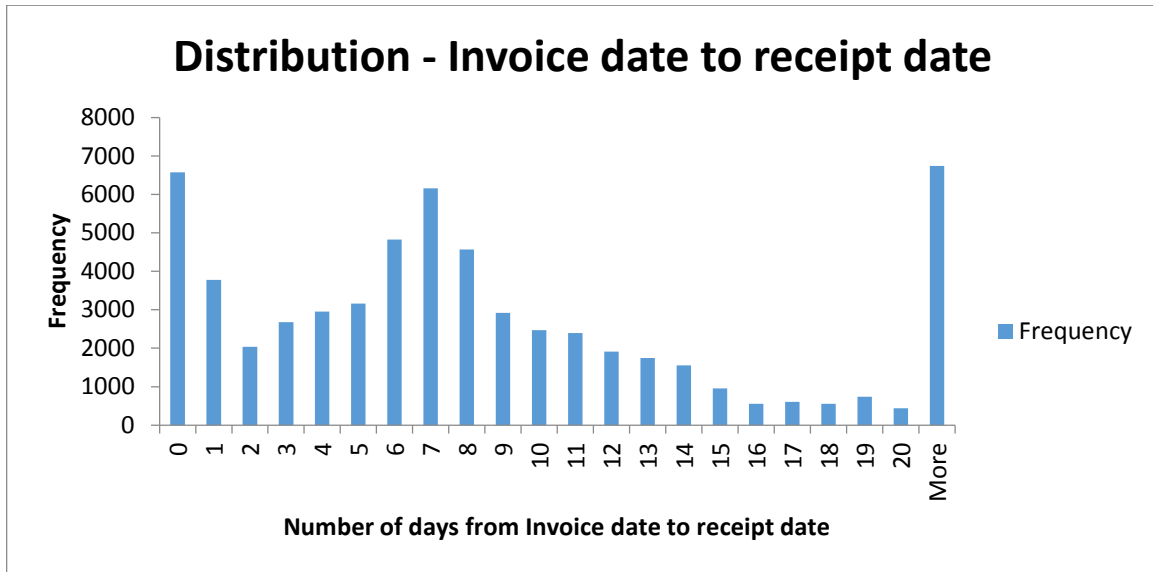


Figure 10 Distribution - Invoice date to receipt date

Here that the number of invoices somewhat skewed distributed around the seventh day towards the invoice date. Most of the invoices received within the first three days are received through the Portal. “Table 4” below shows in percentage the distribution of how long time it takes for the XXth percentage to be received from invoice date.

Invoice date to receipt Date	
Percentage	Days
60.0%	8
62.5%	9
65.0%	9
67.5%	10
70.0%	11
72.5%	11
75.0%	12
77.5%	13
80.0%	14
82.5%	15
85.0%	17
87.5%	19
90.0%	22
92.5%	31
95.0%	52
97.5%	107
100.0%	1382

Table 4 Invoice date to receipt date

“Table 4” above shows the time it is expected to take to receive a certain amount of the invoices after the invoice date. So to receive 80% of the invoices it takes 14 days after invoices date. These numbers in general shows why date calculation from receipt date is superior to the invoice date calculation. This table can therefore be used to clarify to the managers the importance of date calculation from receipt date, and possibly a tool to evaluate the current invoice reception routines.

The  $\beta$  for this variable is 0.526 and it is highly significant with a p value of less than 0.001. This number shows that if this period is extended by one day, all else equal, it is expected to result in approximately half a day longer in the process. Considering that one day here should in general decrease the time available for processing with one day, it is not so when it comes to the invoices that are calculated from invoice receipt date. This makes sense since 40% of the invoices are calculated from receipt date, which reduces the impact of the time spent from invoice date to receipt date on POT.

This variable was only added to make the regression as complete as possible, by including all the important variables so that the variables which SIb actually can affect will be seen in the light of the other variables. Thus the values are not of interest when it comes to finding out how to improve POT.

### 15.17.3. Received date to scan date

In average the time used from reception of an invoice until it is scanned is 0.124, or approximately three hours. As we can see from distribution in “Figure 11”, most invoices are scanned the same day they are received.

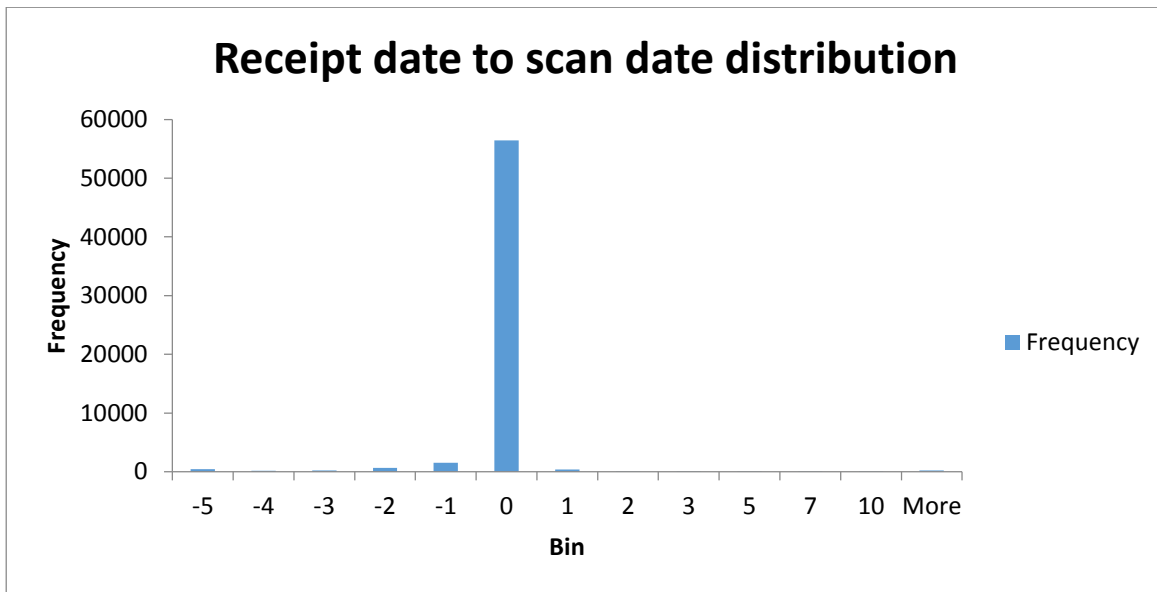


Figure 11 Receipt date to scan date distribution

This value is also highly significant with a P value of below 0.001 and the  $\beta$  is quite the same as for the previous at 0.577. This means that a day longer in the scanning process will only lead to an increase in time spent of about 0.6 days.

15.17.4. Accenture cycle time

The average time spent in the cycle time by Accn is 8.443 days. See “Figure 12” and “Table 5”.

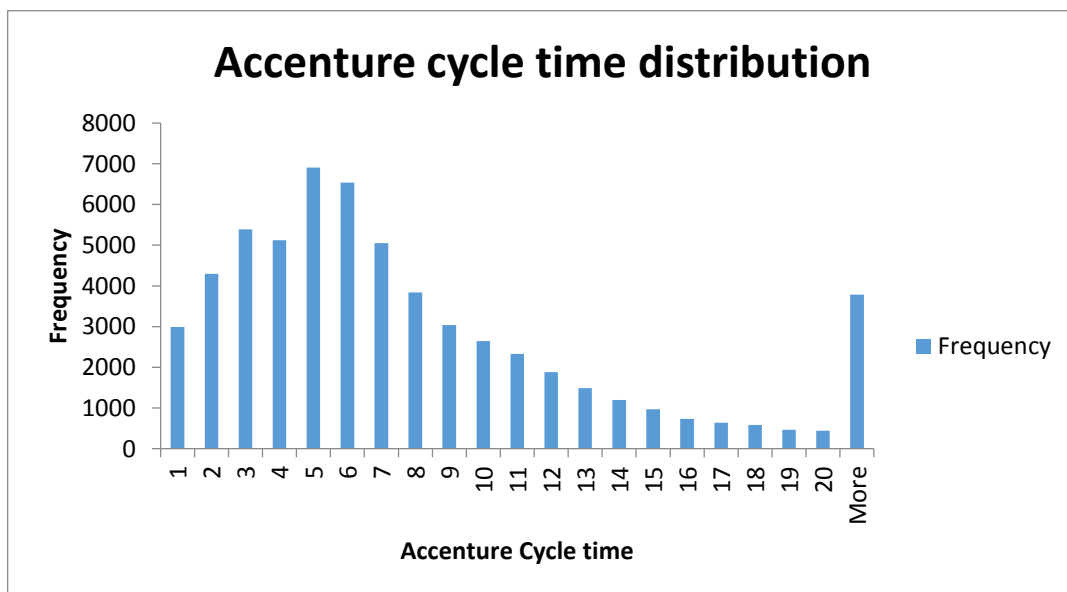


Figure 12 Accenture cycle time distribution

Percentage processed by Accenture after X days	
Days	Processed by Accn
1	5%
2	12%
3	21%
4	29%
5	41%
6	52%
7	60%
8	67%
9	72%
10	76%
11	80%
12	83%
13	85%
14	87%
15	89%
16	90%
17	91%
18	92%
19	93%
20	94%
More	100%

*Table 5 Percentage processed by Accenture after X days*

This distribution shows that 80% of the invoices being checked by Accn is done within 11 days. From the regression it is shown that the  $\beta$  of 0.944 is very close to 1, which makes sense since one day more spent by Accn will lead to approximately one day less time to finish in time. This value is also as expected highly significant with a P-value of 0.000.

#### 15.17.5. Slb cycle time

The average time spent in the cycle time by Slb is 6.361 days, and how the time used is distributed is shown in “Figure 13” and “Table 6”.

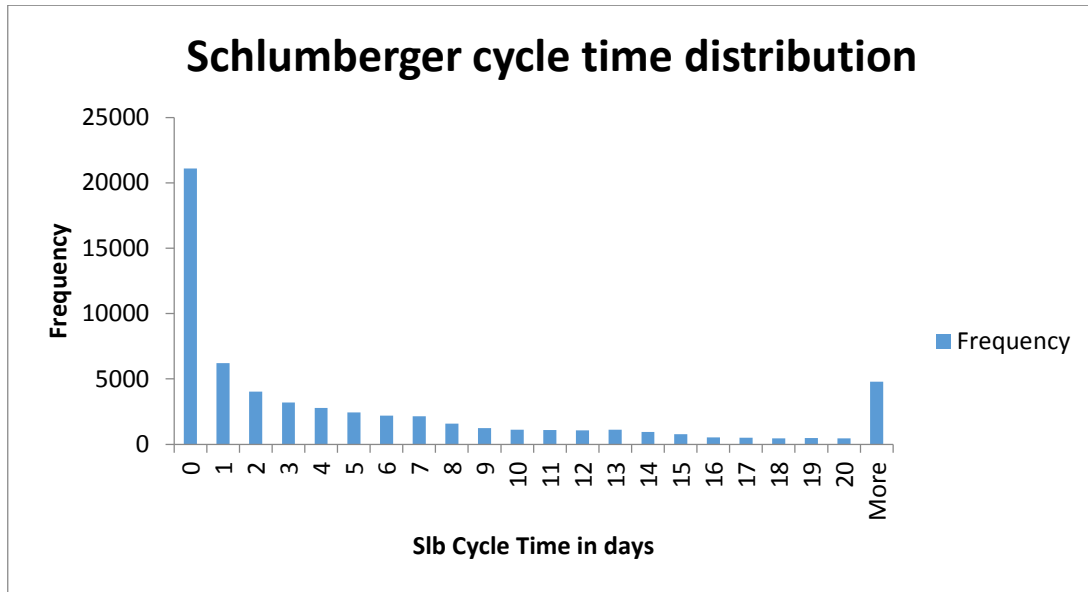


Figure 13 Schlumberger cycle time distribution

Percentage processed by Schlumberger after X days	
Days	Processed by Slb
0	35%
1	45%
2	52%
3	57%
4	62%
5	66%
6	70%
7	73%
8	76%
9	78%
10	80%
11	82%
12	83%
13	85%
14	87%
15	88%
16	89%
17	90%
18	90%
19	91%
20	92%
More	100%

Table 6 Percentage processed by Schlumberger after X days

In general the Slb cycle time has a high number of invoices only using zero days for Slb to process. This is mainly because of the use of PO, which does not need a Slb approver due to the 3-way match. A more even distribution for the Slb approvals follows after here. Where a high number of days could be associated with several approvers, complex or faulty invoices, busy managers etc.

The  $\beta$  value for Overall Slb Cycle time is 0.974 which once again is as expected, and shows the good fit of the dependent variable, where one day used takes away from the time available to pay on time. This value is highly significant with a P-value of 0.000 and is clearly helping to paint the whole picture of POT in the regression.

#### 15.17.6. Payment lead time

The average time spent for Payment Lead Time is 12.064 days. But this value is important to understand since it is not a value or a time consumption that necessarily needs to be shortened. This is among others because for the invoices with long credit time, if the invoice is ready to pay more than the number of days from the ready to pay date to the next payment run, it is better to wait. And so this is made evident in the histogram in “Figure 14” where the values are quite evenly distributed, instead of all invoices being paid within the first few days. This is due to the invoices waiting to be paid because of the credit time allowing it.

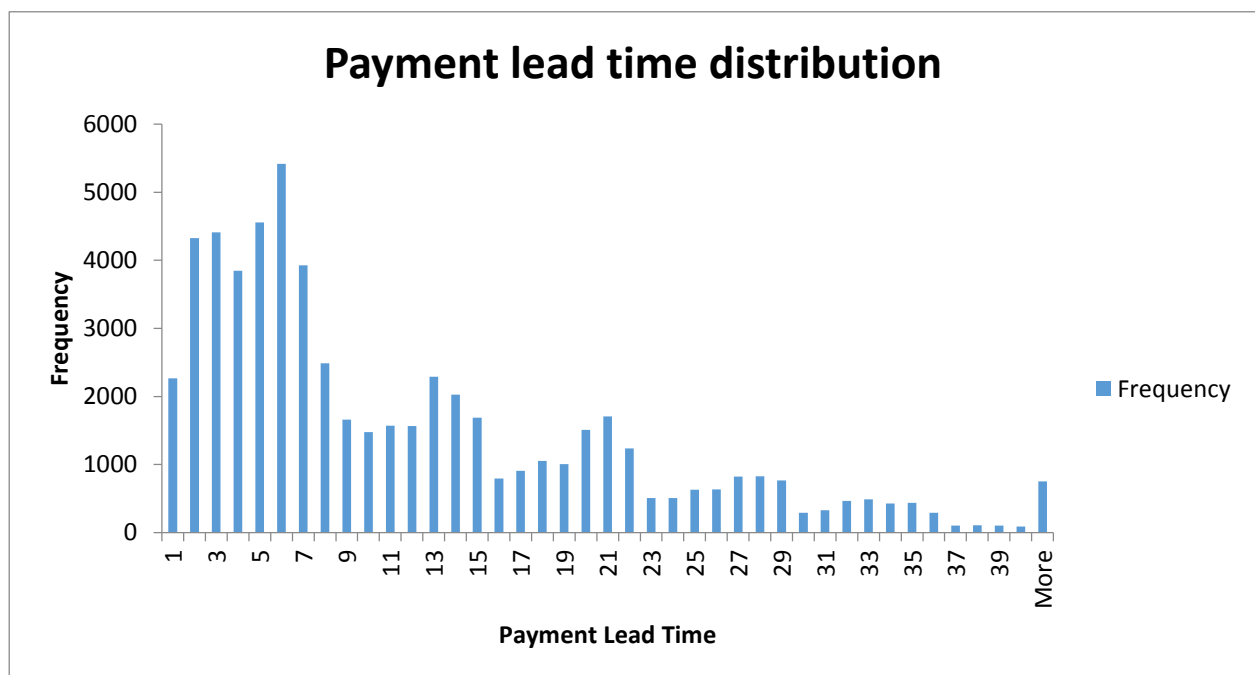


Figure 14 Payment lead time distribution



For the  $\beta$  coefficient this Payment lead time is set at 0.758, meaning that one day extra spent in the payment lead time results in just under one day less to process the invoices. The coefficient is significant, with a P-value of 0.000, and with this variable the framework of total time spent in different departments is completed.

The following variables are the ones of most interest, at least in terms of their  $\beta$  coefficient, making it possible to evaluate the different “tools” for improving POT.

### 15.17.7. Credit time

The average credit time Slb received from the suppliers used (in terms of invoices sent in 2014) was 34.22, but this value is not very applicable, it is much more clarifying to see the fractured distribution in “Figure 15.

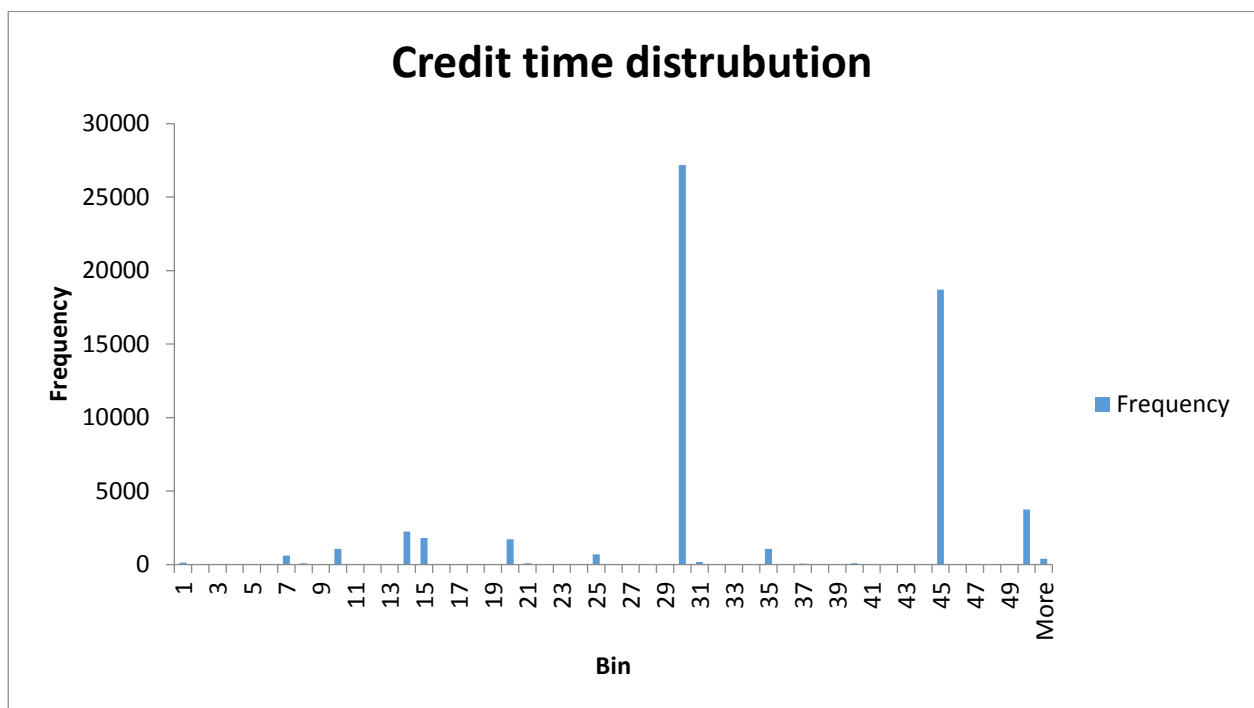


Figure 15 Credit time distribution

Here it is easy to see that the main groups that come out are 7, 10, 14, 15, 20, 25, 30, 35, 45 and 50 days, where 30 and 45 are by far the largest groups. While the standard of 50 days is the third largest category. The reason for the large share on 45 day is that until the end of 2014, the payment terms stated in T&Cs was 45 days. In the time to come, an increase share of suppliers with 50 days is expected, and this is expecting to especially decrease the group of 31 days and below. By focusing on the ones below 31 days, the group of 45 days expects in

general to stand still, although with renewal of contracts there is probably going to be a few moved from this category to the 50 days category as well.

To visualize the need for higher credit time here are some tables indicating the time needed from an invoice is created until it is paid. Where the method for these numbers is to arrange the number of days from invoice date to receipt date from lowest to highest. The reason for not choosing to use averages is because it can be misleading, here is an example of why; Calculating the mean for each of these periods, thus saying e.g. if 80% of Slb`s invoices should be paid in time, you take the average time the first 80% invoices spent on Non-Slb time and then how long time it is being processed. See «Table 7» for the data.

<b>Artificial example of time spent from invoice date to payment date</b>							
<b>NON-Slb time</b>				<b>Processing</b>			
<b>Time spend before invoice received</b>				<b>Time spend from received to paid</b>			
<b>Invoice no.</b>	<b>Days (accumulated)</b>	<b>% POT</b>	<b>Average</b>	<b>Days (accumulated)</b>	<b>% POT</b>	<b>Average</b>	
1	1	10%	1.0	5	10%	5.0	
2	1	20%	1.0	5	20%	5.0	
3	2	30%	1.3	5	30%	5.0	
4	3	40%	1.8	7	40%	5.5	
5	3	50%	2.0	7	50%	5.8	
6	7	60%	2.8	10	60%	6.5	
7	8	70%	3.6	10	70%	7.0	
8	20	80%	5.6	20	80%	8.6	
9	21	90%	7.3	30	90%	11.0	
10	30	100%	9.6	50	100%	14.9	

*Table 7 Artificial example of time spent from invoice date to payment date*

If considering invoices having payment terms calculated from invoice date, then one might say that to be able to pay 80% of invoices on time you would need PT to be somewhere around  $5.6 + 8.6 = 14.2$  days from invoice date. Considering these values individually it is shown that after 5.6 days only the first 5 invoices (50%) are received, to have received the 80<sup>th</sup> percentage invoice the last invoices would need 20 days only in the transit. This is also true for processing, where the average of 8.6 would only give Slb enough time to process the first 5 invoices (50%). So instead of being able to pay 80% of the invoices on time, they are more likely able to pay somewhere around 50% of the invoices. The number of days needed to pay 80% of the invoices in time is closer to  $20 + 20 = 40$  days. This analysis is not very

realistic, and it has its faults, but it clarifies the problem with use of averages in these calculations.

In “Table 8” are the numbers when sorting the numbers after days needed and using accumulated percentage instead;

Total time from invoice date to ready to pay date		Total time from invoice date to ready to pay date	
% POT	Days	% POT	Days
60.0%	22	60.0%	38
62.5%	24	62.5%	39
65.0%	25	65.0%	40
67.5%	26	67.5%	41
70.0%	27	70.0%	41
72.5%	29	72.5%	42
75.0%	31	75.0%	43
77.5%	33	77.5%	44
80.0%	35	80.0%	46
82.5%	39	82.5%	49
85.0%	42	85.0%	52
87.5%	48	87.5%	57
90.0%	56	90.0%	66
92.5%	68	92.5%	78
95.0%	89	95.0%	99
97.5%	138	97.5%	148
100.0%	1432	100.0%	1438

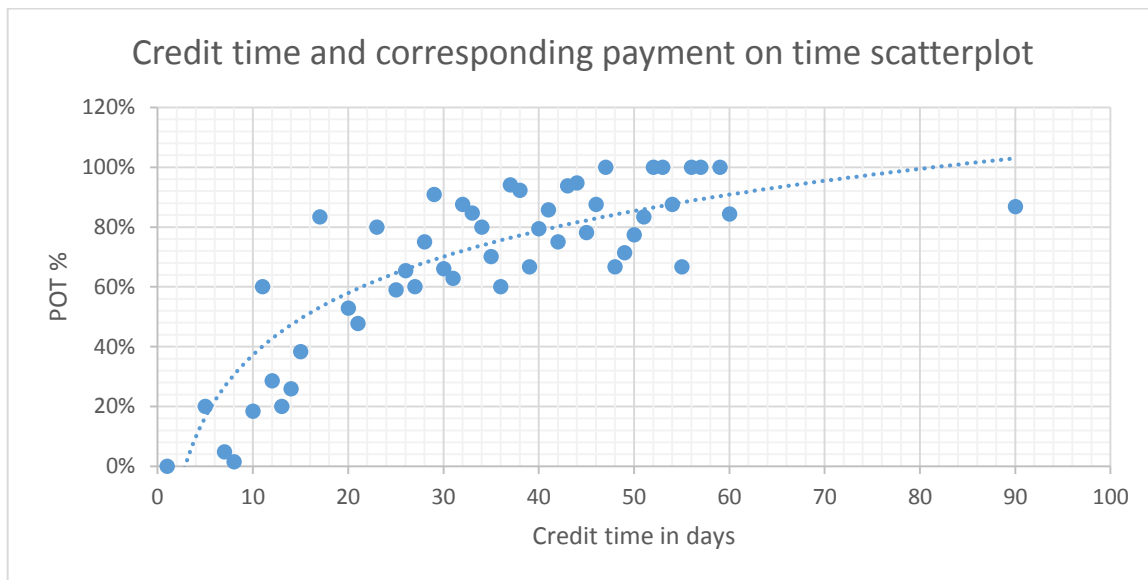
*Table 8 Total time from invoice date to "ready to pay" or "payment" date*

Considering if SIb would pay all their invoices on the same day as they are ready to pay, this would be the days needed to pay a certain percentage of invoices on time. So to be ready to pay 80 percent of invoices on time, date calculation set to invoice date, SIb would need 35 days.

In general the difference is higher for the lower number categories, probably resulting from high credit time causing the invoices able to wait before payment both for invoices calculating from invoice date and receive date. Then for the higher percentage the difference is somewhere around 10 days, probably resulting from the invoices calculating from receipt date, thus making it possible to wait for some of the payments. Yet it will also be shown later

that 8.4% of the invoices ready to pay before DD are not paid within the due date. This is to some degree explained later through credit notes but also states the need for possible routine changes because of problems causing invoices to not be POT.

Figure 16 is a graph picturing the ability to pay invoices on time given their credit time;



*Figure 16 Credit time and corresponding payment on time scatterplot*

This scatterplot and trend line is for all the different credit times and their corresponding POT, only for the once with at least 5 invoices. So if there was only one invoice with 3 days credit time and this was POT, it would not have been added, because of its un-nuanced value. Also here it is worth to mention that the credit time here does not include the effect from date calculation. Another thing is that 30 days credit time with 16000 observations is equally weighted as example 5 days with 10 observations. Still it gives a good picture of the ability to pay on time given the credit time. In general the credit time probably needs to be somewhere between 5 to 10 days to be able to pay “any” invoices on time, and that for 80 days Slb could probably be close to paying all invoices on time, *ceteris paribus*.

Now for the  $\beta$  value of -0.623 it is as expected increasing the days from between payment date until DD. This shows that 1 day improvement in credit time is not in all cases improving POT by one day. The reasons for it not being one to one could be that the invoices with longer credit time will make it so that they will not be prioritized while the once with short will get in front in line. The most likely case though is that for an invoice with high Credit Time, say 50

days compared to an invoice with 15 or 45 days credit time the benefit is different. To go from 15 to 50 days is expected to give a high effect on POT as opposed to going from 45 to 50 days the difference is probably not that evident. So for the invoices being worked on in the PT part with credit time under 31 days the effect is probably a bit higher. Stated in other words, the  $\beta$  is expected to be closer to 1 for the invoices with low credit time and decreasing as the credit time increases. The credit time does as expected increase the possibility of POT. And it is highly significant with a p-value of 0.000.

#### 15.17.8. Date calculation

This variable is named receipt date in the regression and the distribution of this variable is divided as shown in Figure 17.

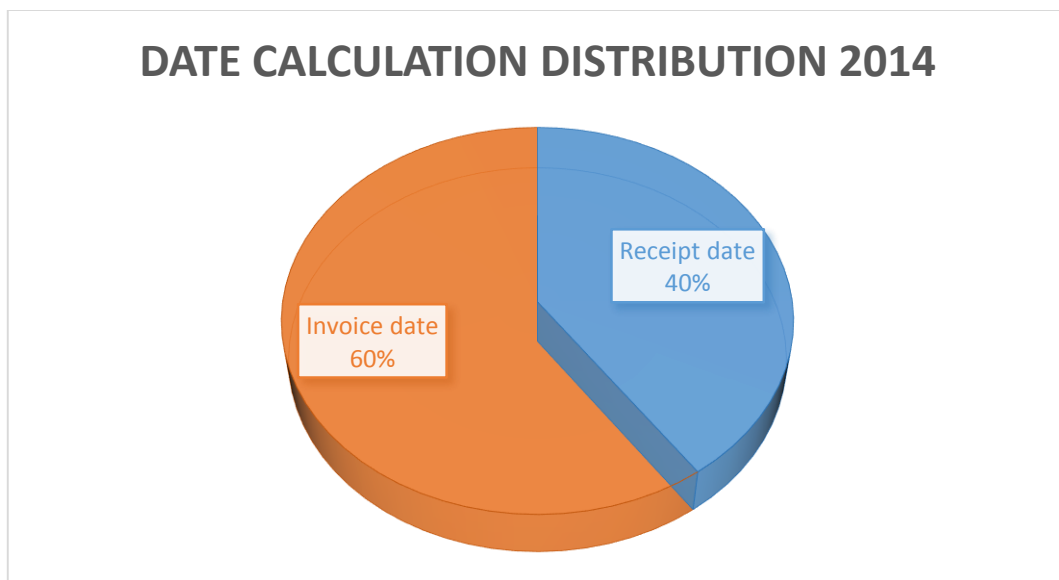


Figure 17 Date calculation distribution 2014

There is 50% more invoices having the date calculation set to invoice date today than the invoices being calculated from receipt date of the invoice. And by looking at the period from August 2014 to January 2015 the percentage of invoices calculating from receipt date is down 3 percentage points. This difference may be coincidental or it may be caused by a small shift towards higher usage of suppliers with date calculation set to invoice date. Either way it is not a very large difference. And since the last one is the closest to the present and is based on a significant number of invoices, an assumption is made as to say 37% of the invoices today are calculated from receipt of invoice.

This is very low compared to other Geomarkets. In comparison, numbers from January 2015 show that NOR scores second lowest on invoices calculating from receipt of invoice compared to all the Geomarkets in EAF. Where NOR have 34% of invoices calculating from receipt date, while the average for EAF for this month is 75%, and higher if you exclude NOR. In Figure 18 all other Geomarkets of EAF have been anonymized except for NOR (second location). “Loc” is short for location, and the numbers are used in the range, where 1 is the location with the lowest percentage of invoices calculating from the receipt date while location 14 has the highest percentage of invoices calculating from receipt date.

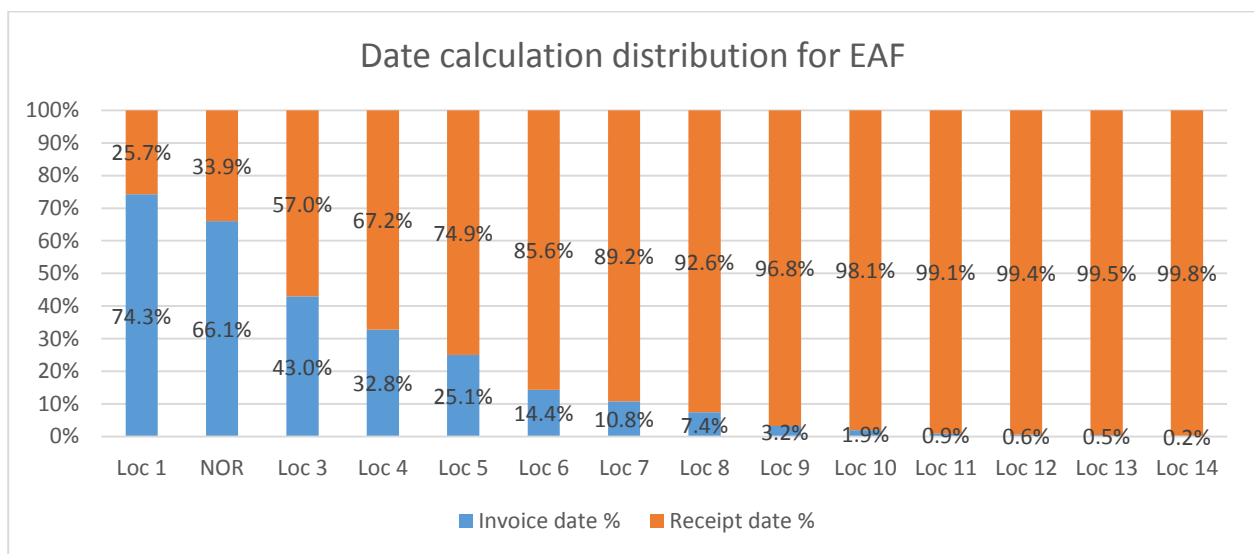


Figure 18 Date calculation distribution for EAF

In Figure 18 it is evident that NOR has a long way to go to improve the invoices calculating from receipt date compared to the other locations. The next location after NOR has almost 50% more invoices calculating from receipt date. This difference is also obviously affecting the POT for NOR compared to the other locations. There could be different traditions for other Geomarkets making it easier to get the invoices to calculate from receipt date.

To visualize the effect of moving an invoice from invoice date to receipt date see the tables in “Table 9” showing the expected time needed for an invoice to be either Ready to Pay or Paid when date calculation is set to receipt date;

## Variables explaining payment on time

Receipt date to ready to pay date		Receipt date to payment date	
Percentage	Days	Percentage	Days
60.0%	13	60.0%	27
62.5%	13	62.5%	27
65.0%	14	65.0%	28
67.5%	15	67.5%	29
70.0%	16	70.0%	31
72.5%	17	72.5%	32
75.0%	19	75.0%	34
77.5%	20	77.5%	35
80.0%	21	80.0%	36
82.5%	23	82.5%	38
85.0%	26	85.0%	40
87.5%	28	87.5%	41
90.0%	33	90.0%	43
92.5%	38	92.5%	47
95.0%	47	95.0%	56
97.5%	64	97.5%	77
100.0%	1131	100.0%	1136

*Table 9 Receipt date to "ready to pay" and "payment" date*

When comparing the numbers shown above with the credit time numbers with the ready to pay or payment date from invoice date (under credit time variable), visualizing the probable time needed for invoices calculating from receipt date, the difference is clear. For instance the credit time needed for 80% of the invoices to be ready to pay is 21 days when calculating from receipt date, while it is 35 days with date calculation from invoice date. When comparing for payment date, the difference for 80% is 36 days for receipt date compared to 46 days for invoices calculating from invoice date. So the benefit from receipt date calculation is obvious.

In addition to these tables, the relative difference in POT in terms of how much better receipt date is compared to invoice date for the different spend buckets and for the business groups is shown in "Table 10". This is calculated from the appended document "21.2 Payment on time per Business group with different payment terms";

Variables explaining payment on time

Payment on time difference between Invoice date and receipt date	
For all business groups	
"0-5"	463%
"6-10"	313%
"11-20"	63%
"21-30"	29%
"31-40"	53%
"41-49"	21%
"50"	5%
>=50	1%

Payment on time difference between Invoice date and receipt date	
MI	
"0-5"	1855%
"6-10"	605%
"11-20"	149%
"21-30"	30%
"31-40"	-11%
"41-49"	22%
"50"	10%
>=50	16%

Payment on time difference between Invoice date and receipt date	
OFS	
"0-5"	-100%
"6-10"	277%
"11-20"	17%
"21-30"	40%
"31-40"	9%
"41-49"	33%
"50"	7%
>=50	-16%

Payment on time difference between Invoice date and receipt date	
Smith	
"0-5"	N/A
"6-10"	168%
"11-20"	56%
"21-30"	41%
"31-40"	-3%
"41-49"	4%
"50"	2%
>=50	5%

Table 10 Payment on time difference for receipt date vs. invoice date - per business group

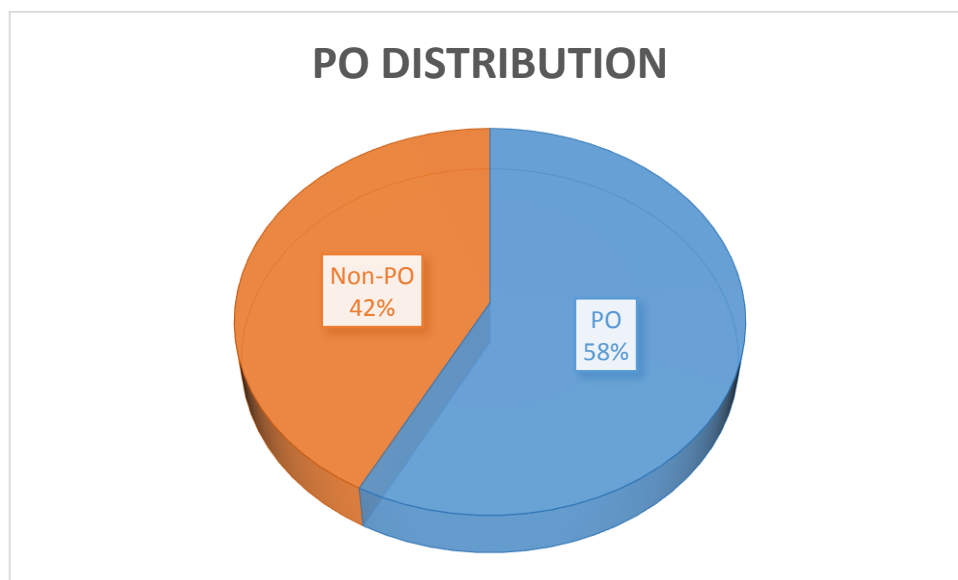
What can be seen in these tables is the difference between date calculation from invoice date and receipt date. Here the receipt date POT% is divided on the invoice date POT% and subtract 100%. This gives how much larger the values are for the Received date categories. So in the top left for the credit time bucket for 6-10 days the invoices calculating from receipt of invoice will be 313% more effective being paid on time, compared to the invoices with date calculation from invoice date. Thus saying that in comparison POT is more than 4 times larger for 6-10 days with receipt date compared to invoice date. In the lower right table for 21-30 days the Receipt date is 41% better at being paid on time than invoice date. These numbers make sense since they are stating that date calculation set from receipt date is especially improving the POT for the invoices with short credit time, making sense since they often will use most or all of their credit time in the post if calculating from invoice date.



The  $\beta$  for this variable it is -13.706 with a high significance with a P-value of 0.000. This result is not surprising since a large share of the invoices are sent by post, and thus it gives the invoices calculating from receipt date a good advantage. Since the effect here is only 1.5 days lower than the average time spent from invoice creation date to receipt date of 15.17 days, this number does make sense. Even though this effect is large considering the large amount of invoices “wasting” precious credit time in the supplier’s hands and in the mail, one thing to notice is how the size of the  $\beta$  decreases to -8.2 by taking away the 3% latest received invoices from invoice date to receipt date, and is reduced further to -6.6 if the 6% latest received invoices are removed. See appendix “21.3. SPSS Output - Removing latest 3% and 6% from Invoice date to receipt date – Dependent variable is PaymentD2DueD” for data. This is due to the extreme values making the effect seem larger than it is. Considering an invoice not received until 200 days after the invoice date, then the date calculation helps the invoice to still get paid within the DD. And considering how long time most invoices spends in the mail, a  $\beta$  lower than 13.7 makes more sense, and probably closer to eight or so. Still, for the very late invoices this is also where the date calculation set to receipt of the invoice has the greatest effect.

#### 15.17.9. Purchase Order

How many of the invoices that had PO in 2014 is shown in Figure 19.



*Figure 19 PO Distribution*

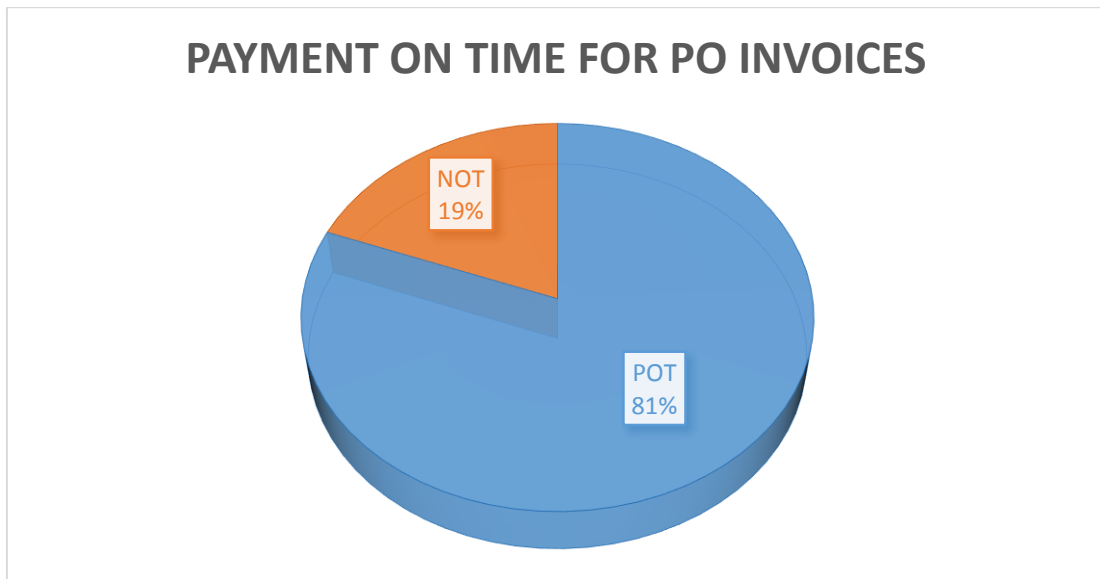
There are almost 50% more PO invoices than Non-PO invoices in 2014. Here the  $\beta$  for usage of PO shown in “15.16. The regression” actually seems to be working in the direction of increasing the time spent on processing the invoice, while the opposite is expected to be the case. Since the PO should be approved in advance and then just cross-checked when the invoice is received. From the results in the correlation matrix, there was correlation between PO usage and Overall Slb Cycle Time. When adjusting for this, these are the results:

*15.17.9.1. Removing Cycle times from regression*

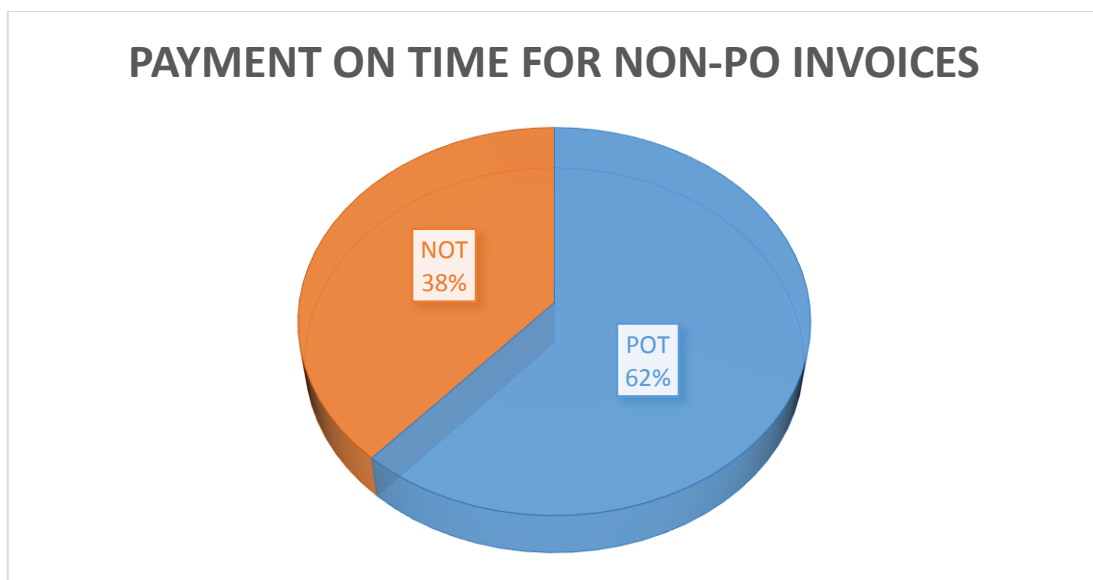
Removing Overall Slb. Cycle time resulted in a  $\beta$  for PO of -4.172 and a high significance level with a P-value of 0.000, see appendix “21.4.SPSS output - Excluding Overall Slb Cycle time – Dependent variable PaymentD2DueD”.

This  $\beta$  is closer to what is expected, where the PO decreases the time spent by Slb and thus makes the invoice ready to be paid earlier and thus helps payment on time. The reason for excluding Slb cycle time is that the use of PO reduces the time needed by Slb. There was also shown to be an effect on Accn cycle time so the regression was also run without this variable. See appendix “21.5. SPSS output - Excluding both Slb cycle time and Accn cycle time – Dependent variable PaymentD2DueD”.

Now the  $\beta$  for PO is -7.263, this means that if an invoice is with a PO it is expected to reduce the time needed to process the invoice with approximately 7.3 days. This seems to align with what is expected effect of PO on POT. This number is also supported by the following “Figure 20” and “Figure 21”, where POT is much higher for PO invoices than for Non-PO invoices:



*Figure 20 Payment on time for PO invoices*



*Figure 21 Payment on time for Non-PO invoices*

POT is 1/3 higher for PO invoices than for Non-PO invoices. When looking at Q4 for 2014 the difference is reduced to POT's of 70.6% for Non-PO and 83.3% for PO invoices. Some of the difference is probably due to the different distribution in credit time. This can be seen in the appendix "21.6.Credit time distributions for PO and Non-PO invoices".

The appended graph shows that there are more invoices with low Credit Time (below 31 days) for the Non-PO invoices and thus will mean that the invoices being moved from under

31 days today through improvement of PT is likely to have a higher share of Non-PO invoices. They have also very similar terms calculations where they are both approximately with 40% from receipt date and 60% from invoice date. See appendix “21.7. Date Calculation Distribution for PO and Non-PO invoices” for figures.

So it is evident that the PO is improving payment on time, still some of the effect seems to be caused by better PT for PO invoices compared to Non-PO invoices. The good thing with the regression analysis is that it also captures PT effect and leaves solely the PO effect. Also running the regression with the dependent variable being POT (Dummy), this also showed a good effect from PO, with a P-value of 0.000 and a  $\beta$  of 0.063.

#### 15.17.10. Invoice submission type

This variable is divided in three; paper (post), Portal and Urgent. See “Figure 22” for how the three are distributed:

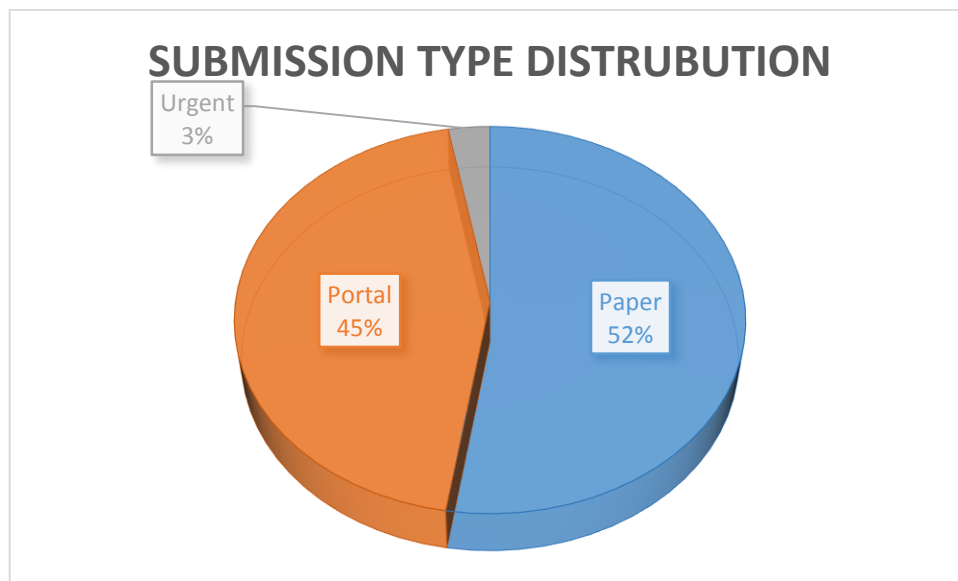


Figure 22 Submission type distribution

##### 15.17.10.1. Supplier Portal

The use of Portal sends the invoices directly to Accn. There are many other advantages with asking the suppliers to submit all invoice and queries through this portal. The suppliers are told which information desirable on the invoice, such as PO number, contact name etc. By informing the suppliers in advance the process becomes faster, and it avoids unnecessary time

spend on searching for this information. Using the Portal reduces payment status inquiries, simplifies supplier communication, makes it possible for the supplier to edit contact information themselves via the portal, and makes it more likely that the supplier manage to submit the invoice to the right Slb Company. One of the main advantages of the portal are benefited when date calculation is invoice date. Sending an invoice across country borders takes some days, and these days you can now rather be used to get the invoice through the system, and this helps POT. It is also cost saving since the supplier is now doing some of the work that Slb otherwise would have had to pay Accn for doing.

The figure shows that close to half of all the invoices are being sent through the portal. And the expected effect from the use of the portal is that it should increase the time available for paying the invoices. The  $\beta$  is highly significant with a p-value of 0.000 but the value is actually 1.293 meaning that if the portal is being used it will in general lead to invoices being paid 1.3 days later. Once again it is expected that the Portal will reduce the time spent from invoice date to receive date since the invoice can be sent and received the same day as it is created. Yet when looking into the correlation matrix there is, as opposed to the Dummy PO and Overall Slb cycle time that had quite some correlation, little or no evident correlation between Portal and Receipt date and Invoice date. This is very surprising, and removing invoice date to receipt date and RD2SD from the regression only led to the  $\beta$  increasing from 1.3 to 3, still in the way of harming POT. See appendix “21.8. SPSS Output - Excluding InvoiceD2ReceiptD – Dependent variable PaymentD2DueD” for SPSS output.

But when looking at the POT for Portal vs Non-Portal it seems clear that POT for the Portal invoices is at 75% while its 71% for Non-portal. This could possibly be caused by a large difference in credit time. Yet this is not really the case both since the credit time is included in the regression, and because Portal actually has a higher average credit time than for Non-Portal with 35 days vs 33 days.

To check if it might be because of a difference in the distribution of the invoices credit time was also evaluated. In general for the Portal invoices the percentage of invoices having 21 days or more Credit Time sum up to 89.3% while for the Non-Portal invoices the percentage of invoices having 21 days or more credit time summed up to 85.3%. Seen at the lower end, the percentage of Portal invoices having credit time of 20 days or less sums up to 10.6% for the Portal invoices and 14.7% for the Non-Portal invoices. This would to some degree explain

why the POT is higher for Portal compared to Non-Portal, since Non-Portal invoices it has approximately 40% more invoices in the risk group below 20 days credit time. So the question of the portals missing effect on POT remains. See appendix “21.9. Credit time distribution for Portal and Non-portal invoices” for distribution charts and diagrams.

Trying to find the solution for the discrepancy here are the distributions of the invoice date to receipt date for the two categories. See “Figure 23”, “Figure 24” and “Table 11”.

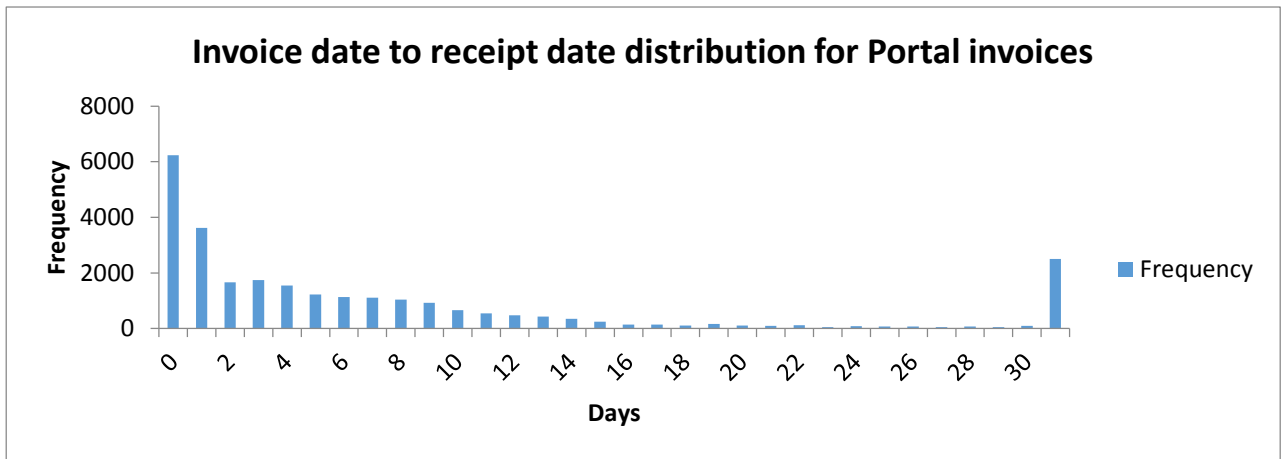


Figure 23 Invoice date to receipt date distribution for Portal invoices

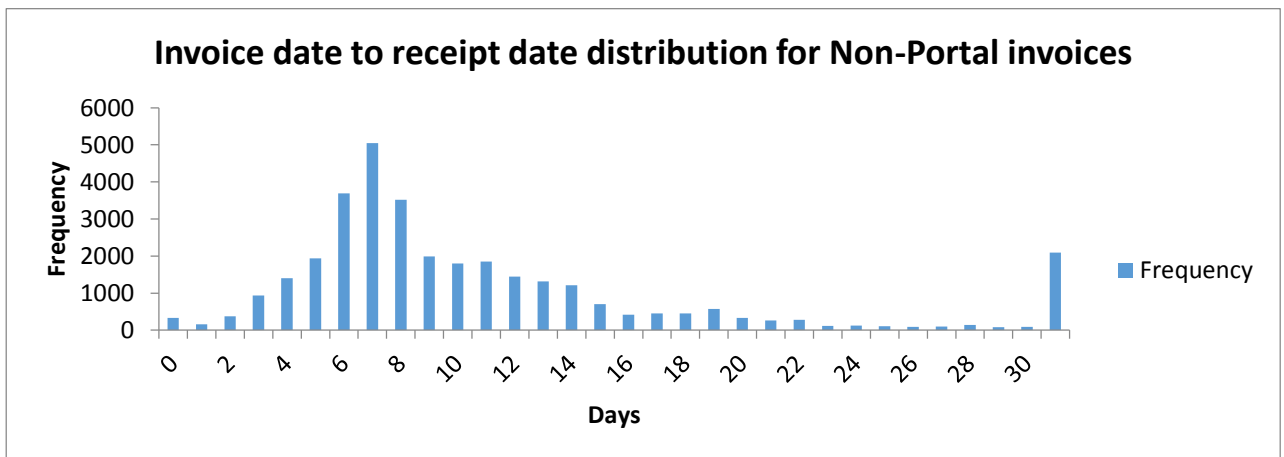


Figure 24 Invoice date to receipt date distribution for Non-Portal invoices

Variables explaining payment on time

Percentage of invoices received after X days Portal			Percentage of invoices received after X days Non-Portal		
Days	%	Accumulated %	Days	%	Accumulated %
0	23.2%	23%	0	1.0%	1%
1	13.5%	37%	1	0.5%	1%
2	6.2%	43%	2	1.1%	3%
3	6.5%	49%	3	2.8%	5%
4	5.8%	55%	4	4.2%	10%
5	4.5%	60%	5	5.8%	15%
6	4.2%	64%	6	11.0%	26%
7	4.1%	68%	7	15.1%	42%
8	3.9%	72%	8	10.5%	52%
9	3.5%	75%	9	5.9%	58%
10	2.5%	78%	10	5.4%	63%
11	2.0%	80%	11	5.5%	69%
12	1.8%	82%	12	4.3%	73%
13	1.6%	83%	13	3.9%	77%
14	1.3%	84%	14	3.6%	81%
15	0.9%	85%	15	2.1%	83%
16	0.5%	86%	16	1.3%	84%
17	0.5%	86%	17	1.4%	86%
18	0.4%	87%	18	1.4%	87%
19	0.6%	87%	19	1.7%	89%
20	0.4%	88%	20	1.0%	90%
21	0.4%	88%	21	0.8%	90%
22	0.4%	89%	22	0.8%	91%
23	0.2%	89%	23	0.4%	92%
24	0.3%	89%	24	0.4%	92%
25	0.3%	89%	25	0.3%	92%
26	0.3%	90%	26	0.3%	93%
27	0.2%	90%	27	0.3%	93%
28	0.3%	90%	28	0.4%	93%
29	0.2%	90%	29	0.2%	93%
30	0.4%	91%	30	0.3%	94%
More	9.3%	100%	More	6.3%	100%

Table 11 Percentage of invoices received after X days Portal and Non-Portal

From these diagrams and tables it is clear that the Portal has a positive impact in terms of fast received invoices in the beginning, where in comparison after three days the Portal invoices 50% of invoices will be received while only 5% of the post invoices are received. Yet there is an interesting thing happening after the 17<sup>th</sup> day, where post catches up with Portal and

actually is quicker for the later invoices. Here the table's shows that the Portal actually have 50% more invoices being received after 30 days (9% vs 6%). This could be due to some of Slb's suppliers having poor routines for using the portal, more so than suppliers having poor routines for normal mail. This makes sense since there will be new suppliers to the portal resulting in startup problems and also need new routines for these suppliers. This extra high number of invoices received late for the portal does not need to be a bad thing for Slb in terms of fees and interests since the invoices being sent very late are probably not going to be charged fees and interests on since it is the suppliers fault. Though this will in many cases not be caught up by Slb, and it would take time for Slb to contact the supplier regarding this. It can also be very difficult for Slb's managers to approve these old invoices, and the chances are high for these invoices ending up harming the POT.

When evaluating the mean time spent from invoice date to receipt date for portal and Non-Portal invoices in SPSS, it states that a Portal invoice uses 14.75 days while the Non-Portal invoices use 15.528 days, and gives an 95% confidence interval that states that the difference between the means are somewhere b/w 0.071 and 1.496. See appendix "21.10. SPSS results from mean time from invoice date to receipt date between Portal and Non-Portal".

With this in mind and the obvious distributional advantages of the portal invoices, it is clear that the extreme values of invoices time spent from invoice date to receipt date is ruining the general Portal effect.

The regression was also run with the dummy variable POT set as dependent variable. This way it is possible to see if the different variables have a significant effect on POT. The results show that in general there is no effect from the Portal on POT, with a Non-significant  $\beta$  of 0.002, and a P-value of 0.572. See appendix "21.11. SPSS output – No excluded variables – Dependent variable PaidOnTime (dummy)" for results. So the  $\beta$  is very low and insignificant. These results are surprising since the Portal seems to be helping the invoices being received earlier. Yet possibly the higher number of invoices being received later than 30 days after Invoice date could be the reason for this. To evaluate this more, other calculations were made to check the difference between the processing of an invoice received by post compared to the portal.



Now back to the regression with the dependent variable being PaymentD2DueD. If excluding invoice date to receipt date and receipt date to scan date from regression and taking away 3% latest invoices from invoice date to receipt date the  $\beta$  is reduced from 2.957 to -1.096 with a significance level of 0.000, and considering that the Portal is expected to affect the receipt date to invoice date and receipt date to scan date these results make sense and with excluding the extreme values from the dataset, a more general effect of the Portal is shown, that is as expected helping to improve POT. See appendix “21.12.SPSS Output - Removing the highest 3% InvoiceD2ReceiptD, excluding ReceiptD2InvoiceD and ReceiptD2ScanD – Dependent variable PaymentD2DueD” for output.

By taking away the 6% latest invoices from invoice date to receipt date the  $\beta$  keeps lowering to -2.120 and the significance level is improving from a T-value of 10 to over 20 thus being very highly significant. See appendix “21.13.SPSS Output - Removing the highest 6% InvoiceD2ReceiptD, excluding ReceiptD2InvoiceD and ReceiptD2ScanD – Dependent variable PaymentD2DueD” for output.

Now for the last adjustment the 10% latest invoice date to receipt date are removed, and doing so the portal effect is still increasing but in a decreasing manner. Ending up with a  $\beta$  for the Portal variable of -2.413 and a significance of even higher standard with a T-value of over 30, a P-value of far below 0.000. See appendix “21.14. SPSS Output - Removing the highest 10% InvoiceD2ReceiptD, excluding ReceiptD2InvoiceD and ReceiptD2ScanD – Dependent variable PaymentD2DueD” for output.

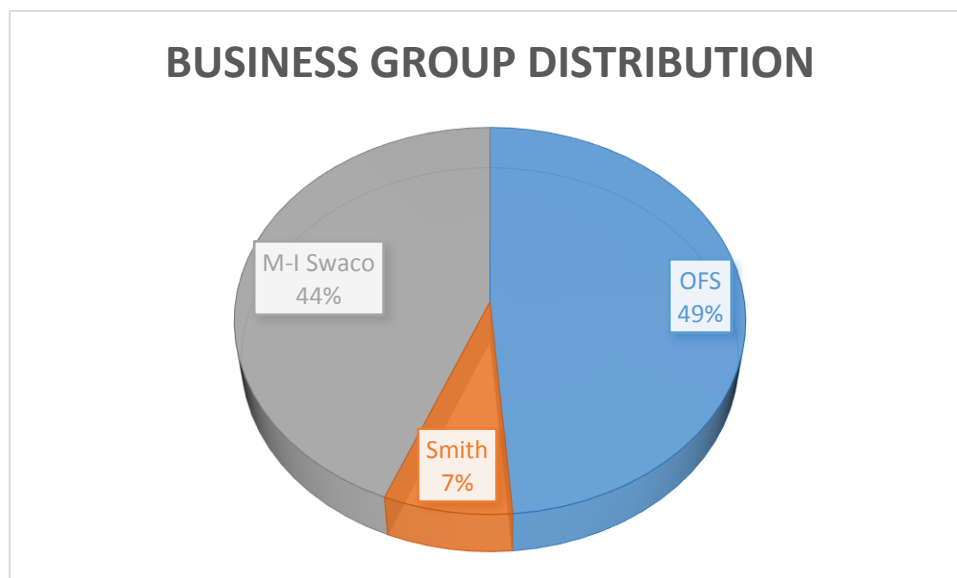
By summarizing it is clear that the Portal is affecting the invoices received in the early group in a positive manner, decreasing the time from invoice date to receipt date. Still because of higher level and number of “extreme” cases the Portal is also to some extent harming the POT because of late received invoices. This cannot be put on Slb`s account since an invoice received late really is out of Slb`s control. Either way it is harming the POT, and this is something that can be focused on when getting the suppliers to use the Portal. When adjusting for the extreme values, the same picture as represented in the distribution of invoices time from invoice date to receipt date is made evident. Where a high level of invoices are processed very fast for the Portal thus the  $\beta$  of -2.413 is in more in line with the findings in this distribution when overlooking the extreme cases.

### 15.17.10.2. Urgent

This variable means that it has for some reason been set to as urgent to make sure that it is paid on time. By the look of the chart under invoice submission type the urgent category is not a large part of the total. Urgent is only accounting for three percent of the invoices, and is not of large importance. Still the variable has a high significance with P-value of 0.000, and at first glimpse it has a surprising value where if it is set to urgent it seems to actually increase the time it takes to pay the invoice with 3.034 days. This is a misleading figure, since the urgent invoices probably have some similarities. Typically an invoice with little time till DD is more likely to get the urgent label, so the urgent label is probably decreasing the processing time for the invoice, yet it is still an invoice that is late for payment. So in total this is not a variable that makes much sense, and it is also representing a small part.

### 15.17.11. Business group

In “Figure 25” is the distribution between the different business groups in terms of how many invoices they have received.



*Figure 25 Business group distribution*

There seem to be clear differences in how the different BG`s handle their invoices, and ultimately their ability to pay their bills on time. This is also made evident in the appendix “21.2.Payment on time per Business group with different payment terms”. and accounting for changes in credit time and in date calculation. In general what seems to be the case is that M-I

seems to be more able to take advantage of the improved credit time than OFS. This is especially evident for the higher credit times where OFS is not able to get any higher POT than 82% for all the representative categories, while for M-I this same category (41-49 days from receipt date) gives a POT of 88%. And for the higher credit times in this table for OFS is actually decreasing, which is probably a bit misleading, yet shows some trouble for OFS. While for M-I the next two categories give a POT of 97% and 100%. So it seems that there could possibly be some things done well by M-I that OFS can learn from.

Smith on the other hand in general seems to have even more trouble with exploiting the credit time, except possibly for the higher credit time categories, where POT seems to be higher for Smith than for OFS. These interpretations are also corresponding to the figures the regression ended up with, as shown under. The researchers expect these tables to be of value when evaluating how the different BG`s are able to pay on time.

#### *15.17.11.1. M-I Swaco*

From the regression M-I seem to be paying more on time than OFS with a  $\beta$  of -1.890, meaning that M-I in general are able to pay their invoices approximately 2 days faster than OFS, or in general more often before the due date. The  $\beta$  for M-I is negative, and this aligns with the assumptions to the workers interviewed in Slb.

#### *15.17.11.2. Smith*

The smallest of the business groups in terms of invoices received is Smith, yet it is still of significant size. The  $\beta$  here states that Smith uses 0.415 more days to pay an invoice than OFS. This value is not significant with a P-value of 0.270, so it is not certain that that this coefficient is reliable. Still the appendix shows that POT for Norway in 2014 that Smith did score lower than OFS.

Norway 2014 Operational POT All areas	POT %				
	Q1-14	Q2-14	Q3-14	Q4-14	Total 2014
OFS Legacy	75.2%	75.9%	76.6%	<b>76.6%</b>	76.1%
Smith	46.2%	52.8%	56.1%	<b>59.4%</b>	53.6%
MI	75.4%	78.3%	79.8%	<b>79.8%</b>	78.3%
TOTAL	72.4%	74.6%	75.9%	<b>76.3%</b>	74.8%

Table 12 Norway 2014 Opeartinal POT All areas

### 15.17.11.3. Causes for Business group differences

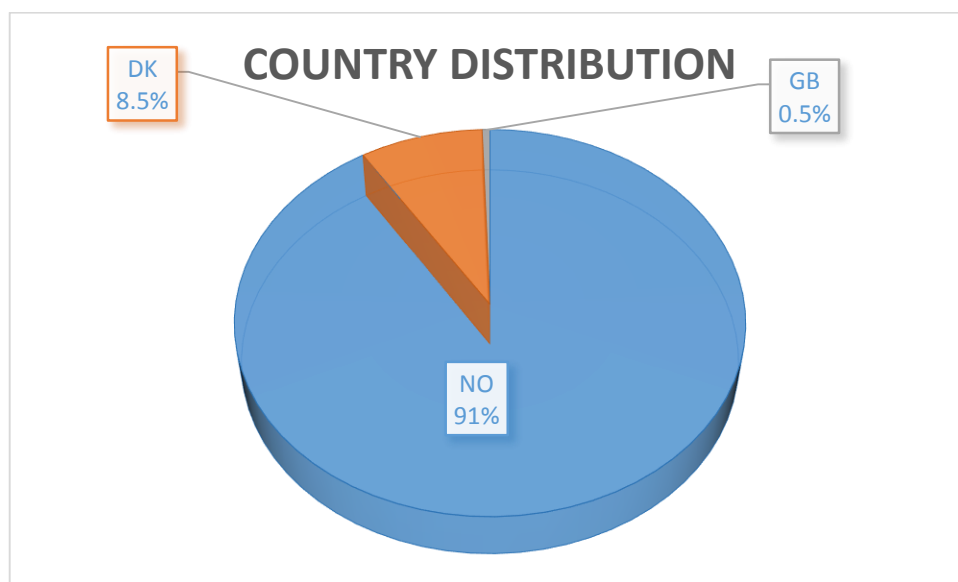
The main findings explaining why there is differences in POT between the different business groups are summarized below:

- The size of the company
  - o MI is a smaller company compared to OFS, which can make many of the processes faster and easier. In a smaller company people know more about each other's functions, and the processes are often more clear and transparent. It will take less time to get the invoice to the right person. But this effect from size of firm does not apply to Smith, because despite that it is the smallest business group, they are doing it worst on POT.
- The culture and structure in the company
  - o People in M-I are showed to be quicker to respond on validations and approvals. This is evident through the SIb cycle time for all business groups it is on average 6.4, for M-I it is 4.6 and for OFS it is 7.2. They are also quicker to respond on questions from AP Retained Team, and this makes the process go faster. This shows that a good business culture is reinforced over time, and a business culture with some weaknesses might be hard to change.
  - o Validators and approvers for M-I are located in Norway, and when all people involved are within the same time zone, no time is wasted due to different time zones.
- The proportion of PO use
  - o The usage of PO is also a bit higher for M-I than the others.
- The PO routines

- PO for M-I and Smith is submitted through Oracle, but for OFS it goes through SWPS. For M-I and Smith it will normally be the same person submitting the PO, ordering the good and receiving the good. This eases the process, and will in fewer cases cause the invoice wandering around in the system without until it ends up at the correct person. When SWPS is used, the good is normally bought by a person working in the SWPS team in Bucharest.
- Time of outsourcing
  - The paradox in this issue is that OFS have had AP outsourced to Accn for a longer period. One should think that they therefore are more used to these routines, and therefore had better PO. An argument that M-I outperforms OFS may be that OFS were the first to try the outsourcing, and that there are problems that came from being the test subject due to the complex implementations. M-I could when they outsourced see what had gone wrong when OFS did it and maybe avoided doing some of the same mistakes.

15.17.12. Country

See “Figure 26” for the distribution of the different countries;



*Figure 26 Country distribution*

It is clear that Norway (base) is by far the largest group. And in reality the NOR Geomarket is only supposed to include Norway and Denmark. Great Britain is very small with just over 300 invoices belonging to this office.

*15.17.12.1. DK*

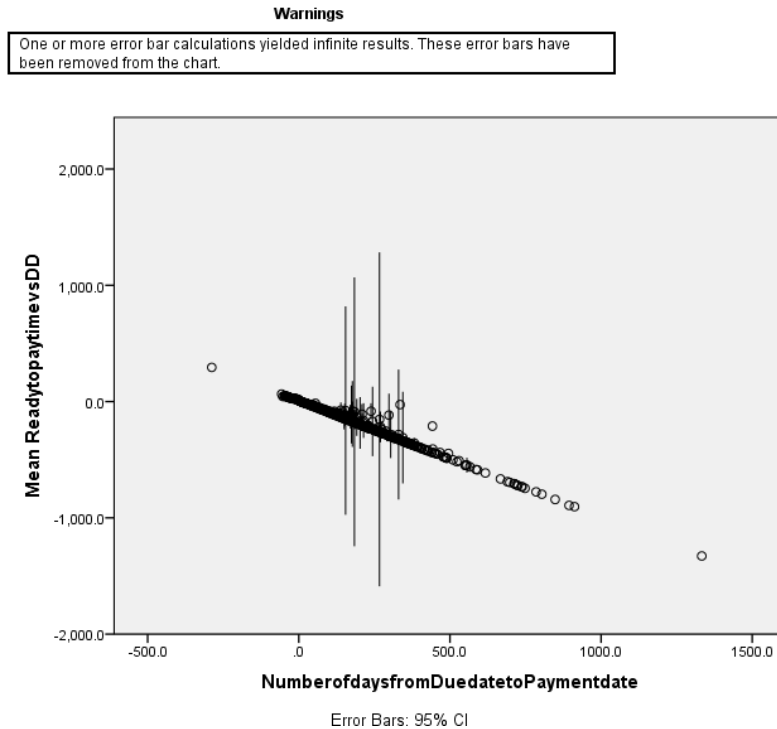
If the invoice is for the Denmark office than it is expected to increase the difference from PD till DD with -3.215, meaning that it improves POT quite a bit. This  $\beta$  is highly significant with a P-value of 0.000.

*15.17.13. Spend*

For the different spend buckets the  $\beta$  is negative for 7 of the different spend groups compared to the base bucket from \$0-100. Still the  $\beta$  does not seem to be increasing for higher and higher spend but is more or less constant around a  $\beta$  of approx. 0,005. And although most of the variables here are significant there is not much added value from analyzing these numbers, except that there does not seem to be a large difference for different spend buckets in terms of POT or time spent to process the invoices. Because of the lack of importance for these values the spend buckets will not be evaluated any further.

## 15.18. Dependent variable as “Ready to pay date to due date” instead of “Payment date to due date”

The regression analysis was also done with “ready to pay to due date” as the Y-variable (dependent variable). Surprisingly this resulted in little or no difference in the regression output, only with the opposite sign, negative instead of positive and vice versa. This is because they are calculated in the opposite manner. Still it was expected that especially the invoices with long credit time would lead this time to be long and short for the invoices with short credit time. Instead what is found is that there could be a more constant relationship between the two. This is illustrated with the scatterplot in “Figure 27”, where the evident line-shape between the two Y-variables induces a constant relationship. There are some exceptions for the plots above the line, and these are the once expected to possibly see more of, while there are no plots underneath the line, since there are no invoices being paid before they are ready to be paid.



*Figure 27 Scatterplot – ReadyToPayD2DueD vs. PaymentD2DueD*

This should be looked further in to too see if invoices with high credit time is letting the invoice use more time until it is ready to pay. It is expected to be quite equal for the different credit times, since in general an invoice processing time up until ready to pay is supposed to be more or less unaffected by the different PT. It could be that the scatterplot is somewhat misleading because of extreme values making it seem like the relationship is more constant than it really is.

### 15.19. Key findings from the analysis'

To summarize what the regression and the added analysis has given of interesting information here are the key findings that have been presented. First of all the model is highly significant and has an adjusted R-squared of 0.641 and a P-value of 0.000 which is very good. The distributions of how long time an invoice spends from invoice date to receipt date, Accn cycle, Slb cycle time and payment lead time can be of interest because it enables evaluating how much time is being spent on the different steps of the invoice process. And enabling managers to say something about who have the highest increase in time spent when an invoice is not paid on time. These answers can be a good pointing stick when determining where to put effort in improving the systems and the processes.

In most cases the invoices use zero or one day in the Slb cycle time, while in the days following there is a more even distribution. The distribution of credit time is also of interest, visualizing the current situation. Where 30 days is the most common, followed by 45 days and then 50 days. This shows the potential Slb have to move invoices from the lower end to the higher. Now for the first of the most important key findings, in the date calculation, this research shows that if an invoice is stated with receipt date instead of invoice date this results in an extra time available to pay the invoices of about 13 days. This value could be artificially high, and the effect is probably closer to 7-8 days when removing extreme values. But even so, it clearly states the importance of moving the invoices over from invoice date to receipt date. And if combining the findings from credit time that seems to be surprisingly low with a  $\beta$  of -0.62, it is clear that date calculation is of high importance. To get the same effect of credit time as for date calculation set to receipt date given the a  $\beta$  value of -8 (or -7) Slb would need to increase the credit time with over 10 days.

Calculation in absolute values:

$$\begin{array}{ll} 0.62 * X = 8 & 0.62 * X = 7 \\ X = \frac{8}{0.62} & X = \frac{7}{0.62} \\ X = 12.90 & X = 11.29 \end{array}$$

So from these calculations it can be concluded that in general to move an invoice from calculating from invoice date to receive date is probably the same as increasing the credit time with somewhere around 11-13 days or so. This is of great value when improving the PT to Slb`s suppliers. Knowing how important it is to get the invoices to be calculated from receipt of invoice instead of invoice date, and how poorly NOR scores compared to the other Geomarkets in EAF it is clear that the potential for improvement is high. Looking at the distribution it is also clear that there is a big potential to improve POT and liquidity by increasing the number of invoices calculating from receipt date and reduce the number of invoices calculating from invoice date. The numbers for receipt date vs. invoice date is not necessarily applicable for other Norway based companies, considering that it will depend on where their suppliers are stationed and where their invoices are received etc. But the method for calculating the effect is applicable to any firm with logged data over their invoices.



Moving on to the second of the most important key findings, the effect of PO on POT. Here there had to be made some adjustments to the initial regression to isolate the PO effect, since in general the PO effect manifests itself in lowered time spent by Slb and Accn employees, so these cycle times had to be excluded from the model. Doing so the PO effect is stated to be - 7.26, meaning it increases the time available to process the invoice with over 7 days. This is a large and significant effect, and although the main goal of PO is to increase control it is also evident that it improves the processing time of the invoice. The fact that 42% of the invoices are Non-PO shows that there is a great potential for moving more invoices to PO. Some suppliers are more compliant with PO than others, and there will always be a share which will be most beneficial by remaining Non-PO. The PO effect on POT is also clearly stated with a POT of 81% for PO invoices compared to 62% for Non-PO invoices, when looking at 2014 full year, while the difference is somewhat more moderate for Q4 in 2014 with respectively POT's of 70.6% and 83.3%.

Now for the third key finding - the Portal. The results here were probably the most surprising since at first the assumption was that the Portal would help improve payment on time, while the SPSS results seemed to be showing a negative effect from the Portal on POT. The reason for this was shown to be the extreme values in terms of invoices turning up late. For the invoices received later than 17 days most of these are from the Portal, and for the invoices received 30 days after invoice date or later was 50% higher for Portal invoices than Non-Portal invoices (9% vs 6%). Thus when removing the most extreme values from the data-set and taking away the independent variables expected to be affected by the Portal, invoice date to receipt date and receipt date to scan date, this gave a negative  $\beta$  for Portal. Thus implying the more general positive effect the portal has on increasing the available time to process the invoices. This was also made evident through the distribution tables that shows how the Portal invoices within 3 days approximately 50% of the invoices have been turned in, while only 5% for the Non-Portal invoices. The critical time here is 17 days after invoice date, where the post and Portal both have received 86% of the invoices. While further away from the due date the post seems to be more effective.

Probably due to better routines at some of Slb's suppliers for Post-invoices than Portal-invoices. Still in sum the Portal seems to have a positive effect on the time available to process the invoices for most invoices, yet the case is double sided. The POT is higher for the Portal, but not much higher with a difference of 4% points (71% vs 75%), and this

difference could also partly be explained by the Portal invoices on average having better PT. It was shown that the portal invoices only had 10.6% of the invoices under 20 days while 14.7% of the Non-Portal invoices had 20 days or less. This also argues for the Portal-POT effect not being as high as 4% points. And to remind when removing 3%, 6% and 10% of the latest invoices, the  $\beta$  changed from 3.0 to -1.1, -2.1 and -2.4 as  $\beta$  values. It seems as expected that the value is decreasing when the most extreme values are removed.

The urgent category is not of high importance, considering that the value is probably showing the opposite effect than it really has due to common denominators of the invoices receiving the urgent label. This is because if an invoice that is late receives the urgent label, there is still a high risk of this invoice being paid late.

The variable called business group can be of interest due to its differences in effectiveness when it comes to processing the invoices. The fact that M-I has a  $\beta$  of -1.89 states that it seems like M-I is quite a bit faster than OFS in processing the invoices, and this is also made evident in terms of M-I's POT for 2014 that was higher than OFS. Several arguments for why M-I scores higher on POT was presented with better routines, smaller company size, quicker response time etc. OFS and Smith may have some advantages, because of the company differences, so there could be good opportunities for OFS to learn from M-I. Smith was insignificant, still the  $\beta$  showed that Smith seemed to have a negative effect on POT and this is also true when looking at POT for Smith compared to OFS for 2014.

For country the only variable worth mentioning is the DK variable, where the  $\beta$  is highly significant with a  $\beta$  of -3.215 and the cause could be the difference in product range for DK or a difference in routines and the effectiveness of the workers. Or it could simply be because of its smaller size and thus less complex work situation.

Spend is the last variable that will be mentioned. And one of the interesting facts for spend is its smooth distribution of different spend sizes. From this the researchers were able to create some spend buckets that would help improve the overall model description. Also there seemed to be no evident effect from the Financial Approval Matrix on payment on time.

## 16. How to reach the objective for payment on time 2015

In this part of the paper the previous findings and some supplementary information will be used to break down the goal, or KPO, Slb has for improved POT in 2015. The tools chosen to reach the goal are credit time, date calculation and usage of PO, as these were shown to be the most effective ways to improve the POT, through the regression analysis. The reason why the portal will not be used as a solution in this case is because its effect is not singularly positive. This is explained in more depth underneath. It will also be shown that the researchers consider reaching the KPO for POT 2015 only through PT and usage of PO to not be very realistic, and thus will also suggest that more effort is put into qualitative improvements and further investigation of loss of POT. One specific issue addressed is the loss of POT in the invoices with status “ready to pay” before the due date, and also the expected benefit from improving the POT for these invoices that should be able to pay on time since they are ready for payment before due date.

### 16.1. Uncertain effects from the use of Supplier Portal

From the results in the regression and distributional analysis, it was shown that the Portal did to a large extent reduce the time wasted in the mail for most of the invoices. Still there is reason to believe that missing routines for some of the suppliers when it comes to handling electronic invoices are harming some of the POT on the other end. This was made evident when adjusting for extreme values and when making the dependent variable POT as a dummy, where the  $\beta$  was barely positive, and not at all significant. With all this in mind the consultants would recommend that the use of the Portal should be properly evaluated and revised to see if there are any other causes for the delays of these invoices. And on the basis of these findings the Portal will not be mentioned as a means for reaching the KPO of for POT. The researchers do see a great potential for the Portal based on the highly positive effect for the most of the invoices.

### 16.2. Qualitative benefits

From the results in the regression analysis and related additional analysis there will now follow an evaluation of the use of these numbers, and look at them in the light of the KPO's. Breaking the objective down in sub goals is the main focus of this part of the paper. Aside from the benefit of breaking down the KPO into smaller goals the results from the regression

etc. can also be used to evaluate the specific execution of the sub goals. E.g. The supplier manager could use the appendix “21.2.Payment on time per Business group with different payment terms” to see where the effect from PT improvements is expected to be highest and use the resources where it has the highest expected effect. It can also help the supplier managers to understand the need for improved PT from their suppliers or for guidance when negotiating new contracts with the suppliers. For instance, if a contract is being evaluated and the terms are 50 days from invoice date, this gives an expected POT for all business groups of 77%, but the difference between the different business groups is large. For OFS it will have an expected POT of 71%, for M-I it is highest with 89% and for Smith it is expected to have 85%. This says that OFS seems to be quite far below the other business groups when it comes to gaining benefit from PT of 50 days from receipt of invoice.

## 17. Sub goals

To be able to improve payment on time with 5% for Q4 2015, it is of good help to divide the goal into several sub goals that are easier to measure and to work towards.

### 17.1. Payment terms

The researchers wanted to use the POT for different PT to create a work plan to reach the goal of a POT for NOR of 81.6% by the last quarter of 2015, up from 77.7% from Q4, one year before. These numbers are a bit different from the official Slb numbers of 81% and 77%, the differences are quite small and are probably caused by different data set adjustments. The researchers chose to keep their data values to make the solutions more traceable according to their dataset.

The researchers wanted to make the sub goals easy to understand and work with, and so the idea was to evaluate the POT for some PT category with poor PT. A target to move suppliers out of the “less than 31 days Credit Time” group, since it is also a KPO to move suppliers out of this group and over to groups with higher Credit Time. Preferably to the Slb standard of 50 days from receipt of invoice.

Since the target for 2015 is set as an increase from Q4 2014 the researchers thought that it would be best to use the Q4 data as base to set the goals to improve the POT for 2015. One could argue that using data for the whole year could have been more accurate, considering that it captures large mistakes that happened in other quarters than Q4, and possibly seasonal changes. Still the field of PT and POT is a field of large focus and changes so the latest data is also the most updated data. And for instance the POT for the group with 50 days credit time from receipt date was *not* as surprisingly low when looking at the 4<sup>th</sup> quarter of 2014 as for the whole year. Also it can be argued that since Slb is striving to not make any big mistakes, and thus to plan for them to happen would be inconsistent with their target. On this basis the researchers thought that using the Q4 data would be the best way to project and set the goals for 2015, since no major mistakes are known to have happened in this quarter. What was found was that the division between the different PT groups for Q4 2014 was like this; Less than 31 days; percentage of invoices with less than 31 days of Credit time is 49.7% and these have a POT of 70.4%.

50 days from receipt of invoice; stands for 3.7% of the invoices and has a POT of 82.6%, yet this is expected to be higher since the category with lower credit time (41-49 days) has better POT, and this group has ten times more observations (625 vs 6213) and is thus more accurate. For this category the POT was 86.9% I Q4 2014, so the POT is expected to be at least 86.9% for the 50 days from receipt of invoice group.

Above 31 days without those signed T&Cs (50 days from receipt date); stands for 46.6% of the invoices and has a POT of 85.1%, this category is as shown earlier mainly represented by the 45 days credit time group.

To be able to increase the POT from 77.7% to 81.6% by only using PT, or more specifically to get enough suppliers below 31 days to sign the current T&Cs this is what SIb would have to do. See “Table 13” for solver solutions.

	Unrealistic - Percentage of invoices paid on time given their payment terms and percentage of invoices in this category.		
	Existing percentage	To reach KPO	Estimated POT
<31	49.7%	26.8%	70.4%
>=31 (Not signed T&Cs)	46.6%	46.6%	85.1%
Signed T&Cs	3.7%	26.6%	86.9%
TOTAL	100.0%	100.0%	81.6%

*Table 13 Unrealistic - Percentage of invoices paid on time given their payment terms and percentage of invoices in this category*

Considering what the existing numbers are with approximately 50% of the invoices is below 31 days, and now you would need to move 46% of these invoices from this group over to the 50 days from receipt of invoice category. This is a quite ambitious, if not impossible, goal for 2015. It is not just that it is demanding work from SIb, but it is not really a one way process but an agreement process. So to assume that 46% of the suppliers in the below 31 days group will accept these T&Cs is over ambitious.

It is probably more likely to assume that some of the improvement in POT should be done by improving PT and some through other actions, such as usage of PO and improved routines. So instead of saying that POT should be improved only through PT, the researchers evaluated

that it could be possible for the supplier managers to get 10 suppliers each from the below 31 days credit time group into the 50 days from invoice receipt date. With six supplier managers this is expected to improve the POT with 1.2% points, from 77.7% up to 78.9%. See "Table 14" for solver solutions.

Realistic - Percentage of invoices paid on time given their payment terms and percentage of invoices in this category.		
	Percentage of total	Estimated POT
<31	43.4%	70.4%
>=31 (Not signed T&Cs)	46.6%	85.1%
Signed T&Cs	10.0%	86.7%
TOTAL	100.0%	78.9%

*Table 14 Realistic - Percentage of invoices paid on time given their payment terms and percentage of invoices in this category*

The way this was calculated was to take the average yearly URN for the suppliers used by Slb today, and use this times the number of suppliers signing T&Cs. It is not a very precise measure, but on average it should give the expected effect. The researchers consider this a tough, yet possible target if it is focused on. And previously explained method for sorting after spend still counts, thus each manager would take the first 10 suppliers willing to sign T&Cs, sorted after the highest spend. Still it does not reach the goal for 2015 and thus the usage of PO is also evaluated.

## 17.2. Improving payment on time through usage of PO

The results from the regressions show that PO's also have a large positive effect on POT. This is made evident through its  $\beta$  when it comes to how it moves the payment date away from overdue, with approximately 7 days. In comparison the PO has approximately the same effect as from date calculation, when adjusting for the extreme values in date calculation. To be able to break the measure down to a tangible goal, the POT for PO and Non-PO invoices have been used. To remind what was found in the regression and distribution analysis it was shown that in 2014 approximately 58% of the invoices are with PO while 42% are Non-PO for 2014 and for Q4 it is 56% with PO and 44% without. Previous analysis also showed that the POT is a lot higher for PO invoices than for Non-PO, respectively 81% and 62% for the whole year, while the difference is quite reduced for Q4 the same year where the POT for PO is 83% and

71% for Non-PO. PT inside these two groups were quite similar, so the differences should not be caused by PT. Credit time seemed to have the same distribution within the two, while with PO-invoices had a bit more invoices calculating from receipt of invoice.

On the basis of this the POT for Non-PO invoices is quite a lot higher than shown earlier with around 60%. By using these last numbers from Q4 to explain the PO effect, it shows that PO increases POT with 17%  $((83\%/70.6\%)-100\%)$ . The goal is to increase the POT with as much as possible through usage of PO. And considering that the aim is to increase the POT with 1.2% points through PT (from 77.7% to 78.9%), for the remaining 2.7%  $(81.6\% - 78.9\%)$  to be POT through increase of PO this would have to be the case.

$$83.3\% * X + 70.6\% * (1 - X) = 80.4\%$$

Solving this equation gives that the percentage of PO invoices should be increased to 81.1%. This is the same as a 25.1% points increase  $(81.1\% - 56\%)$  or a 44.8% increase  $((81.1\%/56\%)-100\%)$ . This is unrealistic, and to set a more reasonable goal, the KPO for increase in usage of PO is at 5% increase, so  $56\% * 1.05 = 58.8\%$ . If this increase is used in the calculation it will increase the POT with 0.4% points. To make this goal more tangible, the goal was set into number of suppliers to be moved from the Non-PO category to the PO-category. This was done the same way as with PT, only here the average URNs for the suppliers in the Non-PO category was calculated, and thus calculating how many suppliers need to move of these over to the PO-category. The average number of URNs for the Non-PO category was 16.4% and this resulted in the goal of moving 28.6 or 29 suppliers from the Non-PO category to the PO category.

### 17.3. Combined effect

Payment on time reached through payment terms and use of PO	
Goal	81.6%
Current POT	77.7%
POT added from PT	1.2%
POT added from PO	0.4%
POT reached	79.6%
Missing POT	2%

*Table 15 Payment on time reached through payment terms and use of PO*



With these goals for both PT and PO the expected POT will be 79.6%, still missing 2% points (see “Table 15”). There is thus a need for more action to be able to reach the KPO for POT in 2015. Routine changes could be the main action, to decrease the time needed to process the invoices. And the differences between OFS and M-I (as the largest BG`s) shows that there seems to be quite large potential to improve the POT by looking at routine changes, possibly through higher awareness for approvers, improve goods receipt, training suppliers that often make mistakes in their invoices etc.

#### 17.4. Loss of payment on time in the ready to pay before due date group

Another way to improve the POT could also be to change the payment routines, this is made evident when looking at the POT for the invoices that are ready to pay before the due date. Today the POT for these invoices, for all business groups, is 91.4%, see “Table 16”. Still this is said to be mainly because of the audit being time consuming and credit notes mirroring the invoice. Thus harming the POT, since the invoice is not paid until the credit note is fully repaid or cross matched with a credit note.

Total percentage paid on time if “ready to pay” before due date	
Count POT	43814
Count Not-POT	4110
%POT	91.4%

*Table 16 Total Percentage paid on time if “ready to pay” before due date*

And to shed more light on this picture, the ready to pay before due date POT is 93.5% for M-I and 90.2% for OFS. Meaning that this is also a problem that is especially evident for OFS. And the distribution of ready to pay before due date – Not-POT in “Figure 28” and “Table 17”.

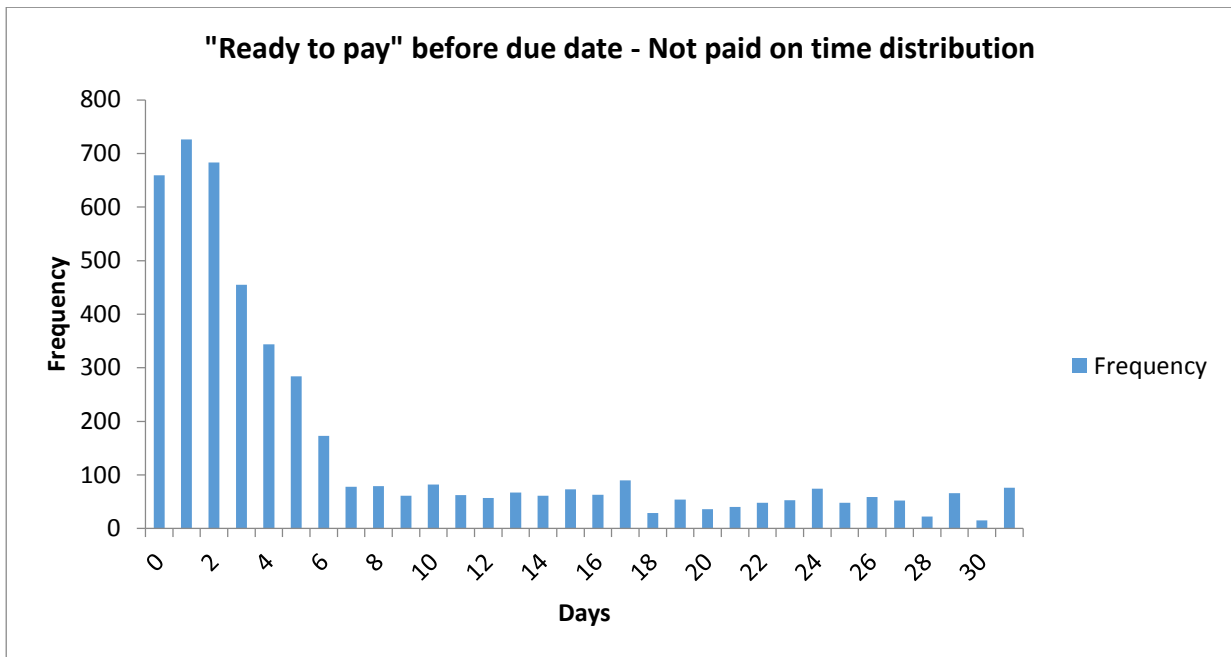


Figure 28 "Ready to pay" before due date - Not paid on time distribution

Distribution of ready to pay before due date - Not paid on time		
Days	Percentage	Accumulated %
0	13.8%	13.8%
1	15.2%	29.0%
2	14.3%	43.4%
3	9.5%	52.9%
4	7.2%	60.1%
5	6.0%	66.1%
6	3.6%	69.7%
7	1.6%	71.3%
8	1.7%	73.0%
9	1.3%	74.3%
10	1.7%	76.0%
11	1.3%	77.3%
12	1.2%	78.5%
13	1.4%	79.9%
14	1.3%	81.2%
15	1.5%	82.7%
16	1.3%	84.0%
17	1.9%	85.9%
18	0.6%	86.5%
19	1.1%	87.6%
20	0.8%	88.4%
21	0.8%	89.2%

22	1.0%	90.2%
23	1.1%	91.4%
24	1.6%	92.9%
25	1.0%	93.9%
26	1.2%	95.2%
27	1.1%	96.2%
28	0.5%	96.7%
29	1.4%	98.1%
30	0.3%	98.4%
More	1.6%	100.0%

*Table 17 Distribution of "ready to pay" before due date - Not paid on time*

The first thing to notice is the large loss of invoices for the short payment time, over 50% of the invoices losing POT for ready to pay invoices are with very short time until due date, up to 3 days before due date. This also points in the direction of the loss in POT is largely due to late processing and not corresponding credit notes.

The researchers tried to take away some of the invoices corresponding to credit notes, but were at the time of writing only able to take away those invoices where the full amount had been credited. The researchers want to point out that the method for doing this might have some systematic faults since only the invoices fully credited might have other properties than the invoices partly credited, possibly resulting values that are not representative. Also the way of finding corresponding invoices to the credit notes could be weak since it was done as a two way match where both spend and supplier name was matched, where there could be several equal invoices for the same supplier. So if a credit note for company X of \$100 was for a typical good from X there might be several invoices with the same amount and thus the wrong invoice might have been chosen as corresponding.

With that said, the researchers found that these chosen invoices were in fact harming POT, suggesting that this method, at least to some degree, was capable of finding the corresponding invoices. Where the average POT for the total amount of invoices was approximately 72.7%, while for the invoices where the full amount was credited, the POT for these invoices were only 56.4%. And when adjusting to look at only the invoices ready to pay before due date, the effect is reduced to a difference of 91.4% POT for all invoices and to 85.0% for those invoices where the full amount was corresponding to a credit note. So this does imply that credit notes does have some effect on POT for the ready to pay before due date invoices. Still the

researchers recommend SIb to look further into this problem, in case of systematic problems harming the POT at this late stage. And the most important things to evaluate is;

1. How many invoices are waiting to be paid because of good PT and still end up not being paid on time because of approval of payments happening to late?
2. How many invoices are lost from ready to pay before due date because of the time needed to approve these payments for a payment run.

The basis of these numbers is based on 208 invoices fully credited by corresponding credit notes. Removing these invoices had a very little yet positive effect on the POT for the ready to pay before due date invoices, mainly because of its very low number. And considering the number of invoices needed to be credit notes to sum a total effect of 8.6% loss of POT it seems to large. Considering if the numbers from previous calculations are correct, it states that more than 50% of the invoices would have to be credited to get the same harm done to the POT for ready to pay before due date invoice. See “Table 18” for solver solution.

Percentage of invoices needing to be related to credit notes if the 8.6% of loss of payment on time from ready to pay before due date is caused by credit notes	
POT for RTP before DD - No credit Note	100.0%
POT for RTP before DD - Credit Notes	85.0%
Share of credit note invoices	57.3%
Target POT = 91.4%	91.4%

*Table 18 Percentage of invoices needing to be related to credit notes if the 8.6% of loss of payment on time from ready to pay before due date is caused by credit notes*

These numbers are not very accurate and the answer could be very different if including the partial credit notes, and possibly a new method for matching the invoices. At least it shows the importance of fully understanding the different reasons for the loss of POT from the ready to pay before due date invoices. And if there is a large loss in POT because of credit notes, this does in reality understate NOR`s POT, and should in that case adjust the POT accordingly since the loss of POT in these cases are “intentional”. On the other hand, if there is a large loss in this category as a result of “systematic” fault, it is recommended to take action to make sure that the payments that are ready to pay before due date are paid on time. This is something that has already been evaluated by SIb where Accn has been made especially aware of SIb NOR poor PT compared to most of the other Geomarkets. Thus Accn is already prioritizing

invoices for NOR, shortening the processing time compared to the other Geomarkets. Still, as long as the Payment Team are able to not fall further and further behind on the audit, it should be possible for them to do the audit within one day for all invoices, considering that in general it has all been checked before.

Another thing to notice on this topic is the planned transition to a new ERP-program, which will make payment runs go daily instead of two times a week. In general this should not affect the POT, since the POT is not calculated from the effective payment date, but the date the payment is set for payment for the next payment run. Still, this could be helping to improve the POT for the ready to pay before due date group if it positively affects the payment approvals.

If there is a potential to improve the POT through the loss of ready to pay before due date group, the researchers assume that it should be especially evident within the first few days whereas for the later days it is more likely to be because of corresponding credit notes etc. The reasons for believing so is the very smooth distribution of invoices over the different days over 5 days before due date, around 1% for each day. So if say 1 % for each day is resulted in corresponding credit notes etc, 5% is taken away from the accumulated percentage of the 5<sup>th</sup> day from ready to pay before due date. This results in an approximate 60% of the loss of POT in the ready to pay before due date group, can be reduced. Thus giving a total increase in POT of 4%. This is a rough measure, still if proven to be true it gives a high increase in POT, and if improved in 2015 along with the goals for PT and PO, this would shift the POT up to 83.6% resulting in more than reaching the KPO for POT in 2015 with 2 percentage points.

$$66.1\% - 5\% = 61.1\% = \text{possible to move over to POT}$$

$$(8.6\% * 61.1\%) * 77.7\% = 4\% = \text{increase in POT}$$

$$79.6\% + 4\% = 83.6\% = \text{possible POT 2014 from all actions}$$

$$83.6\% - 81.6\% = 2\% = \text{percentage above the goal}$$

## 18.Challenges with Schlumberger`s Key Performance Objectives

When working with the KPOs Slb has related to POT, the researchers found that they are good tool for setting focus on POT, setting goals, and motivating the workers. But there are some weaknesses with them and some of them are pointed out below:

- If an invoice is paid one year to late, the POT for the month it is paid will be harmed. Even though this invoice is paid late, it is better that it gets paid late than not paid at all. The payment of this invoice should not affect POT negatively.
- When setting 5% increase in use of PO, it does not motivate the workers to work on the supplier with highest spend on the invoices, but the supplier which it is easiest to get to use PO. This might lead to skewed incentives for the workers. Each KPO might be good for one specific thing, but it is hard to make sure that the KPO is set in a way which makes sure it generates the highest possible value for the company.
- The KPO they have chosen for POT is not good if wanting to reduce the amount spent on overdue interest. Interests due to overdue payment, are triggered by the amount of the invoice. The KPO for POT does not take this into account, but only looks at the number of invoices paid on time.
- The KPO is calculated based on the URNs for the given period. Say if one look at POT for first quarter in a year, this might not reflect the correct picture of the suppliers Slb use throughout the whole year, and PT and POT can be quite different in the second period even without any change in effectiveness or other internal changes.
- As the researchers understand, Slb`s focus is on having the highest profit, not having the most robust measures. Therefore, it is not a lot of time spent on making sure there is no error to the KPO measures. When the consultants worked on the case study they found quite a few errors on different ERPs and this is the bases for the calculation of the KPOs.

## 19. Conclusion

Payment on time and improved payment terms affects a company's relationship to its suppliers, its negotiation power, liquidity, profit and much more. Because of its high importance large companies make great effort in improving their ability to pay on time and delay its payments as far as contractually and legally possible. For many large companies the focus is set through large scale goals and a continued focus from the local management to maximize payment on time.

The complication of the issue is what induced managers at Schlumberger to take new actions in reaching new understanding of the process, to find where problems are occurring. The goal with this paper was to visualize and simplify an otherwise messy and complicated matter, leading to new awareness and knowledge spreading in the related departments. The tracking data from the lifespan of the invoices, together with the other information available, laid the foundation for good analysis that gave many interesting findings. The data made it possible to analyze and evaluate current and future actions for improvements in payment on time. These analyses were sobering in terms of clarifying which actions are helping as expected, and where Slb is over or underestimating the effect. It was even found that some variables supposed to improve payment on time were actually working against payment on time.

By going in to payment terms in details, this paper concludes that for Slb it is better to select which supplier to improve payment terms based on total spend, not based on how much money spent on fees and interest due to overdue payments on the given supplier. This was found by calculating the direct financial cost of fees and interests for overdue payments, shown to be about 1% for Slb. This was supported by the high value coming from changes in payment terms, calculated by the number of days changes, the spend on the supplier, and use of Slb's WACC.

This paper states important factors which it is important to think through before a company ask their supplier for better payment terms. A change in payment terms might lead to higher prices, smaller supplier's warehouses, higher risk etc. for the customer asking for better payment terms. The customer needs to take in to consideration the overall relationship with the supplier, to make sure that they don't worsen their position by improving the payment terms. The researchers also found many weak sections in the process of updating vendor

master data like payment terms. They have listed the most important improvements needed, where the key finding is the poor linking between “Approved Supplier List”, a program used for supplier management, and the ERP systems. This poor linking costs inefficiency of over 20%, meaning that over 20% of the sites sent request on is never changed.

It was also shown that the main drivers for improving payment on time is not surprisingly credit time, date calculation and use of purchase order. Date calculation has a surprisingly high effect compared to credit time. The analysis shows that it is equally good to get an invoice to be calculated from receipt date as 12-13 days higher credit time. The positive effect from purchase order on payment on time is estimated to be approximately as high as date calculation from receipt date, and should keep being focused on. Another interesting finding is the Supplier Portals possibly negative or neutral effect on payment on time, most likely due to supplier’s poor routines when it comes to electronically submitted invoices. This resulted in the researchers recommending Schlumberger to look into all aspects of the Supplier Portal and evaluate the overall effect from it before continuing to motivate suppliers to use it.

Based on this it was found that it would be difficult, if not impossible, to reach the KPO for payment on time in 2015 with only improving payment terms and increase use of purchase order. This results in the need to find new ways to improve payment on time through better routines etc. The high loss of payment on time from invoices ready to pay before due date, still missing the due date was also pointed out. The researchers recommend that Schlumberger investigate this issue, and assume that there might be as much as a 4% point increase in POT available if this problem could be fixed.

Despite the effort to analyze payment terms effect on many aspects in a firm, and the vast and detailed data made available to the researchers of this paper there is still many aspects of the topics that needs to be shed more light on. Such as the country differences in terms of payment terms. The researchers also encourage others to do more calculations on the direct financial cost of fees and interest for firms operating in Norway, in other market sectors. This to be able to generalize more on the real cost of late payments in Norway. In addition to the findings in this paper there are many other things affecting POT which the consultants did not incorporate in the analysis. This is for instance how efficient the different workers in the different departments are, how motivated they are etc. The consultants encourage other to do qualitative analysis on this field.



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## 21. Appendixes

## 21.1. SPSS Output – Approval matrix spend buckets – Dependent variable PaymentD2DueD

Coefficients <sup>a</sup>					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	-.291	.368		-.791	.429
AccnCT	.944	.008	.300	115.631	.000
bw200049999999	-.876	3.480	-.001	-.252	.801
bw10001999999	-1.304	2.542	-.001	-.513	.608
bw500999999	-2.282	1.743	-.003	-1.310	.190
bw200499999	-.813	1.066	-.002	-.763	.446
bw100199999	-1.789	.819	-.005	-2.185	.029
bw5099999	-1.228	.616	-.005	-1.992	.046
bw2049999	-1.558	.377	-.010	-4.133	.000
bw10gt19999	-.010	.361	.000	-.026	.979
bw54999	-.155	.319	-.001	-.488	.625
MI	-1.907	.199	-.026	-9.583	.000
Smith	.418	.376	.003	1.111	.267
Portal	1.286	.203	.017	6.343	.000
Urgent	2.992	.570	.014	5.254	.000
DK	-3.208	.367	-.024	-8.748	.000
GB	-5.558	1.260	-.011	-4.410	.000
SlbCT	.973	.008	.329	122.315	.000
PO	1.316	.196	.018	6.706	.000
PayLT	.758	.009	.236	84.555	.000
CredTime	-.624	.009	-.202	-72.791	.000
Receipt	-13.704	.192	-.183	-71.267	.000
InvoiceD2ReceiptD	.526	.002	.636	248.201	.000
ReceiptD2ScanD	.577	.007	.200	78.337	.000

a. Dependent Variable: PaymentD2DueD

## 21.2. Payment on time per Business group with different payment terms

Date calculation = ALL				Date calculation = Receipt date				Date calculation = Invoice date			
For ALL Business Groups (BG)				For ALL BG - Date calc: Reception				For ALL BG - Date calc: Invoice date			
PT Bucket	POT	TOTAL	% POT	PT Bucket	POT	TOTAL	% POT	PT Bucket	POT	TOTAL	% POT
"0-5"	23	166	14%	"0-5"	20	90	22%	"0-5"	3	76	4%
"6-10"	553	1768	31%	"6-10"	455	936	49%	"6-10"	98	832	12%
"11-20"	2951	5991	49%	"11-20"	1706	2738	62%	"11-20"	1245	3253	38%
"21-30"	21055	29850	71%	"21-30"	9769	11993	81%	"21-30"	11286	17857	63%
"31-40"	4049	7495	54%	"31-40"	2457	3765	65%	"31-40"	1592	3730	43%
"41-49"	36502	48691	75%	"41-49"	15929	18961	84%	"41-49"	20573	29730	69%
"50"	2943	3737	79%	"50"	1128	1393	81%	"50"	1815	2344	77%
>50	338	394	86%	>50	104	120	87%	>=50	234	274	85%

OFS				OFS - Date calc: Reception				OFS Date - Date calc: Invoice date			
PT Bucket	POT	Of	% POT	PT Bucket	POT	Of	% POT	PT Bucket	POT	Of	% POT
"0-5"	2	4	50%	"0-5"	0	2	0%	"0-5"	2	2	100%
"6-10"	282	651	43%	"6-10"	197	248	79%	"6-10"	85	403	21%
"11-20"	1217	2678	45%	"11-20"	35	66	53%	"11-20"	1182	2612	45%
"21-30"	10030	15594	64%	"21-30"	3755	4664	81%	"21-30"	6275	10930	57%
"31-40"	10839	16752	65%	"31-40"	648	926	70%	"31-40"	10191	15826	64%
"41-49"	18466	26870	69%	"41-49"	7372	8963	82%	"41-49"	11094	17907	62%
"50"	1781	2448	73%	"50"	761	1008	75%	"50"	1020	1440	71%
>50	45	61	74%	>50	18	27	67%	>50	27	34	79%

MI				MI - Date calc: Reception				MI - Date calc: Invoice date			
PT Bucket	POT	Of	% POT	PT Bucket	POT	Of	% POT	PT Bucket	POT	Of	% POT
"0-5"	18	129	14%	"0-5"	17	60	28%	"0-5"	1	69	1%
"6-10"	265	1170	23%	"6-10"	236	627	38%	"6-10"	29	543	5%
"11-20"	2201	4736	46%	"11-20"	1617	2493	65%	"11-20"	584	2243	26%
"21-30"	12602	17414	72%	"21-30"	5498	6484	85%	"21-30"	7104	10930	65%
"31-40"	12798	17639	73%	"31-40"	1668	2547	65%	"31-40"	11130	15092	74%
"41-49"	19556	25137	78%	"41-49"	7945	9020	88%	"41-49"	11611	16117	72%
"50"	947	1038	91%	"50"	300	308	97%	"50"	647	730	89%
>50	248	279	89%	>50	49	49	100%	>50	199	230	87%

Smith				Smith - Date calc: Reception				Smith - Date calc: Invoice date			
PT Bucket	POT	Of	% POT	PT Bucket	POT	Of	% POT	PT Bucket	POT	Of	% POT
"0-5"	3	33	9%	"0-5"	3	28	11%	"0-5"	0	5	0%
"6-10"	29	113	26%	"6-10"	22	61	36%	"6-10"	7	52	13%
"11-20"	86	345	25%	"11-20"	54	179	30%	"11-20"	32	166	19%
"21-30"	1374	2833	48%	"21-30"	516	845	61%	"21-30"	858	1988	43%
"31-40"	1467	2954	50%	"31-40"	141	292	48%	"31-40"	1326	2662	50%
"41-49"	2529	4179	61%	"41-49"	612	978	63%	"41-49"	1917	3201	60%
"50"	215	251	86%	"50"	67	77	87%	"50"	148	174	85%
>50	45	54	83%	>50	37	44	84%	>50	8	10	80%

### 21.3. SPSS Output - Removing latest 3% and 6% from Invoice date to receipt date – Dependent variable is PaymentD2DueD

Removing 3% latest from Invoice date to receipt date.

Coefficients <sup>a</sup>					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-1.728	.155		-11.174	.000
InvoiceD2ReceiptD	.560	.003	.460	186.518	.000
ReceiptD2ScanD	.604	.004	.367	150.848	.000
AccnCT	.965	.003	.528	297.525	.000
SlbCT	.969	.003	.566	306.544	.000
PayLT	.818	.004	.449	230.388	.000
CredTime	-.650	.004	-.352	-179.817	.000
Receipt	-8.181	.075	-.192	-109.130	.000
PO	.793	.077	.019	10.300	.000
Portal	.445	.080	.011	5.585	.000
Urgent	-.240	.229	-.002	-1.052	.293
MI	-2.351	.078	-.056	-30.190	.000
1 Smith	-3.159	.148	-.039	-21.343	.000
DK	-2.099	.143	-.028	-14.672	.000
GB	-1.104	.484	-.004	-2.278	.023
gt100	-1.152	.232	-.008	-4.968	.000
@50to100	-1.144	.242	-.008	-4.732	.000
@35to50	-1.054	.238	-.008	-4.436	.000
@25to35	-1.296	.239	-.009	-5.431	.000
@15to25	-1.005	.180	-.010	-5.570	.000
@10to15	-.819	.176	-.008	-4.644	.000
@7to10	-.295	.178	-.003	-1.657	.097
@4to7	-.584	.133	-.008	-4.375	.000
@2to4	-.368	.110	-.006	-3.342	.001
@1to2	.120	.107	.002	1.118	.263

a. Dependent Variable: PaymentD2DueD

Removing 6% latest from Invoice date to receipt date.

<b>Coefficients<sup>a</sup></b>					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-2.251	.135		-16.653	.000
InvoiceD2ReceiptD	.542	.004	.396	124.263	.000
ReceiptD2ScanD	.587	.005	.382	121.772	.000
AccnCT	.970	.003	.562	350.539	.000
SlbCT	.968	.003	.599	359.748	.000
PayLT	.832	.003	.485	274.527	.000
CredTime	-.652	.003	-.372	-209.799	.000
Receipt	-6.582	.064	-.164	-103.070	.000
PO	.825	.065	.021	12.597	.000
Portal	.042	.070	.001	.595	.552
Urgent	-.642	.203	-.005	-3.161	.002
MI	-2.421	.067	-.061	-36.279	.000
1 Smith	-3.175	.126	-.042	-25.285	.000
DK	-1.716	.121	-.025	-14.141	.000
GB	-1.261	.411	-.005	-3.067	.002
gt100	-.998	.198	-.008	-5.040	.000
@50to100	-.888	.208	-.007	-4.279	.000
@35to50	-1.048	.202	-.008	-5.181	.000
@25to35	-1.449	.205	-.011	-7.086	.000
@15to25	-1.010	.155	-.010	-6.535	.000
@10to15	-.803	.150	-.008	-5.351	.000
@7to10	-.210	.152	-.002	-1.383	.167
@4to7	-.505	.114	-.007	-4.449	.000
@2to4	-.274	.094	-.005	-2.924	.003
@1to2	.099	.091	.002	1.087	.277

a. Dependent Variable: PaymentD2DueD



## 21.4. SPSS output - Excluding Overall Slb Cycle time – Dependent variable PaymentD2DueD

<b>Coefficients<sup>a</sup></b>					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	6.607	.414		15.977	.000
InvoiceD2ReceiptD	.529	.002	.639	223.198	.000
ReceiptD2ScanD	.580	.008	.200	70.472	.000
AccnCT	1.160	.009	.369	130.290	.000
PayLT	.585	.010	.182	59.148	.000
CredTime	-.558	.010	-.181	-58.337	.000
Receipt	-12.634	.215	-.169	-58.869	.000
PO	-4.172	.215	-.056	-19.382	.000
Portal	1.481	.227	.020	6.538	.000
Urgent	-4.160	.632	-.019	-6.579	.000
MI	-3.378	.222	-.046	-15.218	.000
Smith	5.316	.418	.038	12.715	.000
DK	-5.275	.409	-.040	-12.881	.000
GB	-9.404	1.408	-.019	-6.681	.000
gt100	.632	.668	.003	.945	.345
@50to100	.985	.696	.004	1.415	.157
@35to50	.249	.686	.001	.364	.716
@25to35	.921	.686	.004	1.343	.179
@15to25	.878	.520	.005	1.689	.091
@10to15	.980	.507	.005	1.932	.053
@7to10	.569	.511	.003	1.113	.266
@4to7	1.170	.383	.009	3.051	.002
@2to4	.268	.317	.002	.846	.398
@1to2	.999	.308	.010	3.245	.001

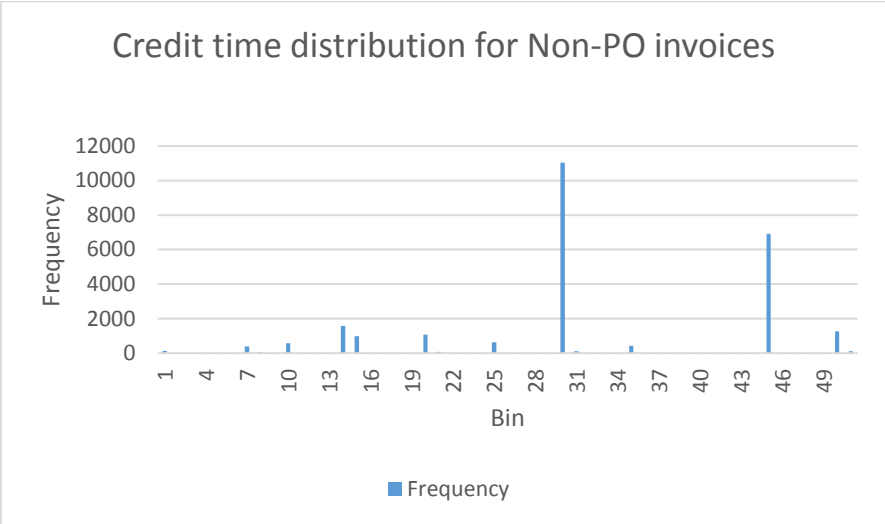
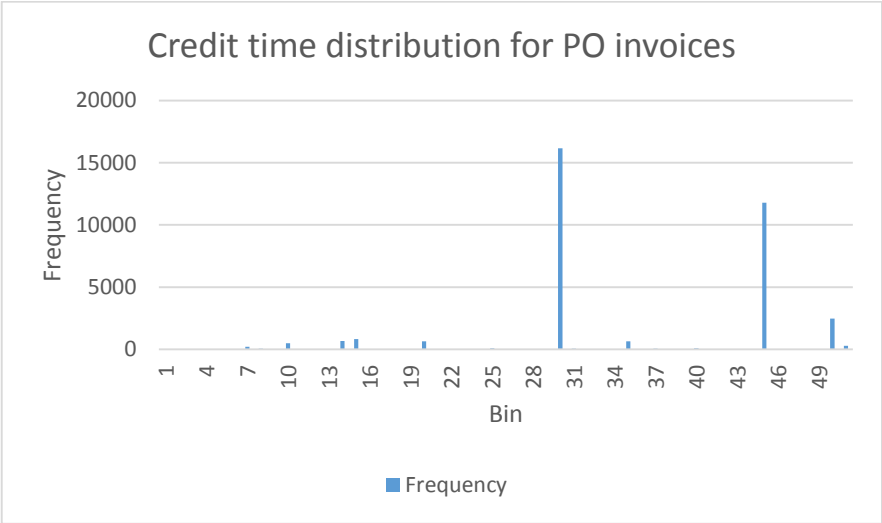
a. Dependent Variable: PaymentD2DueD

21.5. SPSS output - Excluding both Slb cycle time and Accn cycle  
time – Dependent variable PaymentD2DueD

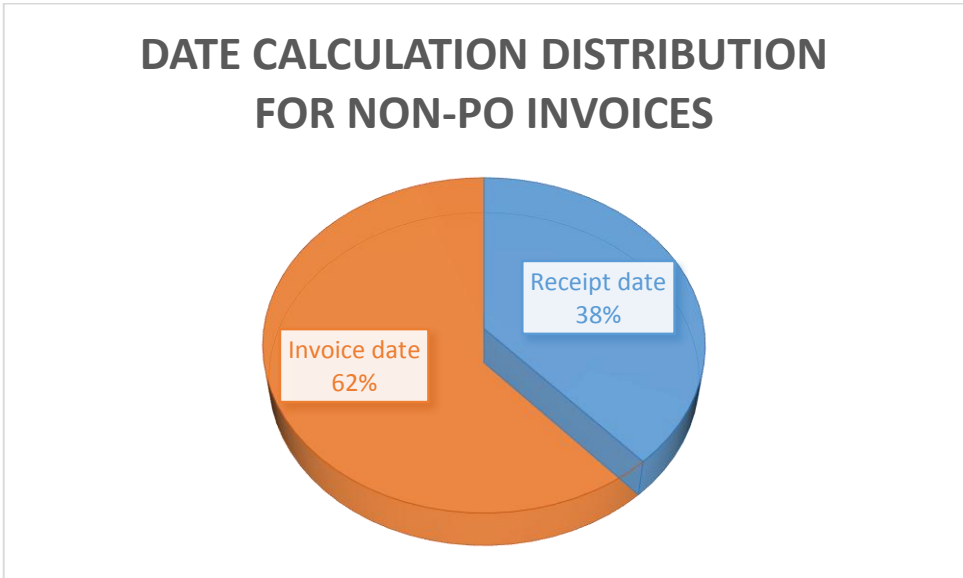
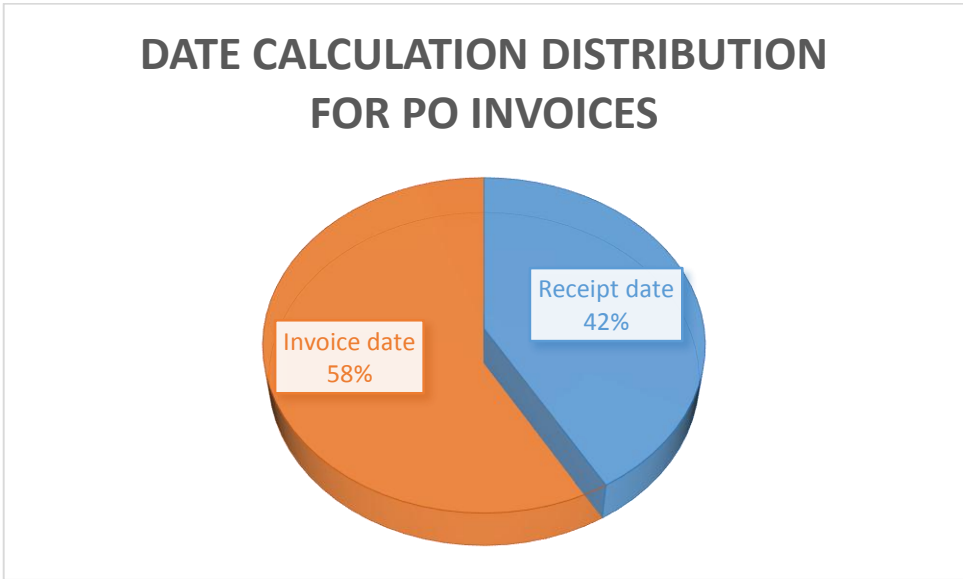
<b>Coefficients<sup>a</sup></b>						
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	18.470	.457		40.445	.000
	InvoiceD2ReceiptD	.528	.003	.638	196.892	.000
	ReceiptD2ScanD	.549	.009	.190	58.939	.000
	PayLT	.364	.011	.114	33.011	.000
	CredTime	-.492	.011	-.160	-45.503	.000
	Receipt	-11.391	.243	-.152	-46.932	.000
	PO	-7.263	.242	-.098	-29.984	.000
	Portal	1.646	.256	.022	6.418	.000
	Urgent	-15.603	.709	-.071	-22.010	.000
	MI	-4.590	.251	-.062	-18.280	.000
	Smith	9.549	.472	.068	20.237	.000
	DK	-6.733	.463	-.051	-14.531	.000
	GB	-10.038	1.593	-.020	-6.300	.000
	gt100	1.692	.757	.007	2.236	.025
	@50to100	2.522	.788	.010	3.199	.001
	@35to50	1.227	.776	.005	1.581	.114
	@25to35	1.660	.776	.007	2.138	.032
	@15to25	1.524	.588	.008	2.591	.010
	@10to15	1.313	.574	.007	2.288	.022
	@7to10	1.263	.579	.007	2.181	.029
	@4to7	1.295	.434	.010	2.982	.003
	@2to4	.388	.359	.004	1.081	.280
	@1to2	1.307	.349	.012	3.748	.000

a. Dependent Variable: PaymentD2DueD

### 21.6. Credit time distributions for PO and Non-PO invoices



21.7. Date Calculation Distribution for PO and Non-PO invoices

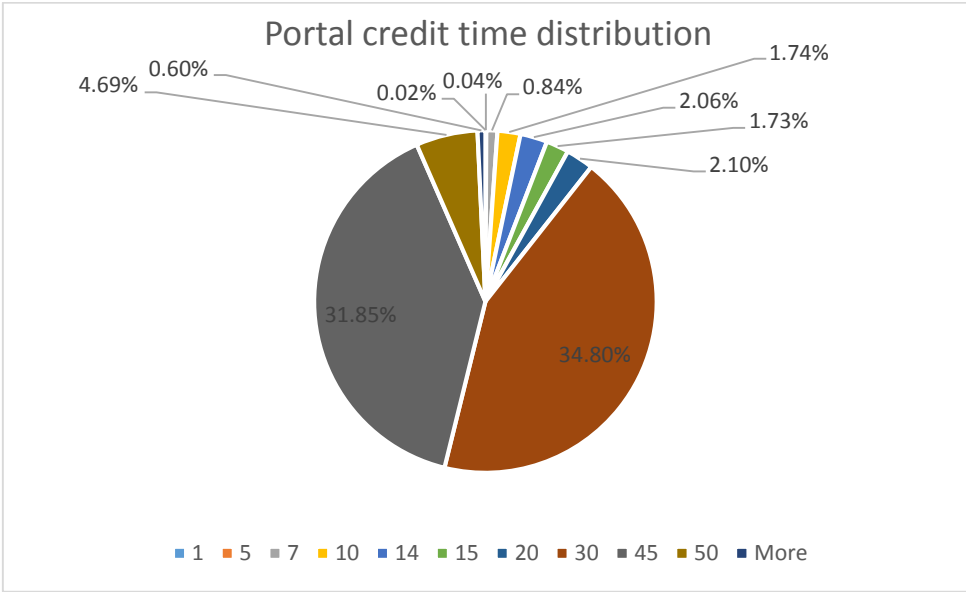
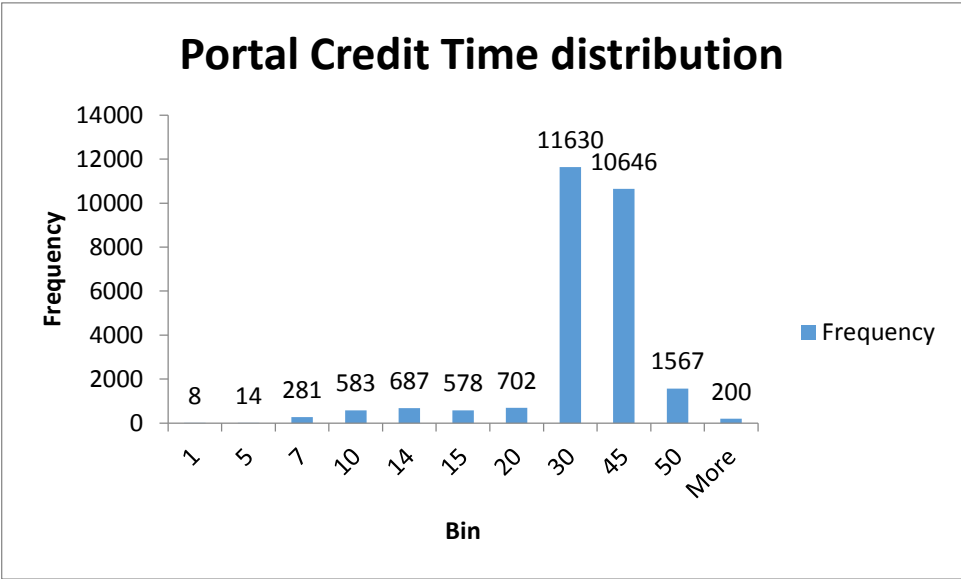


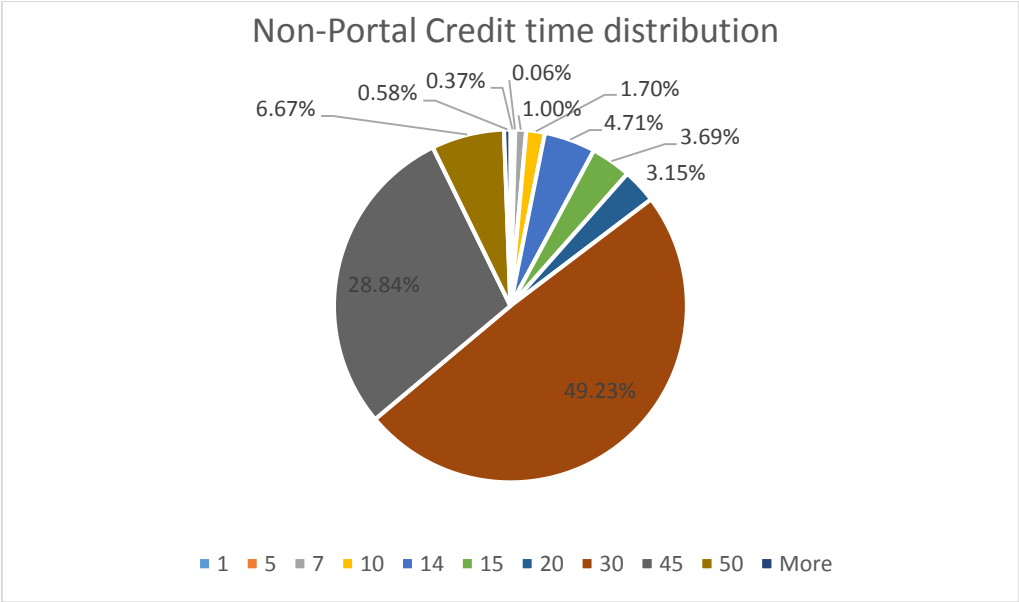
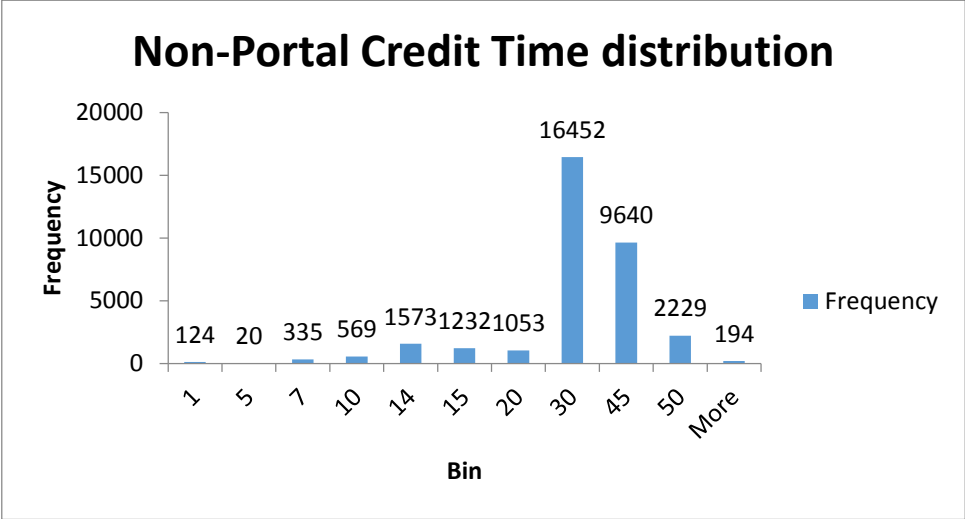
## 21.8. SPSS Output - Excluding InvoiceD2ReceiptD – Dependent variable PaymentD2DueD

Coefficients <sup>a</sup>						
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	7.335	.531		13.820	.000
	AccnCT	.933	.012	.296	80.381	.000
	SlbCT	.992	.011	.336	87.639	.000
	PayLT	.605	.013	.189	47.532	.000
	CredTime	-.570	.012	-.185	-46.713	.000
	Receipt	-13.433	.274	-.180	-49.114	.000
	PO	.632	.281	.009	2.247	.025
	Portal	2.957	.288	.040	10.258	.000
	Urgent	12.104	.807	.055	14.997	.000
	MI	-1.791	.283	-.024	-6.327	.000
	Smith	3.746	.535	.027	7.003	.000
	DK	-7.656	.521	-.058	-14.695	.000
	GB	-10.123	1.792	-.020	-5.648	.000
	gt100	-3.582	.851	-.015	-4.208	.000
	@50to100	-1.798	.887	-.007	-2.027	.043
	@35to50	-2.847	.873	-.012	-3.259	.001
	@25to35	-1.888	.873	-.008	-2.161	.031
	@15to25	-1.515	.662	-.008	-2.290	.022
	@10to15	-.824	.646	-.005	-1.275	.202
	@7to10	-1.056	.651	-.006	-1.622	.105
	@4to7	.392	.488	.003	.804	.422
	@2to4	-.806	.404	-.007	-1.997	.046
	@1to2	.506	.392	.005	1.290	.197

a. Dependent Variable: PaymentD2DueD

21.9. Credit time distribution for Portal and Non-portal invoices





## 21.10. SPSS results from mean time from invoice date to receipt date between Portal and Non-Portal

**Group Statistics**

	Portal	N	Mean	Std. Deviation	Std. Error Mean
ReceiptDateInvoiceDate	.0	33421	15.528	37.9424	.2075
ReceiptDateInvoiceDate	1.0	26896	14.745	51.2391	.3124
ScanReceived	.0	33421	-.080	6.3272	.0346
ScanReceived	1.0	26896	.378	17.6277	.1075

**Independent Samples Test**

	Levene's Test for Equality of Variances		t-test for Equality of Means							
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference		
								Lower	Upper	
InvoiceID2ReceiptID	399.534	.000	2.155	60315	.031	.7833	.3634	.0709	1.4956	
			2.088	48299.747	.037	.7833	.3751	.0481	1.5184	
ReceiptID2ScanID	14.677	.000	-4.412	60315	.000	-.4582	.1039	-.6618	-.2547	
			-4.058	32480.153	.000	-.4582	.1129	-.6795	-.2369	



21.11. SPSS output – No excluded variables – Dependent variable  
PaidOnTime (dummy)

Coefficients <sup>a</sup>						
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	
	B	Std. Error	Beta			
1	(Constant)	.463	.006		75.626	.000
	InvoiceD2ReceiptD	-.002	.000	-.175	-50.690	.000
	ReceiptD2ScanD	-.002	.000	-.068	-19.902	.000
	AccnCT	-.009	.000	-.232	-66.439	.000
	SlbCT	-.013	.000	-.349	-96.312	.000
	PayLT	-.003	.000	-.070	-18.540	.000
	CredTime	.010	.000	.266	71.141	.000
	Receipt	.159	.003	.174	50.430	.000
	PO	.063	.003	.070	19.561	.000
	Portal	.002	.003	.002	.566	.572
	Urgent	.023	.009	.009	2.434	.015
	MI	.071	.003	.079	21.786	.000
	Smith	.027	.006	.016	4.318	.000
	DK	-.013	.006	-.008	-2.097	.036
	GB	.061	.021	.010	2.985	.003
	gt100	-.029	.010	-.010	-2.994	.003
	@50to100	-.027	.010	-.009	-2.661	.008
	@35to50	.010	.010	.003	1.030	.303
	@25to35	.010	.010	.003	.957	.338
	@15to25	.007	.008	.003	.925	.355
	@10to15	.010	.007	.005	1.400	.162
	@7to10	.001	.007	.000	.112	.911
	@4to7	.000	.006	.000	.067	.947
	@2to4	.014	.005	.010	2.962	.003
	@1to2	.006	.005	.004	1.226	.220

a. Dependent Variable: PaidOnTime

## 21.12. SPSS Output - Removing the highest 3%

InvoiceD2ReceiptD, excluding ReceiptD2InvoiceD and  
ReceiptD2ScanD – Dependent variable PaymentD2DueD

Coefficients<sup>a</sup>

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	3.806	.192		19.807	.000
AccnCT	.950	.004	.520	231.320	.000
SlbCT	.951	.004	.555	237.666	.000
PayLT	.739	.004	.405	165.546	.000
CredTime	-.606	.005	-.328	-132.676	.000
Receipt	-8.218	.095	-.193	-86.578	.000
PO	.483	.097	.011	4.957	.000
Portal	-1.096	.100	-.026	-10.920	.000
Urgent	2.419	.289	.019	8.380	.000
MI	-1.488	.098	-.035	-15.121	.000
Smith	-3.506	.187	-.044	-18.705	.000
1 DK	-3.091	.181	-.042	-17.086	.000
GB	-.115	.613	.000	-.187	.852
gt100	-1.246	.294	-.009	-4.245	.000
@50to100	-.835	.306	-.006	-2.727	.006
@35to50	-1.096	.301	-.008	-3.643	.000
@25to35	-.880	.302	-.006	-2.912	.004
@15to25	-.589	.228	-.006	-2.577	.010
@10to15	-.762	.223	-.007	-3.411	.001
@7to10	-.255	.225	-.002	-1.133	.257
@4to7	-.468	.169	-.006	-2.771	.006
@2to4	-.292	.139	-.005	-2.092	.036
@1to2	-.120	.136	-.002	-.888	.375

a. Dependent Variable: PaymentD2DueD

## 21.13. SPSS Output - Removing the highest 6%

InvoiceD2ReceiptD, excluding ReceiptD2InvoiceD and  
ReceiptD2ScanD – Dependent variable PaymentD2DueD

Coefficients<sup>a</sup>

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.501	.147		17.016	.000
AccnCT	.954	.003	.552	304.290	.000
SlbCT	.959	.003	.593	314.513	.000
PayLT	.785	.003	.458	230.393	.000
CredTime	-.624	.004	-.356	-177.654	.000
Receipt	-6.658	.072	-.166	-91.989	.000
PO	.728	.074	.018	9.810	.000
Portal	-2.120	.077	-.054	-27.622	.000
Urgent	-.110	.230	-.001	-.479	.632
MI	-1.540	.075	-.039	-20.472	.000
Smith	-3.410	.142	-.045	-23.963	.000
1 DK	-1.880	.137	-.027	-13.677	.000
GB	-.428	.466	-.002	-.919	.358
gt100	-1.007	.224	-.008	-4.485	.000
@50to100	-1.047	.235	-.008	-4.449	.000
@35to50	-1.156	.229	-.009	-5.044	.000
@25to35	-1.395	.232	-.010	-6.015	.000
@15to25	-1.021	.175	-.010	-5.825	.000
@10to15	-.769	.170	-.008	-4.518	.000
@7to10	-.311	.172	-.003	-1.809	.071
@4to7	-.421	.129	-.006	-3.270	.001
@2to4	-.146	.106	-.003	-1.379	.168
@1to2	-.001	.103	.000	-.014	.989

a. Dependent Variable: PaymentD2DueD

## 21.14. SPSS Output - Removing the highest 10%

InvoiceD2ReceiptD, excluding ReceiptD2InvoiceD and

ReceiptD2ScanD – Dependent variable PaymentD2DueD

Coefficients<sup>a</sup>

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.090	.139		15.007	.000
AccnCT	.956	.003	.557	319.795	.000
SlbCT	.962	.003	.602	331.769	.000
PayLT	.804	.003	.475	246.873	.000
CredTime	-.636	.003	-.367	-189.260	.000
Receipt	-5.885	.069	-.149	-85.677	.000
PO	.757	.070	.019	10.756	.000
Portal	-2.413	.073	-.062	-33.050	.000
Urgent	-1.445	.231	-.011	-6.245	.000
MI	-1.745	.072	-.045	-24.345	.000
Smith	-3.367	.134	-.046	-25.149	.000
1 DK	-1.628	.130	-.024	-12.543	.000
GB	-.392	.438	-.002	-.895	.371
gt100	-1.131	.216	-.009	-5.242	.000
@50to100	-1.137	.225	-.008	-5.064	.000
@35to50	-1.163	.218	-.009	-5.344	.000
@25to35	-1.157	.220	-.009	-5.255	.000
@15to25	-.921	.167	-.009	-5.523	.000
@10to15	-.582	.161	-.006	-3.604	.000
@7to10	-.255	.163	-.003	-1.569	.117
@4to7	-.463	.122	-.007	-3.782	.000
@2to4	-.148	.101	-.003	-1.472	.141
@1to2	.041	.097	.001	.419	.675

a. Dependent Variable: PaymentD2DueD