

Product returns in the e-commerce market, explorative study into the applicability of Machine Learning

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Abstract- The e-commerce market has increased rapidly last couple of years. The demands from the customers are higher than ever and due to the high competition in e-commerce, customers are having a powerful position. E-commerce players offer free shipping and hassle-free returns which led to a big increase in product returns. A case study analysis is conducted with a major Dutch e-commerce player operating in the e-commerce market. Frameworks from literature together with insights of the case study are combined to come up with a set of representative KPIs. The KPIs are divided in four different field that try to fully cover the performance in the return process. First, the Costs of the total process must be measured. This KPI includes all costs related to the return process, from transportation to labor and project management. Second, Process Quality must be measured to ensure the customer satisfaction in the return process. Customers are more likely to come back to the same web-shop if they are satisfied about the return handling. Thirdly, the return volume must be measured closely to analyze the percentage of returns. What type of products come back and what are the different reasons for returns. Such factors can influence the return rate and the return volume must be measured continuously. Lastly, the supplier agreements are an important KPI to ensure the refund policies. The percentage of refund from the suppliers is important to fully cover the returns to the client. Serving the customer at a high level in the return process will be beneficial for the whole supply chain. To improve the performance of the return process, possible applications of Machine Learning techniques are explored. These can reduce the return volume and compress the total time and costs of the return process.

Index Terms- Product returns, Return Management, E-commerce, Machine Learning, Key Performance Indicators

I. INTRODUCTION

The e-commerce market is booming and online retailers are growing rapidly. In the past 5 years, the online market in The Netherlands has doubled and currently covers a total annual revenue of 22,5 billion EURO (Emerce, 2018). Together with this growth in online purchases, the product returns also increased rapidly. These high return rates are one of the most important reasons why these e-commerce players are still not profitable (Wellens, 2017; Rigby, 2014). The e-commerce players do not know how to handle the returns efficiently and created this monster by themselves (Dennis, 2018). With continues advertising on their free return policies they created a loss-making atmosphere. And it seems somewhat logic, research proved that flexible return policies and good handling of returns will positively influence customer purchase behavior and purchase rates (Minnema, 2017; Petersen and Kumar, 2009; Wood, 2001). While practices from online retailers together with researcher also proved that a lowering return rates with 10% improves

profitability with 20% (Pur et al, 2013). This indicates the high impact of product returns on the profitability and performance of companies.

Regardless of all these concerns evolving in Return Management, there has been less research in this field. First the issues and bottlenecks around Return Management are defined. These bottlenecks will be sketched to explore the importance and impact of the return process on business performance. From these bottlenecks, Key Performance Indicators (KPIs) will be composed to measure the performance of the return departments. These KPIs are identified from literature and a conducted case study. The following Research Question is formulated:

“Concerning the high product returns in the Dutch e-commerce market; What are the issues and bottlenecks arising and what are suitable KPIs to measure the performance in the return process?”

A case study analysis was performed to perceive insights in the processes, bottlenecks, KPIs and all relevant information involved in the return process. This case study was done with one of the major e-commerce players in the Dutch market. The focus on KPI level ensured that this research contributes on the existing performance measurements.

II. RESEARCH APPROACH

To explore the issues related to Return Management, a case study is needed to analyze, explore and test the KPIs that are measured in the current market. The case study must have a web shop environment from B2C side. By analyzing the current strategy and process around supplier selection and Return Management, the case study can be of an example to explore the different KPIs. To come up with the right set of KPI's, frameworks from both Shaik & Abdul-Kader (2012) and Bernon et al, (2011) will be used together with the KPIs from the case study analysis. This will give a complete overview of the current representable KPI's in the return process. These two frameworks were quite unique in literature, almost no literature exists in the field of performance measurement in Return Management. Still, through the explosive growth and huge amounts of product returns, the performance of the reverse flows will be more important and will have a stronger influence on business performance. The processes will be analyzed by conducting the Business Process Modeling Notation (BPMN).

Using a BPMN, all the processes from the costumer to the suppliers can be defined. This method will be used to analyze the current situation. To map the full process, interviews will be conducted to see how the products are moving from customer back to the seller. Next to this, the agreements with suppliers will be analyzed to see what the link can be between RM and Supplier selection. An important part of this process will be to identify the available data in the return process, this will give an indication of the applicability for innovative techniques (Kobayashi et al, 2003). The total process of reverse logistics can be convoluted due to the relations with different parties through the entire supply chain structure. Every product can have various destinations and every product must be differently handled. The reasons for return can strongly divert and this results in different return flows. Some products are damaged, others were wrong delivered and other products do not match the expectations of the customer. This dynamic and fuzzy environment makes it complex and hard to manage efficiently. To indicate this complicatedness, the total process of returns will be mapped and all divarication within the process will be displayed. This is done to create a full overview and detect bottlenecks that have potential room for improvement. Matching the right KPIs to these bottlenecks can create better awareness in the return process.

Furthermore, when a strong set of KPIs is defined. A possible innovative technology will be discussed that has the potential to

impact the performance in the return department. This research explored the potential of Machine Learning. This technique can learn by using data and has the ability to predict future instances. Through the huge data capacity of the e-commerce player, Machine Learning can be a successful technology that will help in creating a robust and resilient return process.

III. THEORETICAL LANDSCAPE

In this paragraph the theoretical background knowledge of Return Management will be explained. First, the general definition and explanation of Return Management given. Second, the current literature on KPI measurement is explained. This will indicate the knowledge available and will show the possibilities for improvement.

Return Management

The process of return management is complex and it contains a lot of different stakeholders and intersects. In this research we define RM or RL as the Reverse Logistics Executive Council (Reverse Logistics Executive Council, 2007),

“the process of planning, implementing, and controlling the efficient, cost effective flow of raw materials, in-process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal”.

This indicates all aspects of a normal supply chain, the only difference is the direction. The return flows are starting from the end customer and can return all the way back to the suppliers or producers. The return flow is huge, however this research will focus on the return flow between the end customer and the e-commerce player. In figure 2, a basic supply chain process is presented.

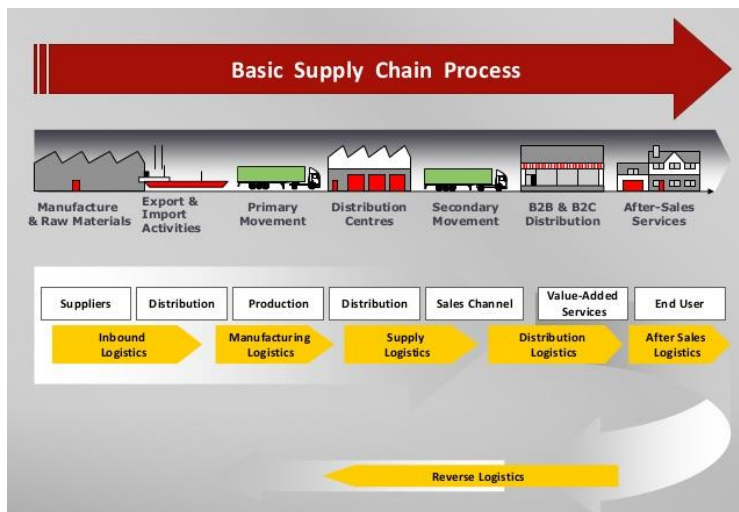


Figure 2, Supply Chain Process (Topno, 2014)

This figure shows different parties involved in the process that are needed to produce and sell the product. The start of the supply chain is at the manufacture or supplier, they have the materials or produce the products. Then the products go to a distribution center or warehouse of the selling party. In this research the e-commerce market is studied, these parties sell majority of their products directly from their warehouse. The last step is the after sales services which includes the customer.

A product can already be returned from the manufacturer to the raw material producer due to bad quality or wrong delivery of goods. However, these return flows are not the focus of this research and happen less often compared to returns from the end customer. It is focused on the last stage of the supply chain, the business to consumer relationship. In this level of the supply chain, returns are playing a very decisive role and can affect the B2C relationship both positive or negatively. The relation between the e-commerce player and the supplier will also be analyzed, to examine what the effect of this relation can be on customer behavior. The three most important stages of the supply chain for this research are indicated in figure 1.

Normal Flow

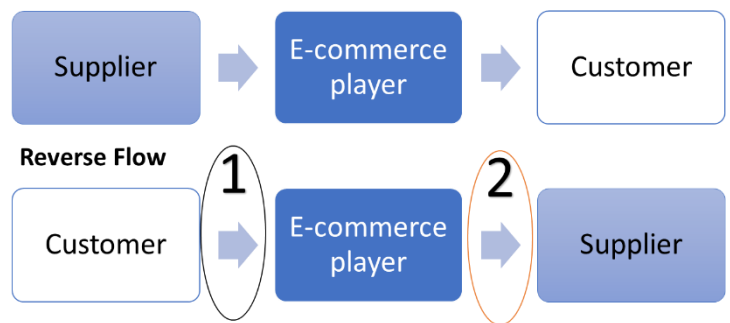


Figure 1, Normal vs Reverse Flow

In figure 1, the supplier block is representing the manufacture and delivering parties of the products. Within the e-commerce player block, the warehouse or distribution center is indicated. The customer block is indicating the end customer of the supply chain. The focus of this research will be the process and relations between customer and e-commerce player, indicated with a 1 in figure 7. Not only products flow from customer back to the original owners of the goods. Flows of information and money must also be returned to the previous stages in the supply chain. Where the normal flow is demand driven, a customer orders a product at the e-commerce player which has it in stock or must order it at the supplier. The reverse flow is unpredictable and the e-commerce players and suppliers do not know which products will come back. This makes it a hard to manage system that requires flexibility and adaptiveness of the stakeholders. Figure 1 has two the number 1 and two in the reverse flow, both indicating a relation. In flow 1 mostly products and information are transferred. This relation is the focus of this research and is customer to business. Flow 1, between the supplier and e-commerce player will mainly be a flow of information and agreement. There will be less focus on the product flow between these parties.

Product returns happen due to different reasons; products are damaged, or wrong delivery etc. When the goods arrive in the warehouse, some products can be taken directly into stock,

these are the products that are still new and unopened. Some products can go to the trader because they cannot be sold anymore at the current store. Maybe the product is damaged and need to be repaired or remanufactured. The product can also be recycled, this happens more often when the product is older. These returns for recycling will not be considered in this study.

were probably one of the most under estimated aspects in the supply chain. However, it is receiving more and more attention from literature and businesses through the rapid growth of e-commerce markets. Zalando Netherlands and Wehkamp are huge online retail players in The Netherlands, however they are still not making profit due to the high return rate (Wellens,

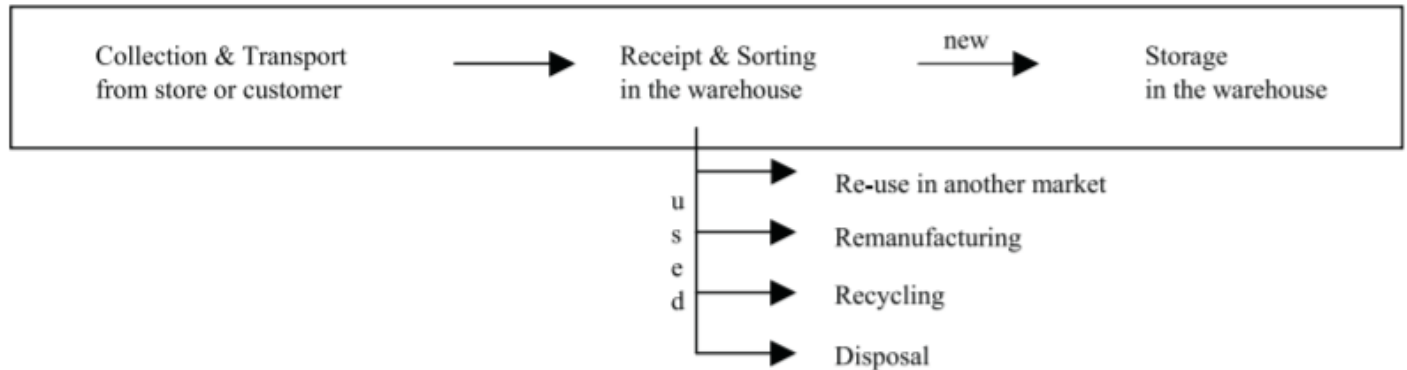


Figure 3, The process of Returns (René et al, 2002)

The last stream is for the products that are not sellable and useable anymore, they will go to the disposal. Figure 3 displays the different possible reverse flows.

In most cases the return process involves more complexity than the forward process, figure 4 shows the differences between the returns and forward processes and the complex issues related to returns (Ronald et al, 2002).

Forward	Reverse
Forecasting relatively straightforward	Forecasting more difficult
One to many transportation	Many to one transportation
Product quality uniform	Product quality not uniform
Product packaging uniform	Product packaging often damaged
Destination/routing clear	Destination/routing unclear
Standardized channel	Exception driven
Disposition options clear	Disposition not clear
Pricing relatively uniform	Pricing dependent on many factors
Importance of speed recognized	Speed often not considered a priority
Forward distribution costs closely monitored by accounting systems	Reverse costs less directly visible
Inventory management consistent	Inventory management not consistent
Product lifecycle manageable	Product lifecycle issues more complex
Negotiation between parties straightforward	Negotiation complicated by additional considerations
Marketing methods well-known	Marketing complicated by several factors
Real-time information readily available to track product	Visibility of process less transparent

Figure 4, Differences in Forward and Return Process (Ronald et al, 2002)

As can be seen in figure 4, there are many uncertainties in the reverse flow, where different factors such as, difficulty of forecasting, no uniform product quality and less transparency in the process lead to complexity. The product return rates are increasing due to online sales, and product quantity and diversity makes it hard to handle (René et al, 2012). To manage this complex dynamic environment, there is a need for good process management, collaboration between different parties and transparency throughout the whole supply chain. Returns

2017). They are obliged to take back all the returns, free of charge and repay the full amount of money to the customer. Due to these strict regulations from European Union it is hard to deal with these returns. However, the web shops themselves created this ‘monster’, they were willing to replace the fitting room to the customers home. Clothes are a very specific product that can easily misfit a person’s size. Therefore, in the retail industry the product return is outrageous high. Not only in the retail industries online web shops are dealing with these high returns, also in electronics and furniture markets some products can have high returns. To analyze the return flows a case study is taken to sketch the process, to see what KPIs they are measuring and how they deal with and fight against the returns. This case study is taken as an example for a broader industry, the KPIs and the process will be used to generalize so that it can be used for further research. From both literature and business there were similarities in the measurement of KPIs. There are still companies that do not measure their return rates properly and underestimate the impact of returns. On the other hand, there are companies that take the return process very serious and try to measure important numbers and percentage. In this way, literature and practical examples are combined to give a total view on the return process in the e-commerce market.

KPI Frameworks in Return Management

Extensive measurement of KPIs in the return process is only done by a few companies in the market. Measurement and monitoring of the costs and performance in returns are lacking behind, are inadequate and heavily underestimate (Lambert and Pohlen, 2001; Aramyan et al., 2007; Olugu and Wong, 2012). Due to the growing volume of product returns, especially e-commerce companies are developing a stronger focus on their return measurement. The increase of online shopping and the strict laws and regulations from EU are demanding e-commerce parties to manage their returns efficient. This creates a significant impact in their organization and it is valuable to steer on the returns. Especially in apparel industry it is a significant cost factor and they need to deal with these costs in an efficient manner. Due to this rapid evolvement, KPIs in the return process are receiving more attention from both literature and businesses. Where in the literature most KPIs measured are related to sustainability and closed loop supply chains (Beske-Janssen, 2015). The literature is more focusing on the sustainability of the supply chain and the product returns or so called “reverse logistics” is a huge impacting part. The disposal, recycling or reusing of the products is important to minimize the emission and greening the supply chain. For KPI measurement in Supply chains, many frameworks are developed to define best practice KPIs that improve the results and performance of the company. However, in the field of Return Management, there were almost no frameworks found in literature. This indicates the importance and relevancy of this research.

Bernon et al, (2011) created a framework for the management of reverse logistics, the framework is displayed in Figure 5. This framework is divided into three levels. Starting at the bottom

with operational performance. This relates to process management which is crucial for the reverse logistics management. A well-managed reverse logistics can not only lead to cost reduction, it can help in reducing returns and detect bottlenecks (Rogers et al, 2001). The re-sales profits and revenue is playing an important role in operational performance. Retaining high value from the returned products can help in regaining the profit over a product (Mollenkopf, 2007).

The second level is the organizational integration, the study of Bernon et al (2011) discovered the poor relationships and connections between the various players in the return field. No alignment of objectives and conflicting demands are reasons for a weak return process. Return policies with both customers and suppliers are important for the e-commerce players to have a full understanding of what they can expect from their relations. Trust and confidence is an important key issue in this part, how to have a good relationship with the supplier to boost sales. When both parties take care of their returns it can help the customer in the best way. This results in higher sales and higher customer satisfaction (Minnema, 2017).

The third level relates to Management reporting and control, in this level all costs and performances are measured. This is a critical layer that involves measurement in different levels of the organization. Applying the right metrics is important to have a full view on the costs and performances of the return process. A returned product enters various parts of the supply chain, the costs of this movement are hard to measure and companies do not know the exact costs of their returns (Bernon et al, 2011). The monitoring and control of these costs is therefore very complex but critical for e-commerce companies.

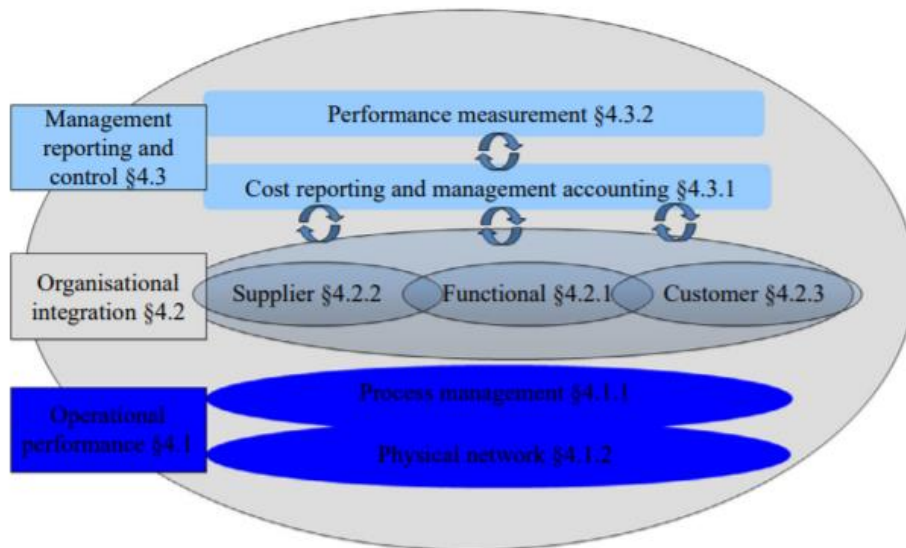


Figure 5, Reverse logistics framework (Bernon et al, 2011)

Secondly, the Key Performance Indicator framework of Shaik & Abdul-Kader (2012), displayed in Figure 6, was used as basis for the indication of the KPIs. This study presents a comprehensive performance measurement framework for Reverse Logistics. Based on literature review, they defined 6 different categories for KPIs in RL. Financial, Process Internal/external, stakeholder, Innovation & Growth, Environmental and Social are the areas where the KPIs are measured. This framework is used to filter out the applicable KPIs for the Dutch e-commerce market.

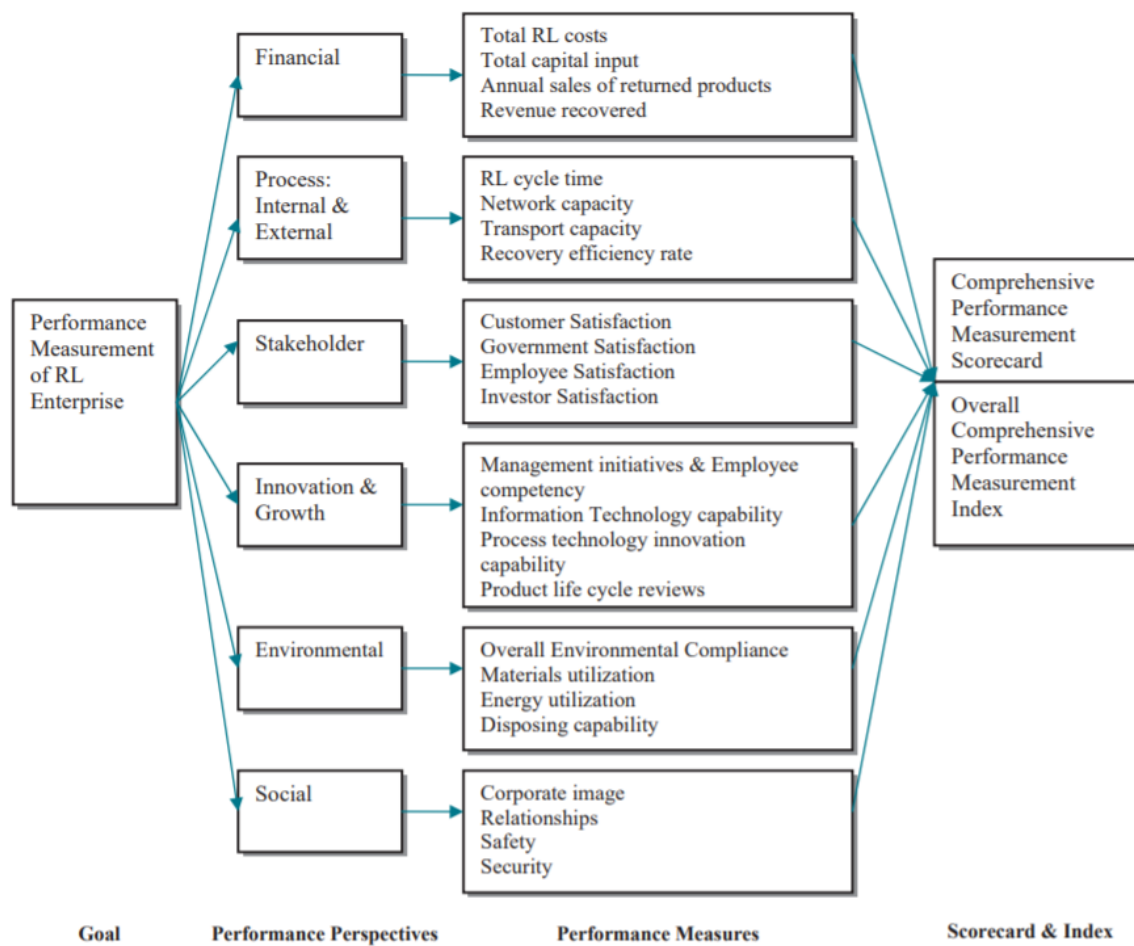


Figure 6, KPI measurement Framework (Shaik & Abdul-Kader, 2012)

IV. PROBLEM EXPLORATION

By conducting a case study and use business practices as examples, there appeared a clear distinction in the process of return management. Not only the return process is important, also the prevention and reduction of returns are of crucial importance. Therefore, this study made the distinction between the forward process and return process. The forward process involves all issues around reducing the return volume and help the customer in choosing the right product. The return process comes after the customer decided to return the product, how to manage this process efficiently and serve the customer in the best way possible.

Through this analysis, 4 bottlenecks in the field of return management were explored. Based on these 4 bottlenecks, 4 matching KPIs were formed that will be used to measure the performance in the return process. In figure 7, the identified bottlenecks from the case study in combination with the literature are presented. These bottlenecks will be described to indicate their importance and complication. Based on these bottlenecks, 4 KPIs are defined to measure the performance in the return process. These KPIs are based on the frameworks of Shaik & Abdul-Kader (2012) and Bernon et al, (2011) together with the case analysis.

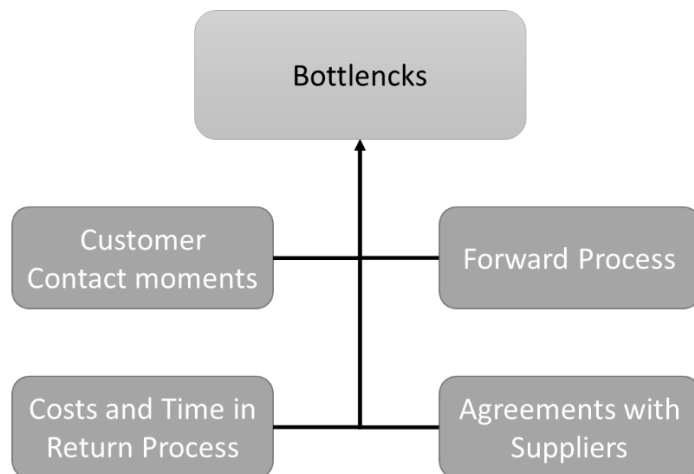


Figure 7, Bottlenecks and KPI's

1. Costs and time in return process

In the return process itself, there are many possibilities of improvement. It is a continuous trade off for a company between having control or having less costs. Skipping certain steps in the return process can fasten the process, meanwhile it will also be more chaotic and will give less control due to more outsourcing or higher pressure. Making the process of returns shorter can be less costly and can possibly lead to faster refunds of the customer. This however, will diverse the control of the returns and this can be harder to manage. This means, on the one side there is willingness to shorten the process and make it

as fast as possible. And on the other side, the control over the returns is important to guarantee customer service.

2. Customer contact

Customers always want to know where their goods are, what their status is and when they can expect to have their money or product returned. This can be a very costly and time-consuming process for the service desk of the company. They must deal with continuously returning customers and they are asking most of the time very easy questions. In this process there is a continuous trade off, that must be taken care off. Being in control or being less costly is a choice that is not easy to take. The customer contact department is costly, there have to be employees that can support clients and help them with their questions. Certain highly specified questions can be hard to answer for a single person and this can take a long time to come up with the right answer. This time consuming and labor-intensive process is therefore a good incentive to improve. Exploring the possibilities of ML in this process can probably increase customer service or decrease labor intensity.

3. Forward process

The customer journey of buying a product on the website can already have influence on the product return rates. As earlier mentioned, customer reviews and product descriptions has impact on the return rates (Minnema, 2017). This tells us that every aspect can be of impact and the forward process plays an important role for the returns. When there is good communication between return and forward departments, simple adjustments can prevent and lower the returns. There is many to improve in the forward process, however not all improvement will be beneficial for returns. Some marketing techniques or advertisements can boost sales, however they do not consider the return rates. If the advertisement leads to an impulsive purchase from the customer, they are more likely to return the item (Zhu et al, 2016). The forward process therefore influences the return behavior of customers. Managing this forward process in an efficient way can reduce returns and will help e-commerce players in being more competitive.

4. Agreements with suppliers

Having clear and transparent agreements with suppliers are crucial for companies in the last stage of the supply chain. Contracts that consider the warranty and handling of returned products can be beneficial for the e-commerce companies. When the contracts are covering all costs of returns, the return flows do not have to be costly anymore. It can even be a process of gaining profit when it is managed well. This makes it a very interesting and complex issue to further analyze. Having bad and incomplete agreements with the suppliers can affect the profitability of a company. Some products are selling extremely well, however these products can be very costly in returns. When there are no clear agreements on the terms of returns, the selling party, in this case the e-commerce player, will be responsible for the high costs and will have to cover it individual. This can negatively influence the relationship with the supplier and this can lead to an insufficient supply chain.

V. OPPORTUNITIES AND POTENTIAL RESULTS

KPI Measurement

In figure 8, the bottlenecks now mapped with the matching KPIs, presented as green building blocks. By accommodating the KPIs on the identified bottlenecks, they ensure the essential parts of the return process. They try to cover all relevant results and performance in the return process. Each KPI will be further elaborated to indicate their importance.

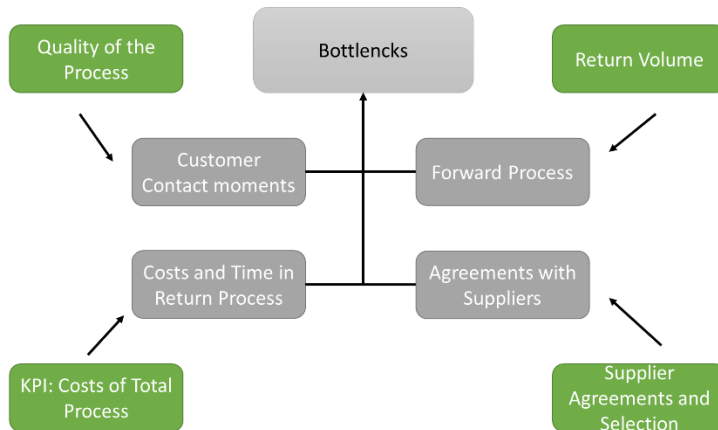


Figure 8, Bottlenecks and matching KPIs

- Return volume

This includes all the processes involved to prevent returns. For instance, the product selection, what to sell and what not. Make sure the information on the website is complete and transparent. Prevent defects and make sure customers know how to handle the product. All these aspects can have influences on the return rates. Previously mentioned studies already showed the causal relations between information to the client and the product return rates. This KPI can be divided into many more concrete smaller KPIs that are measured on lower levels. However, the focus of this study will be on these four larger identified KPIs. These will show the impact on the organization and will provide enough information about the possible points of measurement. This KPI is clearly measured in the forward process, return reduction can be measured concretely by comparing different periods with each other. For instance, what is the percentage of returns on the Apple iPhone 8 in January 2018 vs February 2018? What are the differences and how can these be explained? It will be important to act upon these analyses. A new marketing strategy on the iPhone could lead to higher sales in March 2018, however the return rate could also be higher. This will ask for a new strategy to prevent the higher return rate while keeping the sales high. If a certain adjustment in customer journey, for example a more extensive product description, can result in a lower percentage of returns. This must adjustment must be implemented to reduce the return rate and achieve a better business performance.

- Quality of the process

This KPI involves all customer satisfaction and customer classification of the process. What does the customer think of the process? Are they satisfied about the process? Research already told us that a customer that is happy about the return process is more likely to return to the website and purchase again (Minnema, 2017). This is an interesting point that is important in the customer journey in the return process. In case of a return by a customer, the customer is not happy about the order and is likely to enter the return process in with a negative attitude. Creating a smooth process will turn around the attitude of the customer, this can be crucial in retaining the person as a customer. Having a high customer service level in the process of return will lead to a higher customer lifetime value in the future.

Another point of interest in this KPI is the communication with the customer. How many client contacts are there with the customer in the total process of return. High numbers of customer contact can be costly and reducing this number is essential to keep customer service costs low. Same with the duration of the process, the longer it takes for the product to be sold again, the more costs will be involved. Processing costs and transportation costs are decreasing the value of the product.

- Costs of the total process

This is one of the most important KPIs measured on product level. What is the cost of a returned product? This includes the whole process, from the decision of the customer to send back the item till the product is arrived at its destination. This can be in various places; stock, trader, trash or even back to the customer. All costs of back office, transport etc. are included in this process. Retaining value from the returned products can lower the costs of returns. A returned product that directly goes to the garbage is probably less costly due to the shortage of the process. However, recovering the product and sell it again can be profitable and reduce the costs per product. Simply reducing costs is therefore not always the best strategy. Probably investing a little more into the process to retain more value out of the returned product in the end, can be more profitable for the company.

- Supplier agreements

This involves all agreements with suppliers, what do we have on service agreements, how much do they reimburse from the returned goods? This can be measured on supplier level, this will show the return rates per supplier. If a certain return rate on a specific supplier is relatively high compared to other suppliers, there can be made changes in agreements with this supplier to lower the return rate. Some products are economical too valuable, therefore it is not possible to leave them out of the assortment. This can create conflicting issues between sales and

returns. Managing this in a good order can be hard and challenging. However, it is an important measurement that indicates the return rates on supplier level. When several products from one supplier have high return rates compared to other products in the same range, the supplier can be the cause. This can lead to a change in supplier or it can be an incentive to better negotiate about return policies and agreements.

Exploring Machine Learning

The product returns in the e-commerce market are causing serious problems. To deal with these issues, extensive KPI measurement is essential. When the right KPIs are in place to keep track of the business performance, e-commerce players can steer upon their KPIs. To improve the performance of the return process, e-commerce players have to go deeper than only KPI measurement. There is need for new innovations that can help in tackling the issues regarding product returns. Preventing returns and optimizing the return process will have beneficial effect on business performance. This study will shortly touch upon the future possible applications of Machine Learning in Return Management. First, possible application of Machine Learning will be elaborated in the forward process. This relates to reducing and preventing returns. What can be done in the forward process to lower returns? Second, the return process itself will be analyzed to see the potential effect of Machine Learning in these processes.

Forward Process

The current industry estimates a 9% return rate on electronical products. However, this variates up to 50% in different sectors like online apparel businesses (Minnema, 2017). Reducing this return rate can significantly reduce the costs of the total organization. An example with external hard disks at Coolblue showed a return reduction of 50%. Customers did not know how to use the hard disk and this resulted in a high return rate. Including a link to a short instruction video helped customers in installing the hard disk properly. This reduced the return rate of this product by 50% (Keswiel, 2018). Simple adjustments can result in return reduction, SL and USL can help to optimize these adjustments and create insights on the causes of returns. USL can be applicable to prevent and detect fraudulent returns. Through the cluster capabilities of USL, the fraudulent returners can be identified and separated from the other clients. These fraudulent returns can be clustered by identifying their buying behavior. If this can be detected and labelled as a fraudulent returner. The website can offer them products with discounts which are not possible to return. Or the website can offer these customers products that have full refund coverage agreements with their suppliers. In this way, the e-commerce player secures itself and avoids high return costs. USL techniques will base their decision on all available information.

Where at Amazon, persons were banned unfairly, an USL algorithm can prevent these unfairly bans. It will make the decision based on more data and complete information. By applying USL on the customer groups, outliers can be detected and the fraudulent returns can be warned and eventually be banned or penalized.

Return Process

An important step in the process of returns is the entrance of the products in the warehouse of the e-commerce player. Most products are now shipped from the customer to the warehouse where the products are initiated and further handled in the return process. Products will have different destinations, some products can directly back in stock where others first need to be repaired. Currently, the handling of the returns is done manually and require human labor intensity. A text and image recognition machine in the warehouse can help in reducing the costs and time of the return process. This machine can classify based on a unique identifier on the returned package, this information can be matched with the customer. This will automate a huge part of the return process and will decrease the labor intensity. It can even ensure higher quality due to the small error sensitivity of such machines.

These two options of Machine Learning in the forward and return process tried to give a small indication of possible applications and improvements. Further research is needed and implementations need to be performed to see the effect of such Machine Learning possibilities. This paper focused on the KPI measurement. Innovative solutions can contribute in being more robust and score higher on the measured KPIs in the return process. For this reason, techniques like Artificial Intelligence, Machine Learning and Blockchain can be explored to further optimize the return process in the e-commerce market.

VI. CONCLUSION

This research tried to explore the necessary Key Performance Indicators in Return Management. The process of product returns is complex and companies will need to pay attention to ensure their quality and lower their costs. Four KPIs were defined based on the bottlenecks detected in the return process. First, the Return Volume includes all measurements concerning the prevention of returns. Complete product description and trustworthy customer reviews can lower the return rate. Second, The Quality of the Process must be measured continuously. What is the satisfaction rate of the customers about the return process? And do customers come back to the same e-commerce shop after they had a return? Third, The Costs of the Total Process must be measured continuously. Labor, transportation and management costs must be included to have the full overview of the costs in the return process. Fourth, The Agreements with Suppliers must be continuously measures and analyzed. Having full contracts with the suppliers that ensure refunds and sharing of costs can benefit the e-commerce player enormously. To improve the performance of the return process, innovative technologies will need to be explored in future researchers. This study, gave a soft touch upon the possibilities of Machine Learning in the field of Return Management. Extensive use of data can help in reducing the return rate and fasten the process of returns.

DISCUSSION

This research is based on literature and a case study in the Dutch e-commerce market. While this case study gives a good representation of the Dutch e-commerce market, it is not completely representable. Every company will have different return processes and will set different standards on their quality. This research would have higher representativeness if more e-commerce players were interviewed. However, due to time constraints and the focus of this study it was not relevant to include more case studies. The case study was conducted with a successful company that already had a strong focus on returns and are managing returns quite successful. A case study with a company that is less successful in terms of Return Management could have created other insights. The fact that Amazon is destroying their returns indicates huge problems and bad management in their return department (NOS, 2018). Interviewing Amazon would probably have led to different outcomes of this study. It would also create a broader or different set of KPIs that cover the performance in Return Management. The case study was conducted with an e-commerce player in the electronical market, every market will have different return process and return rates. Therefore, this research is only representative to the comparable companies. The environmental aspect of product returns is left out of the scope of this project. More and more businesses are focusing on

their green footprints and trying to improve on these aspects. Closed loop supply chains are currently extensively researched in literature and this in combination with return management does give very interesting material to research. However, the bottlenecks and KPIs related to environmental and sustainable issues are left out of the scope of this project. In this research 4 main KPIs were identified and chosen to measure the performance in the return management. A more extensive search on KPIs and a bigger set of KPIs could have created a broader overview of the performance in product returns. However, the researcher believes that the essence of return management is cropped into the 4 KPIs presented. This study chose to explore the field of Machine Learning. There are many other possible, innovative techniques that can bring added value in the return process. Blockchain technology can potentially have big impact in supply chain structure and can also impact the product returns. Probably products can be directly shipped from customer to customer without the intervention of a third party.

And lastly, there will come up some moral and ethical issues when applying ML algorithms in the returns. GDPR regulations will affect the market, research is needed to see what the effect can be and see if this significantly change the effectiveness of ML in e-commerce.

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