INEFFICIENCIES IN ORDER TO CASH PROCESSES IN THE LOGISTICS INDUSTRY

Empirical evidence from the Netherlands

Christiaan de Goeij, Windesheim University of Applied Sciences

Rogier van Weelden, HAN University of Applied Sciences

Marco Breijer, Windesheim University of Applied Sciences

Jan Jansen, HAN University of Applied Sciences

Richard Holman, Windesheim University of Applied Sciences

Summary

The logistics industry faces specific challenges in its Order to Cash (O2C) processes due to complex pricing structures and relatively low profit margins. Literature focuses mainly on specific parts of the O2C process, especially payment terms, and therefore offers LSPs limited insights into how they can manage O2C as an integrated process. Based on a survey with 116 responses, and 4 in-depth case studies, this research gives insights into the specific inefficiencies per step in the O2C-process for the logistics industry. We conclude that the main inefficiencies are caused by a lack of an integrated vision on the O2C-process as a whole, limitations in IT systems used and IT skills of employees and by a lack of internal coordination and collaboration between involved departments.

Acknowledgements

Keywords

Order to Cash, O2C, Logistics Service Providers, Payment Term

1. Introduction

The Order to Cash (O2C) process can be explained in short as the process from the receipt of an order, to acceptance of an order, to delivering of a product or service, to the sending of the invoice, the approval of the invoice by the buyer and the final payment. If suppliers shorten their O2C-process, they receive cash faster resulting in a better liquidity position. Furthermore, suppliers can achieve advantages in terms of transaction costs once they limit the time spent on order and invoice management.

Industry reports show that logistics is one of the industries with the longest payment terms (Graydon, 2019). According to insurance provider Atradius the amount of invoices being paid after the due date in the Netherlands increased from 32% to 56% in 2020 (Accountant, 2020). However, even though both literature and industry reports give most attention to payment terms, the O2C-process comprises many other steps. The buyer is responsible for the invoice approval and the final payment, the supplier is responsible for most of the other steps in the process. For suppliers it's therefore important to optimize these steps to avoid liquidity problems and high transaction costs. Since Logistics Service Providers (LSPs) often face low margins (Hausmann et al., 2015; Eliott et al., 2020), a long and inefficient O2C-process has a relatively big impact on profitability.

In this paper we look at the O2C-processes of LSPs in the role of suppliers. The literature review shows the main research gaps, resulting in our research question. The methodology section explains our mixed method research based on a survey and four case studies. The results section addresses the main findings, while in our discussion and conclusion chapter we show how our results relate to existing literature and what the main managerial and theoretical contributions are.

2. Literature Review

2.1 O2C-Process Steps

In figure 1 a typical O2C-process is mapped based on earlier literature (Cronie, 2008; Perego & Salgaro, 2010; Silvestro & Lustrato, 2014). A typical O2C-process consists of the following phases:

1) *Order acceptance and approval*. After suppliers receive and accept the order from buyers, the order has to be processed in internal systems.

2) *Delivery of goods/services.*

3) *Invoicing*. Usually the invoice is sent after the goods/services have been delivered, however, there are occasions wherein suppliers can already send the invoice before delivery.

4) *Payments (according to contractually agreement payment term).* The payment takes place after approval of the invoice by the buyer. In case there are mistakes in the invoice, this can lead to disputes resulting in increased invoice approval time and late payment.

5) *Payments (after contractually agreed payment term).* Buyers often do not live up to agreed payment terms, for example due to liquidity problems or inefficiencies in the payment process. In such cases follow-up communication by suppliers is usually needed.

Even though almost all O2C-processes consist of these five phases, many exceptions exists, especially in the sequence of phases. For example, in large construction projects it's common to have multiple payments for one project in a certain period, with the first payment often already taking place before construction   starts.

Figure 1: O2C-process steps
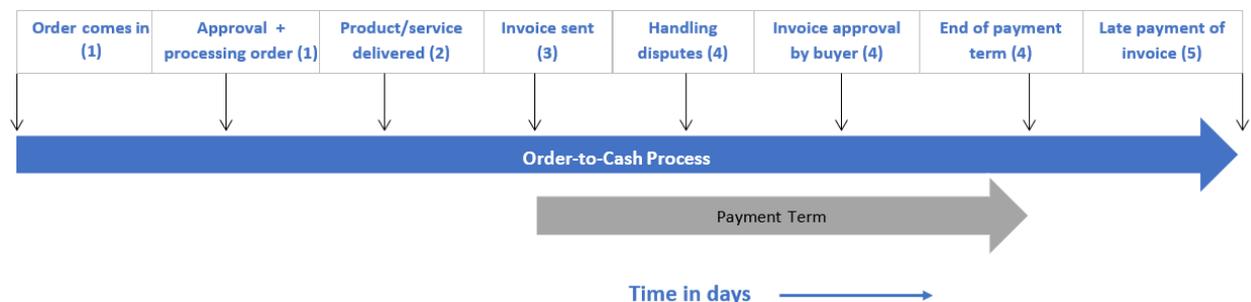
In many companies O2C is not managed as an integrated process (Korotina et al., 2015). Often different departments are involved in different phases. Sales or customer service is usually negotiating with customers about orders, while finance or administration is following up on invoices (De Goeij et al., 2016). Because the O2C-process is not managed as an integrated process it's not common for

companies to measure and monitor the length and effects of the O2C-process on liquidity or costs. Literature is mostly focused on specific parts of the O2C process, especially payment terms (e.g. Van der Vliet et al., 2015; Lekkakos & Serrano, 2016; De Goeij et al., 2021), or is focused on digitalisation of the invoicing process (e.g. Fairchild, 2004; Fairchild, 2005; Koch, 2019). Therefore, literature offers limited insights into how companies can manage O2C as an integrated process.

2.2 Inefficiencies in the O2C-process

There are numerous inefficiencies mentioned in the literature throughout all stages of the O2C-process. Manual processing of orders and invoices can lead to negative cashflow effects due to a longer processing time and to more transaction costs, for example costs of staff working on orders and invoices and printing costs (Fairchild, 2004). A lack of digitalisation in the O2C-process is arguably the most discussed inefficiency in the literature, which could affect many different steps in the O2C-process. With automation suppliers can get greater visibility in the processing of orders and invoices, leading to increased flexibility in managing accounts receivables (Fairchild, 2005; Caniato et al., 2016). E-invoicing receives special attention in literature, as a way to both reduce labour efforts and receive payments faster (Nienhuis et al., 2013; Dello Iacono et al., 2015; Koch 2019). After the delivery of goods and services suppliers often do not send the invoice immediately. Results from a survey from Betaalme.nu (2018) among small and medium sized suppliers in the Netherlands show that 49% of respondents send out the invoice more than five days after the goods/services have already been delivered. This contributes to unnecessary long lead times in the O2C-process. De Goeij et al. (2016) highlight that a lack of customer segmentation and having many different types of invoices could contribute to longer O2C-processes. A segmentation strategy based on factors like payment history of customers and/or invoice volumes per customer, could lead to better liquidity management (Zeng et al., 2008; Hu et al., 2015). When companies have many different types of invoices for different customers, for example invoices per order, weekly invoices, monthly invoices, and partial payment invoices, this increases the complexity possibly leading to more time needed for efficient invoicing. Late payment is often caused by disputes between suppliers and buyers (Silvestro & Lustrato, 2014; De Goeij et al., 2016). Even though disputes already cause inefficiencies, De Goeij et al. (2016) explain that a lack of a standardised process for the handling of such disputes can contribute to even longer O2C-processes. Finally, a frequently mentioned inefficiency is explained as internal goal conflicts, especially between the sales and finance department. Dekkers et al. (2020, p. 7) explain that financial managers often have a "*transactional view*", meaning they are focused on getting paid, while the sales managers have a "*relational view*", where they also find it important to keep the customer happy. For example, this can lead to sales managers giving longer payment terms to keep customers happy, whilst finance is unhappy about this, as it will negatively affect liquidity.

2.3 The O2C-process and the logistics industry

De Goeij et al. (2016) describe invoicing and the pricing structure in the logistics industry as complex, due to a variety of reasons, such as the crossing of borders in transportation or the payment of fuel and waiting time for truck drivers. Such complexity can increase the likelihood of creating mistakes in invoices resulting in disputes and longer lead times. A lack of standardisation in the exchange of invoices with very limited usage of e-invoicing is mentioned as an important bottleneck for LSPs. De Goeij et al. (2016, p. 274) conclude by mentioning a higher degree of automation is needed to "*increase visibility and decrease mistakes in invoices*". Logistics is often described as a low-margin business (Eliott et al., 2020), and therefore the effects of inefficient O2C-processes in terms of costs and liquidity could have a relatively big impact on profitability.

Studies with an integrated view on the O2C-process are scarce, and so far, there has been little attention paid to the O2C-process of LSPs. Therefore, the research question of our paper is:

What are the main inefficiencies in the O2C-processes of LSPs?

3. Methodology

We carried out mixed method research based on a survey with 116 respondents and a multiple case study consisting out of 4 cases. Both methods are used in a complementary way. While the survey results give insights into the average length of steps in the O2C-process, the case studies give more in depth insights into the main bottlenecks LSPs face (Gable, 1994).

3.1 Survey

An online questionnaire has been developed consisting firstly of general information such as the function of respondents in the company, industry and size. After that, respondents are required to answer questions about the length in days of steps in the O2C-process. Finally, there are questions about factors which can potentially influence the length of the O2C-process such as the degree of digitalisation, the usage of credit limits, the industry and percentage of total yearly turnover represented by the customer. Respondents are asked to fill in the survey for the largest customer (in terms of sales volume) only, since the length of O2C-process steps can be different for each customer. The survey questionnaire is based on literature, and a pilot-version was tested among 8 companies before data collection started (Fowler, 2013).

At the time of writing, there have been 116 responses to the survey. Respondents of the survey are mostly CEOs/directors (40%), are representatives of the finance (22%), sales (9%) or supply chain (8%) departments, or have other company functions (21%). The industries represented can be seen in table 2. Based on this data we were able to compare the logistics industry with other industries. Descriptive statistics are used for the purpose of this paper, since at the moment of writing we are still collecting a larger amount of data to perform more advanced statistical techniques.

3.2 Case studies

We chose a theoretical sampling approach, by including cases that either extend or replicate theory (Eisenhardt, 1989). The case study sample is summarised in table 1. The cases are homogenous in terms of geography and industry, since the companies are all based in the Netherlands and they are all LSPs, allowing for cross-case comparability. At the same time there is heterogeneity in the sample, in terms of yearly turnover, the main activities of LSPs and the industries of their clients, which allows for investigation of factors that can explain differences between cases.

Data triangulation is achieved in our research by conducting semi-structured interviews with employees from different company departments. In all cases at least both sales/customer service and financial/administrative employees are interviewed, enabling analysis of both financial/transactional aspects and sales-linked customer relationship aspects (Dekkers et al., 2020). In this study secondary data plays a crucial role, especially the extensive data on orders, invoices and payments which have been extracted from internal systems. Combining secondary data with interview information increased construct validity (Yin, 2009), and enabled the assessment of both the length of different steps in the O2C-process and the main inefficiencies per step.

Once collected, data were checked by the main contact person at each of the four companies, who provided additional information or made corrections when necessary. Data were also checked by the research team. Coding for the cross-case analysis was firstly undertaken independently by each researcher and consensus was achieved following subsequent discussions. Codes are based on the different steps in the O2C-process. In the within- and cross-case analysis we show detailed insights on the four cases, but at the same time we make clear what the peculiarities are in our specific sample, to explain the extent to which results are also applicable for other LSPs or for other industries.

Table 1: Case study sample

	LSP 1	LSP 2	LSP 3	LSP 4
Size (yearly turnover in €)	25-50 million	50-100 million	100-150 million	25-50 million
Main Activities	(Sea and Road) Forwarding, Warehousing, 3PL	(Road) Transport, Warehousing	(Sea and Road) Transport, Forwarding, Warehousing	(Road) Transport, Warehousing, Forwarding
Most important industries of clients	Fashion	Interior Design, Construction	Food & Beverages, Retail	Larger LSPs + Luxury goods, food & beverages, chemical products
Interviews	CEO, administrative employees (2x), customer service employee.	Sales manager, finance manager, head of customer service, head of credit control.	CFO (3x), financial /administrative employee, sales managers (2x), CEO.	Sales Manager, Customer Service employees (2x), Account Manager
Secondary data	In all cases: extensive order, invoicing and payment data (MS Excel-extractions from internal IT-systems), sales volumes and payment terms for all customers. Financial ratios (e.g. DPO, DSO, current ratio) and annual reports.			

4. Preliminary Results

4.1 Survey Results

Table 2 shows the main survey results, with the average amount of days per O2C-process step per industry. In terms of total O2C-process time the logistics industry is very close to the overall average. However, there are large differences between logistics and other industries in the time taken for each O2C-process step. In logistics the acceptance of an order and putting the order into the system is much faster in comparison to the average. Also, delivery of the service after order creation is faster than in most other industries. This might be partly explained by the fact that there is no production time for LSPs after order creation, in contrast to, for example many industrial companies. Furthermore, in other industries orders might be planned more in advance in comparison to logistics, which contributes to a longer time before goods/services are delivered in such industries. LSPs perform poorly in terms of sending out the invoice after delivery. While companies are legally allowed to send an invoice immediately after delivery, unless specified otherwise in buyer-supplier contracts, for the LSPs in our sample it takes 6.7 days, while the overall average is 3 days. The contractually agreed payment term with buyers is 36.2 days, which is 9.1 days higher than the average. The actual payment term is even worse for LSPs. On average LSPs get paid 2.3 days too late per invoice resulting in the actual payment term being 38.5 days, which is more than 10 days higher than the overall average. In conclusion LSPs

accept and create orders and deliver their service relatively fast, but send out invoices relatively late, face long payment terms from buyers and are often paid later than agreed upon in the contract.

Table 2: Average length of O2C process phases per industry

Average # of days per phase → *Industry* ↓	*# of respondents*	1. Order receipt – order creation	2. Order Creation – Delivery goods/services	3. Delivery of goods/services – sending invoice*	4. Contractually Agreed Payment Term	5. Actual Payment Term	Total O2C-process time***
Logistic service and transportation	**19**	**1.8**	**8.8**	**6.7**	**36.2**	**38.5**	**55.8**
Agriculture	4	2.0	1.3	0.5	8.0	6.5	10.3
Business services	15	6.1	26.4	8.8	23.7	30.8	72.1
Construction	4	21.2	9.6	-1.2	30.1	31.0	60.5
Financial services	4	10	25.9	4.4	17.7	16.9	57.3
Healthcare and public health	4	0.8	1.3	4.8	22.0	22.0	28.8
Hotel and catering	4	6.0	6.9	0.7	11.2	12.4	26.1
Industrial	8	3.4	59.6	-12.0	39.4	41.3	92.3
Retail/Trade	23	3.1	19.0	1.9	28.8	26.6	50.6
Other Industries	15	10	11.5	3.7	22.3	19.5	44.7
Companies with partial payments	16	9	56.3	-3.8	n/a**	n/a**	n/a**
Overall averages per phase	**116**	**5.3**	**18.3**	**3.0**	**27.1**	**27.9**	**54.5**
Standard deviation		*14.1*	*42.0*	*14.0*	*19.7*	*22.0*	*47.1*

*negative numbers are possible due to the fact that some companies send their invoices before delivery of goods/services (n=21).
** 16 out of 116 respondents have partial payments. Results on payment terms are therefore not applicable in this context.
*** Total O2C-process time is the sum of phase 1, 2, 3 and 5: we need the actual (5) and not the contractually agreed payment term (4) to know when cash arrives.

4.2 Case Study Results

From order receipt to creating order in system

All LSPs in our case study sample mention having a large variety of orders coming in. One of the main causes for this is that the LSPs, especially LSP 2 and 3, want to be flexible in dealing with customer wishes which can be very specific sometimes. The CFO of LSP 2 explains: "*a large part of the problem starts when agreements are made with customers. A lot of flexibility is given here, which means a growing amount of variables has to be taken into account for invoicing*." Once there are more exceptions to 'common' orders, there is a lack of standardisation possibilities for LSPs.

Second, orders can be registered in different ways, and order input can to a large extent be prone to mistakes for the LSPs in our sample. LSP 1 sometimes has to arrange multiple partial deliveries for one order, leading to changes from the regular order input. Both LSP 2 and 4 explain they use an EDI system for order receipt, but often customers don't use this system, and simply send e-mails which have to be manually put in the system by the LSPs. The complex pricing structure in the industry enlarges this problem, for example when consolidated invoices are sent at the end of the month by LSP 4, the system frequently fails to calculate the right prices, leading to extra control activities needed by employees. At the same time, the CFO of LSP 4 explains there is not enough knowledge in the company to use the system in the right way: "*The IT system is so complicated that some problems require very specific expertise which I don't have*". In addition, miscommunication between the operations and sales department in many occasions led to wrong prices in orders, resulting in complications in invoicing and sometimes to disputes with customers.

From creating the order to delivering the service

The two main inefficiencies at this stage are related to the registration of the moment when services are delivered and adjustments made to orders after they have already been approved.

It's important to register when a service is delivered, so that a company knows when they can send an invoice to the customer. As an expeditor LSP 1 arranges sea transportation from many different parts of the world, especially Asia, to Europe. Sometimes they also take care of 'follow-up transportation', from European ports to the final customer destination. The CEO mentions this follow-up transportation is not always registered in the same way, which results in a lack of clarity of when the service is actually delivered and when the invoice can be sent.

LSP 2 often makes adjustments to orders after they have already been approved, in response to specific customer wishes. This leads to a further growing amount of exceptions and complications for the registration of orders, increasing the chance for mistakes to be made in invoicing.

From delivering the service to sending the invoice

All LSPs on average send out invoices later than the survey average of 3 days, as can be seen in Table 3. There are three main reasons why invoices are sent out late. First of all, in the internal organization of LSP 1 and 3 it happens frequently that the delivery moment is internally registered or communicated to the invoicing employees too late or not at all. This results in internal confusion about the moment when they can send an invoice.

Secondly, late invoicing can be the result of manual activities needed which increase administration handling time. LSP 2, 3 and 4 all mention having to manually create or correct certain invoices when either the IT-system is not capable of dealing with customer specific variables for the invoices or the employees are not capable of dealing with the IT-system. Thirdly, and related to the second reason, work pressure contributes to more time needed for sending out invoices. This is especially true for LSP 3 and 4, where customer service and/or administrative employees mention that the workload is heavy, resulting in more mistakes made and additional corrections needed before the invoice is sent out.

LSP 3 is on average very late at sending out invoices (12.7 days), as can be seen in Table 3. This is the only company for which all of the three reasons mentioned apply.

From sending the invoice to end of contractually agreed payment term

For the majority of their contracts, the LSPs in our sample have contractually agreed payment terms of 30 or 60 days. All LSPs also have customers with whom they agreed to send consolidated invoices once per month, with a payment term of 30 days, which on average comes down to a payment term of 45 days in case all services are distributed equally over the month.

Inefficiencies in the buyer organization can lead to long invoice approval times. For example, the CFO of LSP 3 mentions: "*For one of our top-3 customers the invoice approval time is very unpredictable.*

Sometimes it takes 20 days, sometimes 25 days and sometimes even 40 days (...)They have problems in their purchase-to-pay process".

When there are mistakes made in the invoices by the supplier, and these mistakes are not recognized before the invoices are sent out, this can result in disputes. Disputes can lead to credit notes (reductions in the amount a buyer owes a seller), when prices are wrong. There is a big variety in the reasons for disputes, for example miscalculations of waiting time during transportation, sea freight costs, exchange rates or demurrage. LSP 2, 3 and 4 register all disputes and the reasons causing them, while LSP 1 only registers a dispute when it leads to a credit note. Remarkably, LSP 2 mentions one of the main inefficiencies is inconsistencies in dispute registrations. Employees who put a dispute in the system can choose 17 categories of disputes, many of which overlap. LSP 1, 3 and 4 explain there is not really a standardized company approach to dispute resolution. The logistics engineer of LSP 3 mentions: "*more clarity about roles and responsibilities in case of disputes would be better*".

LSP 1 recently (2021) started working with credit limits to make customers pay faster and limit the amount of outstanding receivables. The impact of outstanding receivables became much bigger, since the prices of the containers increased over 2020 and 2021. A customer service employee elaborates on this: "*Nowadays customers easily exceed the credit limit, since the costs of sea containers are sky high: it's above 10,000 US dollars per container".*

Differences between contractually agreed payment term and actual payment term

In all four cases many invoices are paid later on average than agreed upon in the contract (see Table 3). This can be the consequence of buyers intentionally paying late or inefficiencies in the invoice handling of the buyer or the supplier. Disputes play an important role in this, as stated by a Customer Service employee of LSP 1: "*The longer it takes us to revise an invoice after a dispute, the later the client pays. It sometimes leads to payment after 60 days while there is a 30-day payment term.*"

Out of the four LSPs, only LSP 1 recently started to consistently track the amounts and percentages of invoices paid late and the impact on working capital. None of the LSPs uses automatic reminders for customers at the end of the contractually agreed payment term or when this term has been exceeded. In the follow-up on invoices maintaining a good relationship with the customer is mentioned as very important by the LSPs. The LSPs don't see automatic reminders fitting this picture.

Table 3: Invoicing and payment time in case study sample

Time in days (averages)	LSP 1	LSP 2	LSP 3	LSP 4	Logistics industry average (survey, n = 19)	Overall average (survey, n=116)
Sending invoice after delivery	2.3	4.6	12.7	4.0	6.7	3
Contractually agreed payment term	34.3	33	30	38.6	36.2	27.1
Actual payment term	37.9	43.1	36.8	41.1	38.5	27.9
Difference contractual and actual payment term	3.6	10.1	6.8	2.5	2.3	0.8

5. Conclusions

Our results support managerial and theoretical contributions in three categories.

First of all, there is a paucity of studies researching the O2C-process as a whole, while our results show the value of doing so. Looking at the survey results, LSPs seem to be relatively fast with order approval and order input. However, our case study results show that there are often mistakes made in the order phase, which contribute to inefficiencies in later stages. In logistics there seems to be a strong belief that the customer always comes first, to the extent to which it can actually hurt the provider of logistics services. For example, in multiple cases in our sample there are many exceptions made to 'regular' orders in response to specific customer wishes, sometimes even after the order has already been approved, while the pricing structure is already complex and IT-systems cannot always manage this. This contributes to the fact that the time before an invoice is sent out by the LSP and paid by the customer after invoice approval, is much longer than the overall survey average. LSPs need to carefully assess how the complexity in orders can be managed in the organization.

Our second contribution is about (the lack of) digitalisation and IT usage in O2C-processes, a topic which receives a significant amount of attention in the literature. Our results confirm the importance of well-functioning IT systems for optimization of the process. Multiple LSPs in our sample considered purchasing a new IT system or new functionalities. However, we not only show the importance of IT systems, but also of IT skills of the employees using the system. A lack of knowledge or experience with the system can lead to mistakes made in all stages of the O2C-process, or not using certain functionalities like the monitoring of process time for certain steps. Two LSPs in our sample considered purchasing a new IT system or new functionalities. LSPs need to not only focus on functionalities of the system, but also on the degree to which employees are able to work with the functionalities, for example by providing training for employees.

Our third key contribution is about internal collaboration between involved departments in the O2C-process. All four LSPs have a different distribution of tasks between involved departments. The LSPs explain that they need greater clarity on roles and responsibilities, especially in relation to dispute management. In addition, the contrast between sales and finance goals, explained by Dekkers et al. (2020) as 'keeping the customer happy vs. getting paid', is very relevant in our context. The strong desire to keep customers happy by LSPs can lead to being lenient towards late payments of customers. Despite a large amount of late payments in all four cases leading to significant liquidity disadvantages, none of the four LSPs are seriously considering automated payment reminders for example, perhaps due to the belief this might hurt customer relations. In addition to providing clarity on roles and responsibilities, LSPs can benefit from carefully monitoring and overthinking the impact of long O2C-processes on working capital and transaction costs, and discussing the impact internally to create the right balance between the sales and financial goals.

Our research relies on an extensive amount of primary and secondary data from LSPs in the Netherlands. However, future research might benefit from also considering data from other countries, especially countries with higher average payment terms. In addition, detailed perspectives from different industries are needed to create more insights on the underinvestigated topic of O2C-process optimization. Future research can benefit from using theoretical lenses for an improved theoretical conceptualisation of themes in O2C-research. Since many of the inefficiencies in our research result from the (lack of) strategic resources of companies, for example IT resources, human resources or financial resources, the resource-based view seems to be suitable for theoretical framing of further O2C-process research.

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