Customer involvement in selling product-service systems

integrating the customer perspective into the B2B sales process to design and assess product-service systems

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Thesis by

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Management Summary

This master thesis explores how the customer perspective should be integrated into the sales process in business-to-business (B2B) markets in order to design an assess product-service systems (PSSs) based on relevant values such as sustainability. A PSS is considered a type of sustainable business model that integrates products and services to fulfil customer needs. This type of business model is potentially more sustainable by employing principles such as resource efficiency and the possibility to deal with end-of-life issues by using recycling and refurbishment. The B2B market forms a relevant research context as researchers have stated that B2B firms are increasingly shifting from a goods-dominant logic to a service-dominant logic in which PSSs are being offered (Ulaga & Reinartz, 2011). Therefore, this research applies a case study approach which will be conducted at BagFlex: a corporate venture that develops an innovation for the airport baggage handling industry. As this innovation comes with a PSS, BagFlex is faced with the challenge to successfully sell the PSS since the company has traditionally been focused on selling products and services separately in contrast to integrated solutions. Therefore, the sales team has to be educated on how to effectively communicate the value of a PSS. However, any formal sales training or approaches for selling PSSs have not yet been introduced. Moreover, the activities that regard the crafting of offerings together with the customer take place during the sales process. As such, designing and assessing the PSS with the customer is part of the sales process. Therefore, the research focuses on the development of a design solution which supports BagFlex in involving the customer during the sales process to design and assess PSSs. A design science methodology is applied to link the scientific knowledge base to practice. Design science aims to develop knowledge that is focused on how to design solutions for field problems. Knowledge is generated in the form of design principles which are constructed according to CIMO-logic. In this research, a set of design principles was constructed based on the literature review. Hereafter, the current sales process of the company's PSSs was examined. Besides, the sales team of the company was interviewed to discover challenges and needs in selling BagFlex. Based on the insights gathered from these interviews, a set of design requirements were formed. More specifically, the theory-based design principles and practice-based design requirements served both as a basis for the development of the first version of the design solution. The feedback of the company was used to create a second version of the solution which was subsequently tested with the customer representatives. Hereafter, the feedback from the customer representatives was used to make a final iteration on the solution. Lastly, a validation session was organized with members from the sales team and the BagFlex team in order to discuss how the design solution should be integrated in the current sales process of BagFlex. This validation session gave also insights into the added value of the design solution. The design solution of this research takes the form of a tool which integrates the customer perspective into the sales process in which BagFlex's PSSs are designed and assessed. The tool consists of four steps: 1) assess the customer's value drivers; 2) explore the customer's design needs regarding a PSS; 3) explain the benefits of the BagFlex model; 4) design and assess the product-service systems. PSS assessment is integrated by the evaluation of multiple criteria that are relevant for both the company and customer. By assessing the PSS, the customer is able to influence the offering according to their needs. In this way, the design of the PSS offering can be refined. The tool should be used by the members of the sales team during the early phase of the sales process in which the customer has not yet decided on a solution. Also, the tool comes in the form of a number of visuals in paper format which facilitates more creative input from the users. After the user-tests, it was confirmed by multiple customer representatives that the tool allows for a better understanding of the PSS offering and that the exercises employed by the tool could lead to stronger relationships with the customers. Moreover, the sales team of the company addressed that the tool could facilitate a sales approach that differentiates from that of the competitors.

1. Introduction

Several long-term challenges such as climate change, resource scarcity, and pollution have led an increasing number of political, academic, and economic actors worldwide to move towards sustainability (Boons et. al., 2013; Hofmann, 2019). Especially businesses need to rethink current value creation architectures towards more sustainable ones in order to overcome these problems (Hofmann, 2019). Because of this, the concept of sustainable business models has received considerable attention from both academics and practitioners. Sustainable business models aim at benefitting society and the environment by also generating economic value (Bocken et. al., 2015). In that sense, a sustainable business model includes the triple bottom line approach in which economic, environmental, and social dimensions are integrated (Bocken et. al., 2015).
One archetype of a sustainable business model is a product-service system (PSS) (Bocken, 2014). Tukker (2015) has stated that a PSS is viewed as one of the most practical applications of a sustainable business model. The concept of a PSS stems from the integration of products and can be defined as a solution that combines products and services to deliver functionality in order to meet customer demands. (Tukker, 2015). Especially within the business-to-business (B2B) market, PSSs are becoming more prevalent as previous literature has stated that B2B firms are increasingly shifting from a goods-dominant logic to a service-dominant logic (Ulaga & Reinartz, 2011).
In general, the PSS provider remains the owner of the materials and products and is therefore responsible for their functioning, and thus maintaining them. This gives the producer the incentive to design products that have an extended lifecycle which increases the overall quality of the product. Besides, the shift of ownership enables the PSS provider to reclaim control over the used materials. This implies that customers are often reusing items when employing a PSS (Tukker, 2004). In this way, PSSs are potentially more sustainable due to resource efficiency, consumption reduction, and the possibility to deal with end-of-life issues by using recycling and refurbishment (Tukker, 2015; Bocken, 2014).

However, Tukker (2015) has stated that the adoption rate of PSSs is relatively low and that failure rates are relatively high because of the customer's resistance to moving away from ownership and not doing enough preparations for the practical changes that a PSS brings. This missing customer perspective results in reluctance from customers when shifting to a PSS. (Barquet et. al., 2013). Also, the performance, cost and sustainability related values of a PSS are often more complex to understand because of the integrated service components (Barguet et. al., 2013). Therefore, implementing PSSs means a shift towards more value-driven communication with customers
(Chou et. al., 2015). In that sense, value-based selling (VBS) has been proposed in the literature as a useful means for B2B firms to convey the value of complex solutions such as PSSs to the customer (Terho et. al., 2017). VBS is defined as "the degree to which the salesperson works with the customer to create a market offering in such a way that benefits are translated into monetary terms, based on an in depth understanding of the customer's business model, thereby demonstrating the contribution to customer's profitability" (Terho et. al., 2012, p. 178). VBS finds its foundation in the co-creation logic and stresses the importance of seller-customer interaction for the effective co-creation of value (Vargo & Lusch, 2004). Salespeople who practice VBS focus on proactively crafting and promoting solutions that have potential to add value to the customer.

Further, the challenges and difficulties that are experienced by companies in the shift towards PSSs have led researchers to explore how PSS value can be measured by conducting an assessment (Bertoni et. al., 2017). PSS value includes diverse aspects, such as novel revenue streams, closer customer relations, increased operational performance, and environmental sustainability.

All these aspects are critical in PSS performance and should be assessed to effectively guide companies in making design decisions to generate satisfactory value for customers and create sustainable PSS value (Chou et. al., 2015). As such, PSS assessment which includes the customer perspective suggests design directions for improving an already developed PSS which increases its successful implementation (Kim et. al., 2015). Despite the fact that past research has come up with a plethora of tools for PSS assessment, it is argued that many assessment tools are not being used in practice (Bocken et. al., 2019). This is due to the fact that they did not include users such as the customers and their needs in the tool development process. Besides, the developed tools are either too complex or conceptual or are not capable to holistically support sustainable practices, for instance by involving users (Bocken et. al., 2019). Consequently, the majority of tools developed with soDy sustainability objectives in mind, remain unused as they do not include other relevant considerations of the company and customer (Bocken et. al., 2019). Moreover, Baldassarre et. al. (2017) states that company's innovation efforts predominantly focus on improving existing products but not on other key drivers of successful sustainable innovation like understanding customer needs. To address environmental challenges, a shift towards the integration of sustainability needs within business activities by actively involving the customer seems necessary (Baldassarre et. al., 2017).

This research makes an attempt in exploring how the customer perspective should be integrated into the sales process in B2B markets in order to design and assess sustainable PSSs by developing a design solution. BagFlex is taken as the empirical context for conducting the research since this corporate venture is aiming to implement various PSSs and is faced with the challenge to design and assess the PSSs together with the customer during the sales process. In the case of BagFlex, the activities that regard the crafting of offerings together with the customer take place during the sales process. As such, designing and assessing the PSS with the customer is part of the sales process. Therefore, in this research, VBS can be considered as an approach to link the sales process of BagFlex with PSS design and assessment together with the customer. Assessment in this research comes down to evaluating the PSS based on a holistic set of criteria including sustainability values that are both relevant for the company and customer. In this way, this research makes a contribution to the literature on PSS assessment.
In addition, this study also makes a contribution to the literature on value-based selling and co-creation. According to Luotola et. al. (2017), corresponding literature on co-creation as part of value-based selling is considered too conceptual, for which its actual appearance and use has remained rather abstract. This implies that specific actions that explain how value co-creation is achieved are not widely identified yet. Therefore, there is a need for more empirical examples in which co-creation activities are employed as part of a value-based sales process with the offering PSS models in particular (Luotola et. al., 2017; Cuevas et. al., 2015). In line with the need for more empirical examples, this study contributes to the literature on VBS and co-creation by making co-creation practices less abstract and more tangible, thereby providing guidelines that facilitate the realization of VBS in B2B markets. The design solution developed in this research serves as a tool that facilitates the implementation of value co-creation in B2B markets which stimulates further work in VBS and value co-creation implementation.

To summarize, this master thesis aims to add to the research in the fields of PSS assessment and value-based selling in B2B markets. This research may be taken as a case study to increase applicability and usability of a tool which supports practitioners during the sales process to design and assess PSSs together with the customer. Academics have not yet covered the topic of tooling for PSS design and assessment in which the focal point is on the co-creation activities between the company and customer.

1.2 Organizational context

NextLevel Logistics

This graduation project is conducted at NextLevel Logistics Industries. NextLevel Logistics's main activities centre around the development, production, and implementation of logistic automation and material handling. The company has been the global market leader for process automation within the airport and parcel market industry. NextLevel Logistics's headquarters are located in Veghel and their production and service offices are located at diverse locations such as Germany, United Kingdom, India, China, and the United States. The company was established in 1949 and has nowadays more than 6500 employees that are working over various locations over the world. This research will focus on the activities regarding the airport industry which involves the production of baggage handling systems' (BHSs) for airports. Currently, more than 600 airports over the world are utilizing the baggage handling systems of NextLevel Logistics. NextLevel Logistics operates as a business-to-business company since their products and systems are sold to other companies and not to a specific end-user. This implies that the customers of NextLevel Logistics's BHSs systems are the airports (NextLevel Logistics, 2019).

BagFlex

The master thesis research will specifically be done at BagFlex which is the name of the corporate venture within NextLevel Logistics. *BagFlex*'s main activities centre around the commercialization of a radical innovation for the baggage handling within the airport industry. The innovation which is also marketed under the name BagFlex uses intelligent autonomous vehicle technology which offers flexibility to support operational excellence in the current airport environment. The technology implements Automated Guided Vehicles (AGVs) called 'Flex-Vehicles' that carry a single bag and determine the most optimal route through an airport. The autonomous vehicles operate on intelligent software developed by BagFlex. The software which is called the 'BagFlex management system', controls the routing of individual vehicles, as well as the traffic management between them. Also, the BagFlex solution is seamlessly integrated with NextLevel Logistics's intelligent software to make scheduling, tracking and monitoring of baggage items possible.

BagFlex was created as a response to several developments that are becoming evident in the dynamic aviation industry. Firstly, passenger numbers are growing, but precise volumes are difficult to predict. At the same time, airports are dealing with environmental pressures as the awareness concerning sustainability has increased considerably over the last year.

This implies that airports have to maximize their activities in a limited footprint and accommodate the growth in passenger numbers. Furthermore, the reduction in ticket prices means that airlines are coming under increasing pressure in terms of profitability.
They must investigate ways to maintain operational reliability and remain cost-effective. Also, airports face difficulties in attracting new employees due to a tightening labour market with fluctuating demands. Especially attracting handlers (the employees who collect, sort, and check the luggage to make sure items end up on the right aircraft) remains difficult since there is a high dependency on manual labour. Lastly, the growth of passengers in combination with a scarcity of labour has increasingly led airports to consider the implementation of digitisation (such as IoT and big data) (BagFlex, 2019).

The BagFlex solution can be considered as radical since at the moment, no other comparable technology is being used within the airport industry. Currently, airports employ the conventional conveyor belt systems for baggage handling (BagFlex, 2019). These conveyor belt systems include rigid, vast constructions. Due to these characteristics, the conveyor belts are seen as investments for a fixed amount of years. Since most of the airports already have made such an investment in conveyor belts, it remains hard to soDy sell BagFlex as an independent system. In addition, the airport industry is considered as quite rigid and conservative which results in resistance when offering an innovative solution. Therefore, NextLevel Logistics offers hybrid systems: a combination of BagFlex and the conveyor belt system. In this way, it is easier to reduce the uncertainty experienced by airports when acquiring a BagFlex system. Moreover, under specific circumstances, it can be more beneficial to acquire a hybrid solution instead of soDy a conveyor belt system or BagFlex system. Advantages that can be obtained are higher efficiency of operations and flexible capacity adjustments.
Furthermore, BagFlex is offered as a product-service system which includes, besides an innovative technology, a service model. By offering this product-service model, BagFlex guarantees a high quality level of performance and continuous system optimisation including reduced costs for the customer. Within the service proposition, NextLevel Logistics will manage all maintenance activities and ensure that every vehicle is working optimally at all times. This is supported by NextLevel Logistics's global network and local team who provide expertise and software solutions. Four types of product service models are currently offered in which the amount of service and ownership for the airport vary. In the long term, the offering of a product service model helps to establish a close relationship between customers and NextLevel Logistics, which leads to better value propositions. This in turn leads to the creation of customer value (BagFlex, 2019).
BagFlex contributes as a solution to the developments mentioned above by offering five key values. Firstly, the innovation is **flexible** due to its ability to configure routes that contribute to an optimised operation. Also, flexibility refers to scalability since an increase or decrease in capacity of bags can easily be accommodated by adding or removing vehicles.
Secondly, the innovation offers **operational excellence** since if a vehicle fails to operate, others can manoeuvre around it or a vehicle can be put easily to the side which guarantees operational certainty. In addition, vehicle and software updates ensure that the solution remains up to date which further improves the system performance.
Thirdly, the solution is **cost-effective** since airports can adapt the number of Flex-Vehicles and routes to their specific capacity needs. If an airport's requirements change, there will be limited impact on fixed equipment since the Flex-Vehicles can be easily rerouted. In addition, maintenance can be planned more efficiently. There is no need to make immediate repairs if a single vehicle needs attention, because the rest of the Flex-Vehicles can still operate unaffected.
Fourthly, the solution is **fast and seamless** since it easily connects to existing systems and technologies within the airport environment. This is supported by the pre-programmable components and technologies of the BagFlex platform.
Lastly, **sustainability** forms an integral part of the BagFlex solution. This becomes evident through the people, planet, profit principles on which BagFlex builds.

These principles involve aspects such as safety & ergonomics, energy consumption, circular material use, circular business models, reuse, modularity, and upgradeability.
For instance, the innovation uses electric energy which reduces the CO2 footprint and after its lifetime, the design is returned to NextLevel Logistics for refurbishment or recycling which contributes to a circular economy (BagFlex, 2019).

Currently, a dedicated development and solution team is working on BagFlex. The development team consists of 25 employees and focuses on the technical development and implementation of BagFlex. The solution team includes 15 employees and works on the commercial activities regarding the implementation of the BagFlex solution. Next to these two teams, a small team under the name 'NextLevel Logistics Sustainability Team' has been assigned to work on the sustainability activities of BagFlex. The team consists of various working students and researchers and is led by BagFlex's Strategy & Sustainability Director. This master research will contribute to the activities of the NextLevel Logistics Sustainability Team.

1.3 Problem statement

BagFlex aims to implement a product-service system as a type of business model in order to meet both customer needs and sustainability goals. A business model portrays how value is created, delivered and captured by an organization (Osterwalder & Pigneur, 2010). A product-service system is a type of business model that combines products and services in order to fulfil customer needs (Tukker, 2004). Product-service systems have the potential to positively impact the environment (Tukker, 2015; Chou et. al., 2015). Therefore, a product-service system can be classified as a sustainable business model (Tukker, 2004; Bocken, 2015). Over the past year, a first version of an assessment tool that compares different product-service systems was developed for BagFlex (Peeters, 2019). The tool evaluates how a product-service system scores on different criteria such as environment, profit, performance, and costs. An overview of these scores helps the internal team of BagFlex to design the product-service systems further. In that respect, the tool provides guidance during the process of sustainable business model design for BagFlex (Peeters, 2019). However, this tool was predominantly created from the company's perspective in which only the internal employees at BagFlex were taken as the intended users of the tool. An extensive customer perspective was thus not yet applied in the sustainability assessment tool, while past literature has stated there is a need to involve the customer in the development of sustainable business models (Baldassare, 2017; Bocken, 2019; Chou et. al., 2015). Therefore, integrating the company as well as the customer perspective within the tool would be relevant both from a practitioner and academic view.

From a practitioner perspective, the offering of a PSS solution was associated with challenges for NextLevel Logistics regarding the sales process. These challenges were addressed during the explorative interviews which were conducted prior to the research with employees from BagFlex to identify relevant problems and needs that would add to the formulation of the problem statement. By exploring these challenges, it could be ensured that the research would contribute to solving a practical business problem that resides in the company. An overview of the insights of these interviews can be found in Appendix A. It was addressed that BagFlex is currently not sold by representatives of the BagFlex team but by the general sales team of NextLevel Logistics who is responsible for the communication and selling practices of all portfolio solutions that the company offers. However, the sales team of NextLevel Logistics mostly discusses the cost and performance related benefits with the customer during the sales process while the BagFlex solution entails more value drivers. This is due to the fact that the company has traditionally been focused on selling products and services separately instead of integrated solutions such as product-service systems.

Since this type of business model is new for both NextLevel Logistics and its customers, the sales team has to be educated on how to effectively communicate the value of PSSs. However, any formal sales training or sales approaches for selling PSSs have not yet been created or introduced. This implies that the BagFlex solution still is not fully integrated into the sales process of NextLevel Logistics. The main difference with selling product-service systems is that the services are inseparable from the product, which is different from selling soDy products in which services are not necessarily included. Therefore, offering a PSS implies a serious shift towards selling total value and solutions (Ulaga & Reinzartz, 2011). The sales team of NextLevel Logistics should be able to convey all the tangible and intangible value drivers of the PSS to the customer including sustainability which remains a fundamental aspect of BagFlex. This intention is in line with the concept of value-based-selling (VBS) which has been proposed as a means for B2B firms to convey the value of complex solutions such as PSSs to the customer. Salespeople who practice VBS focus on proactively crafting and promoting solutions together with the customer that have the potential to add value (Terho et. al., 2017).
In the case of BagFlex, crafting the offering together with the customer would involve activities in which the PSS is further designed and assessed to come to a final solution. In that sense, the customer should be actively involved during the sales process. As mentioned before, BagFlex's sales process is embedded in the NextLevel Logistics sales process since as for now, the innovation is only sold in combination with a conveyor belt resulting in the offering of hybrid solutions. Therefore, PSS design and assessment should be embedded in the sales process of BagFlex and NextLevel Logistics. Figure 2 depicts the different processes in which the design solution for this research takes place.

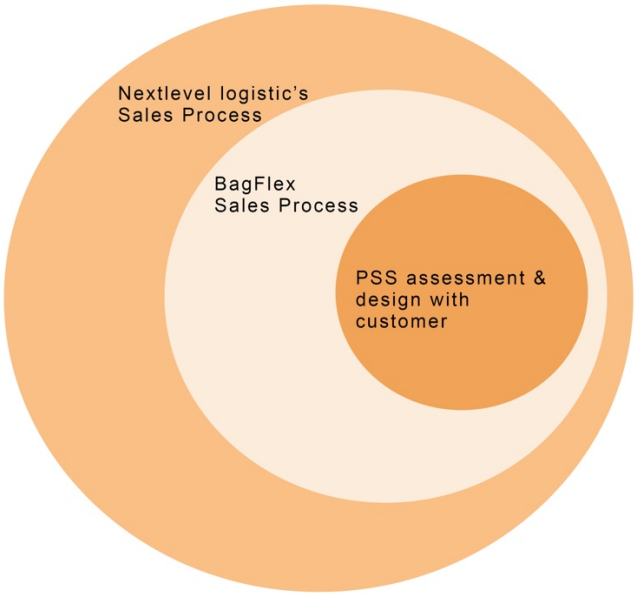


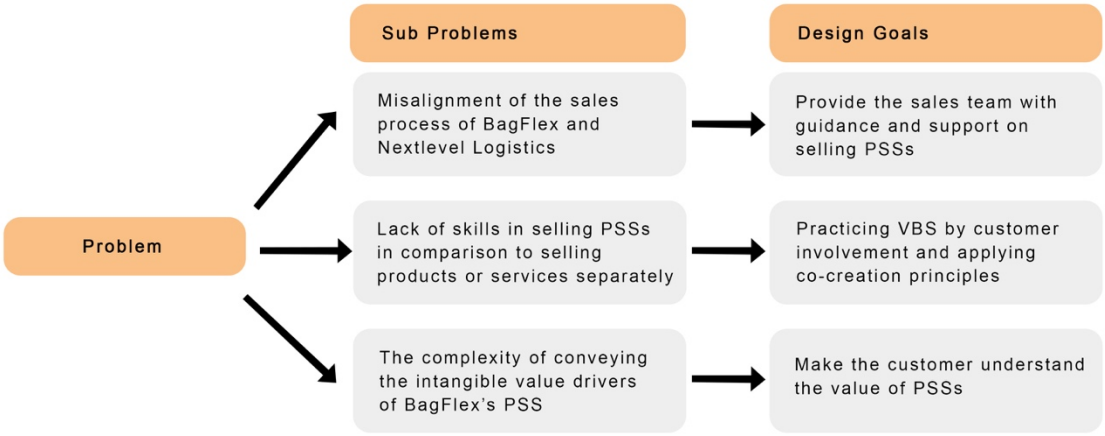
Figure 2. PSS assessment & design embedded in BagFlex and NextLevel Logistics sales process

Aligned with both the academic and practical viewpoint, the master thesis will focus on the further development of a design solution for PSS design and assessment during the sales process in which active customer involvement will take place. By involving the company and customer in the earlier stage of the solution development, a more desirable design will be created. These aspects are relevant since the interviewees of BagFlex expressed that the aim of the design solution should be its frequent applicability in practice within the business context.

The problem statement is formulated as follows:
'There is a need for support during the sales process of BagFlex that will aid in conveying the value drivers of the product-service system to customers which stimulates the adoption of the innovation.'

Figure 3 illustrates how the problem statement is related to the different sub-problems that BagFlex is currently facing and how these sub-problems in turn translate into design goals for this research. These sub problems and design goals were derived from the explorative interviews conducted with the employees from BagFlex and NextLevel Logistics. A summary of the insights of these interviews can be found in Appendix A.

Figure 3. Sub Problems and Design Goals



1.4 Research questions

Research Goal

The main goal of this master thesis research is to examine how the customer perspective can be integrated into the sales process in B2B markets to design and assess sustainable product-service systems which should result in improved communication of the value of PSSs towards customers.

Research Questions

The main research question reflects the problem statement and research goals that were addressed before.

Main Research Question

How to integrate the customer perspective into the sales process in business-to-business markets to design and assess sustainable product-service systems?

In order to answer the main research question, three sub-questions should be answered in which three distinctive topics are further examined. The first sub-question aims to gather the relevant information that is needed from the company to analyse the current state of the research context. The sales process of PSSs in B2B markets forms an important aspect within this research as the activities of designing and assessing the PSSs will take place during this process. Therefore, the first sub-question will first describe the offered PSSs of BagFlex into more detail. Subsequently, the sales process of BagFlex is analysed. Besides, the literature was employed to analyse what elements of practice overlap with existing concepts and theories on the sales process and PSSs. In this way, insights from literature were used to partly answer the first sub-question:

1. How does the sales process of product-service systems look like for the company?

The second research question centres around collecting the relevant information needed for the creation and development of the design solution. Therefore, it includes the results of the interviews with the company in which the challenges and needs regarding the sales process are addressed from which design requirements were drawn. Also, it includes the user-tests with the company and the customers in which feedback was given on the design solution.

2. What challenges and needs should be considered in the creation of the design solution according to the company's and customer's perspective?

The third research question focuses on the final design solution in the specific company context and the related sales process of the company that the design solution might affect.

3. How to integrate the customer perspective into the sales process in the specific case of BagFlex?

1.5 Report Structure

The remainder of this report is organized as follows. Chapter 2 includes the theoretical background on the relevant concepts of this study. Subsequently, in Chapter 3 the methodology of this research is presented which describes the outline of the research design and steps. Hereafter, the design principles are discussed which serve as the basis for the development of the design solution. Then, in Chapter 5 the results are explained which involve the development process, description, and evaluation of the final design solution. Finally, Chapter 6 elaborates on the conclusions and contributions of this research including the limitations and suggestions for further research.

2. Theoretical Background

This chapter elaborates on the relevant literature for the master thesis research. As explained before, this research is concerned with the integration of the customer perspective into the sales process in B2B markets to design and assess sustainable PSSs. In order to understand the research context of the company, the definition and application of *product-service systems* is further analysed, since BagFlex applies this type of sustainable business model. Besides, the goal of this research is to integrate the customer perspective in the PSS sales process of B2B markets. Therefore, the concept of *PSS sales in business-to-business markets* is analysed to further examine what the role of the customer during this process is. Lastly, various approaches for *PSSs design and assessment* in which the customer perspective is included are discussed.
Thus, the following topics are discussed: product-service systems; selling PSSs in B2B markets; PSSs design and assessment.

2.1 Product-Service Systems (PSSs)

A business model portrays how value is created, delivered, and captured by an organization (Osterwalder & Pigneur, 2010). Several business models are identified as potential sustainable business models. A sustainable business model offers a holistic perspective that incorporates all three dimensions of sustainability (social, environmental and economic) in order to capture, deliver and distribute both financial and non-financial values (Bocken, 2013). A product-service system (PSS) has been identified as a sustainable business model (Bocken, 2014). Tukker (2015) has stated that a PSS is viewed as one of the most practical applications of a sustainable business model.

2.1.1 Definition

The concept of the PSS stems from the integration of products and services and can be defined as an offering that combines products and services to meet customer demands. It is a solution that provides products and services to deliver functionality (Tukker, 2015). Value in the PSS is created not by the customer purchasing the product, but by fulfilling the customer needs. For instance, the sale of the use is promoted instead of the sale of the product. Thus, the definition of a PSS includes three key factors: products, services and customer satisfaction. In this regard, it is important for companies to figure out how products and services must interact to generate satisfaction for customers. This requires a broad perspective and a deep understanding of the customer (Chou et. al., 2015). In literature, the terminology that is used for defining PSS differs. Other definitions being used are: customer solution, integrated solution, end-to-end solution (Tukker, 2015; Ulaga & Kohli, 2017).

2.1.2 Types of product-service systems

There exist different types of PSSs, varying to the extent to which value is captured from the product, or from the service provided. Tukker (2004) classified the PSS in product-oriented (product-related and consultancy services), use-oriented (product lease, renting or sharing), and result-oriented categories (pay per unit of use and outsourcing). Consequently, eight archetypical types are proposed which are depicted in Figure 4.

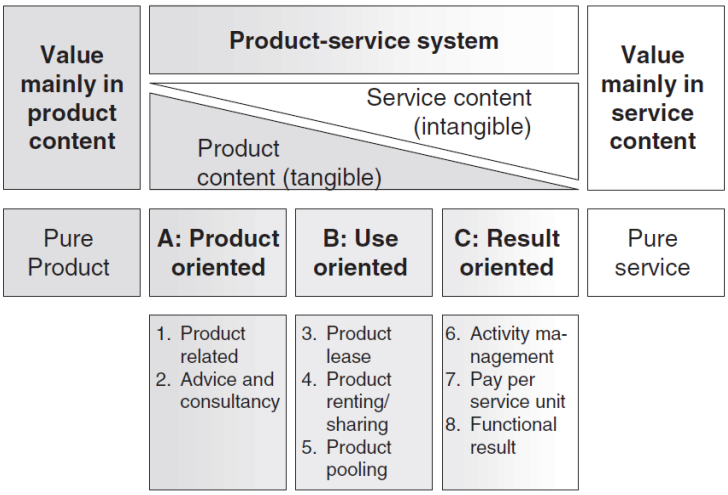


Figure 4. Classifications of product-service systems (Tukker, 2004)

Firstly, product-oriented services concern traditional product sales in which the customer maintains ownership of the product while the PSS provider offers additional services. Product related services aim to ensure product functionality and durability for instance by offering a maintenance contract. Also, advice and consultancy can be given in which the company gives the customer advice on use efficiency. This type of PSS reduces the costs of using a product but does not contribute as much to improved sustainability in comparison with the other two PSS types since the customer stays in ownership of the product.
Secondly, use-oriented services include product leasing, renting, sharing, and pooling in which the company stays in ownership of the product and is responsible for the maintenance, control, and repair. In this case, the PSS provider will prefer to develop products that include long-life materials and offers services to keep its products in good working conditions as long as possible. Therefore, the PSS provider can maximize the product usage by extending the product life cycle and reuse of materials.
Lastly, when applying result-oriented services, a manufacturer sells a result or competence rather than a product. In this case, a company offers a mix of services. Also, when the result is delivered through a product, the PSS provider keeps its ownership while the customer pays only for the results. It includes three types of services. Firstly, activity management where part of an activity is outsourced to a third party. Secondly, pay per unit service in which the customer pays for the performance instead of the product use. Lastly, functional result in which the company decides how the result that the customer delivers is obtained (Tukker, 2004).

2.1.3 The value of sustainable product-service systems

A sustainable PSS indicates that the product-service solution should generate customer satisfaction and fulfil sustainability requirements at the same time. Especially in a result-oriented PSS, all elements (resources, materials, products) that are needed to create a certain result become a cost. Therefore, PSS providers are incentivized to minimize the use of resources, materials and products by extending their lifecycle through reuse, remanufacturing, or recycling (Tukker, 2004).
A use-oriented PSS can potentially intensify the use of products. In both result- and use-oriented PSSs, the PSS provider remains the owner of the materials and products and is therefore responsible for their functioning, and thus maintaining them. This gives the producer the incentive to design products that have an extended lifecycle which increases the overall quality of the product. Besides, the shift of ownership enables the PSS provider to reclaim control over the materials used. This implies that customers are often reusing items when employing a PSS (Tukker, 2004).

Moreover, PSS providers rethink their design in case they will take back the product at end-of-life, and make products easy to recycle or disassembly which enables them to reuse the components (Chou et. al., 2015). To summarize, employing a PSS could lead to environmental benefits because the shift of ownership from the customer to the provider stimulate companies to design products with an extended life cycle, minimized operation costs, high modularity, simple maintenance, and whose components can be re-used at end-of life (Tukker, 2004). This in turn could lead to resource efficiency and waste reduction (Tukker, 2015).

2.1.4 Benefits and challenges

A PSS brings benefits to both customers and companies. From a customer perspective, new functionalities and combinations of products and services are available that better fit their needs. Also, the responsibility for monitoring and end-of-life of the product is transferred to the manufacturer. Further, the total value that is delivered to the customer increases due to the service elements of the PSS. From a company perspective, there are new market opportunities and competitive advantages since there is more access to information about the product's performance during its use phase. Also, higher profit margins can be achieved by providing services instead of products. Lastly, a PSS creates the potential for more intense and longer-term relationships with customers. Increased interaction with customers provides companies with customer and market insights, on which they can adapt their offering (Barquet et. al., 2013). However, Tukker (2015) argues that a PSS can also have negative influences through rebound effects. For instance, production increases due to the fact that customers treat products with less care due to the shift of ownership. Also, Tukker (2004) argues that a PSS provider operates with the life-cycle performance in mind which might lead to the pressure of constantly improving and upgrading the product. As a consequence, earlier disposal of old models may occur which in turn increases production. Further, implementing a PSS means a shift towards more value-driven communication with customers, as PSS offers often are more complex. As such, the adoption rate of a PSS is relatively low and the failure rates are relatively high. This can be explained by the customer's resistance to moving away from ownership and the lack of preparation by companies for the practical changes that a PSS brings (Tukker, 2015). This is often due to the lack of a customer perspective when implementing a PSS. This lacking perspective brings up questions that hinder companies and customers in their attempt to implement a PSS. For example: 'how can companies create and offer value to their customers? How can this value be produced and delivered? How can companies interact with customers? (Barquet et. al., 2013). These questions reflect the challenges that companies face when offering a PSS.

2.1.5 Summary

Section 2.1 provided insights in the concept of product-service systems as a type of a sustainable business model. The value in the PSS is created not by purchasing the product, but by fulfilling the customer needs by offering a combination of products and services. In that sense, it is important for companies to understand customer needs and involve them in the process of creating a PSS offering. In the context of BagFlex, the activities of understanding customer needs and creating a PSS together with the customer especially takes place during the sales process. This is because during the sales process, the customer will be able to express their needs regarding the PSS offering and could contribute to crafting their PSS. Therefore, the following section elaborates on how B2B organizations could involve their customers more during the sales process of PSSs.

2.2 Selling PSSs in B2B markets

2.2.1. Shift in selling landscape

Recent studies have found that the sales function in B2B firms and their selling practices are undergoing a major transformation (Ulaga & Kohli, 2017). This is because the buying behaviour of B2B customers has changed significantly. As a consequence, suppliers transformed their sales organization and the way in which they interact with customers. Several trends have affected how customers buy products and services in B2B markets and what their expectations are towards the suppliers and their sales organizations (Ulaga & Kohli, 2017). Firstly, the salesforce is moving from an operational focus towards a more strategic focus (Storbacka et. al., 2009). New approaches to strategic sourcing and the application of concepts such as Total Costs of Ownership (TCO) have shaped customers' expectations from suppliers. With the Total Costs of Ownership the total economic investment for a customer rather than the direct cost is determined. A second trend links to what the customers in B2B markets want to buy. Customers increasingly seek end-to-end results and tend to ask for performance commitments from their suppliers. Also, the growing focus on obtaining better business outcomes, both from a provider and customer perspective has led to an expanded interest in end-to-end customer solutions. The fact that leading B2B firms are shifting from a goods-dominant logic to a service-dominant logic in which they emphasize high value-added offerings such as PSS has increased the complexity of the sales process (Tuli et. al., 2007; Ulaga & Reinartz, 2011).

2.2.2 Sales process in B2B markets

The context of this research involves the sales process of a B2B firm in which PSSs are offered to customers. Various scholars have developed frameworks that study the sales process in B2B markets. For instance, Ulaga & Reinartz (2011) developed a framework that identifies the underlying capabilities needed to succeed in selling product-service solutions such as the service organization (service-related interpretation capability), the execution of risk assessments, and the sales force selling capabilities regarding PSSs. Moreover, Storbacka et. al. (2011) proposed a framework which identifies management practices relevant to selling PSS solutions such as strategy planning, performance management and increased sales involvement. The study underlines how strategic and management practices are interrelated with successful sales practices. Further, Panagopoulos et. al., (2017) highlights the specific role salespeople play during the B2B sales process with the customer. The study offers a conceptualization of the individual-level activities that include salesperson involvement in selling PSSs. It is stated that sales solution involvement influences the sales performance when the firm's product portfolio is broad and deep, and when customer-supplier relationships are strong. What these three studies have in common, is that they all build on one general framework, which seems to be applicable in many supplier-customer contexts: the framework of Tuli et. al. (2007). This framework suggests a four-stage categorization of the sales process for customer solutions in supplier-customer relations which is depicted in Figure 5. The study in which this framework was developed focused on theory construction rather than theory testing by drawing on field research that was collected from multiple organizations active in the information technology and health care industry. Since the relevance of this framework has been widely acknowledged in literature (Storbacka et. al., 2011; Ulaga & Reinartz, 2011; Panagopoulos et. al., 2017), it is justified to also apply this framework to the context of the BagFlex sales process. Moreover, the focus on supplier-customer relationships in selling customer solutions (PSSs) of this study is applicable to the sales process of BagFlex. Therefore, this framework will be used to analyse the current sales process of BagFlex which provides insight in how the company positions itself regarding its sales strategy from an academic perspective.

The framework consists of the following phases: (1) customer requirements definition, (2) customization and integration of products, (3) deployment of products, and (4) post-deployment-support. In this way, the study contributes to understanding the relational processes between a supplier and customer at the firm level. Firstly, during the requirement definition stage, customers frequently are not fully cognizant of their business needs and cannot easily communicate them to a supplier. Therefore, requirements definition involves addressing the customer's current and future needs, such that these can be taken into account in the development of goods and services for the customer. Defining the future needs of a customer is important since these might evolve over time and lead to adjusted customer expectations from a solution. During the second phase, the customization involves designing, modifying, or selecting products to fit into a customer's environment. Integration encompasses designing, modifying, or selecting goods and services that work well with each other. Thirdly, the deployment phase entails the delivery of products and their installation into a customer's environment. The installation process frequently leads to new customer requirements that call for adjustments of products during this stage. For example, providing the employees of the customer with sufficient information and training to enhance the benefits of the solution. Lastly, the post-deployment support phase refers to the ongoing relationship between a supplier and a customer that is present after the solution is delivered. It includes activities such as operating information, routine maintenance and deploying new products in response to evolving customer requirements.
Especially the first two steps of Tuli's (2007) framework are relevant for the context of this research. During the requirement definition phase the sales team of NextLevel Logistics should become aware of the values and needs of the customer by for example practicing value-based selling. Then, during the customization and integration phase, the customer should have the opportunity to design, modify or select a PSS according to their values and needs.

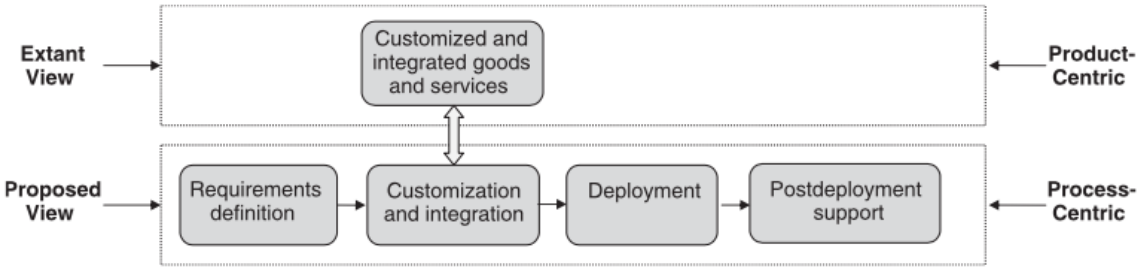


Figure 5. Proposed views of a customer solution (Tuli et. al., 2007)

2.2.3 Value-Based Selling

Prior literature has acknowledged the strategic importance of the salesforce in translating the firm's value propositions to the customer's specific business contexts and creating value for the firm and its customers (Tuli et. al., 2007; Terho et. al., 2012; Vargo & Lusch, 2004).
A strategy which enables the salesforce to communicate value centric offerings such as PSSs to the customer is value-based selling (VBS) (Terho et. al., 2017). VBS is defined as "the degree to which the salesperson works with the customer to create a market offering in such a way that benefits are translated into monetary terms, based on an in depth understanding of the customer's business model, thereby demonstrating the contribution to the customer's profitability" (Terho et. al., 2012, p. 178). VBS finds its foundation in the co-creation logic and stresses the importance of seller-customer interaction for effective value co-creation (Vargo & Lusch, 2004).

Salespeople who practice VBS focus on proactively crafting and promoting market offerings that have potential to add value to the customer through cost savings or performance enhancements. When an offering provides substantial value opportunities to a customer, the customers should have a strong incentive to buy the offering, even at a premium price (Terho et. al., 2015).

Authors have agreed on the changing sales capabilities that are required in VBS (Terho et. al., 2012; Terho et. al., 2015; Ulaga & Reinartz, 2011, Vargo & Lusch, 2004). First, the salesforce should gain a deep understanding of a customer's business model, operations, value drivers and usage situations associated with value creation to identify selling opportunities (Ulaga & Reinartz, 2011; Terho et. al., 2015). In order to successfully practice VBS, the salesforce should help customers to understand the value of the intangible elements of the PSS. Therefore, the salesforce should have a thorough understanding of the value that the PSS can offer for a specific customer (Ulaga & Reinzartz, 2011). Second, a complex network of relationships should be managed in the customer organizations by the salesforce (Ulaga & Reinartz, 2011). Members of a procurement team view value drivers from different perspectives, which indicates that VBS requires the salesforce to connect with key stakeholders in a customer's organization, such that they can understand and integrate their viewpoints within a holistic perspective on value creation (Terho et. al., 2017). Third, the salesforce should adopt a proactive, value co-creator role and should strive to influence the customer's value creation process (Terho et. al., 2017; Vargo & Lusch, 2004). In that sense, VBS reflects the need for the salesforce in business markets to work together with their customers to create a mutual understanding of the offering's potential contribution to customers' business performance, and effectively communicate how the supplier can contribute to achieving customer goals (Terho et. al., 2015). Fourth, long-term relationships should be developed with the customer. Salespeople should therefore proactively manage customer expectations to ensure profitability not only for the initial sale but also after the sales. Following a sale, the performance of the solution and the customer's satisfaction need to be carefully monitored to be able to expand business with this customer in the future (Ulaga & Reinartz, 2011).

Various studies have proposed frameworks for a value-based sales process. Terho et. al. (2012) addressed three stages of value-based selling behaviour (understanding the customer's business model, crafting the value proposition, and communicating the value) including their consequences. Toytari and Rajala (2015), presented a framework for value-based selling that requires three kinds of competences; planning, implementation, and leverage. Further, Luotola et. al. (2017) developed a framework that incorporates value co-creation activities in a value-based selling process with the customer. The framework consists of three phases: (1) problem identification & value demonstration (pre-sales); (2) designing a solution for the customer problem (detail-sales); (3) reaching certainty (final-sales). Because the role of value co-creation is highlighted in this framework, it could be used to gain understanding in the link between co-creation activities and value-based selling in the case of BagFlex. First, during the pre-sales, the supplier and the customer draw a problem formulation which includes some potential solutions. The main goal is to gain the customer's confidence on the value potential of a solution (Luotola et. al., 2017). This implies they should understand the benefits of sharing information on their value drivers, operations, and business problems with the supplier. Second, the detail-sales phase entails increasing the customer's commitment to the offered solution, which is achieved when the customer starts to see that the solution fits their business environment and trusts that the supplier is able to deliver the solution through its offerings (Luotola et. al., 2017). Thus, the customer should feel confident about the supplier's ability to manage the risks of the solution.

The last phase, reaching certainty (final-sales), involves outlining the final scope and specifications of the solution with the customer. This also entails the signing of the final contract. This phase requires mutual confidence from both parties on the value of the solution in which uncertainty and complexities are well settled. Figure 6 depicts a summarized version of the framework.

Figure 6. Value-based sales process through co-creation (Luotola et. al., 2017)

Visualization strategy in selling PSS

As mentioned before, VBS is a means to communicate the value of PSSs to the customer (Terho et. al., 2017). However, the value of a PSS is often difficult and complex to clearly communicate due to the intangibility of the service performance, especially prior to purchase (Anderson et. al., 2007; Hill et. al, 2004). Therefore, firms can employ a visualization strategy as a concrete approach to support the PSS sales process in B2B markets (Hill et. al., 2004; Kowalkowski et. al., 2009). Visualizations serve to illustrate, demonstrate, and communicate the value of PSS offerings during the interaction process with the customer (Kowalkowski et. al., 2009). Three value-categories are identified that help in understanding what value PSS offerings contribute: 1) product-based; 2) service-based; 3) and relationship-based value. Product-based value includes typical parameters such as product performance, quality and price. These parameters are still heavily emphasized by most firms. Service-based values are more difficult to visualize due to its intangibility. Typical parameters include operations, costs, customization, and performance. Lastly, relationship-based value should explain how the supplier and customer maintain their relationship over time. Similar to service-based value, relationship-based value is more process-oriented which makes it difficult to visualize. Typical parameters include pro-activity, trust, and long-term commitment (Kowalkowski et. al., 2009; Kindström et. al., 2012). In order to visualize the value of a PSS offering to customers, various visualization strategies have been suggested. Four strategies are identified for conveying the value of complex solutions; 1) envisioning; 2) association; 3) documentation; 4) representation. First, envisioning includes using vivid cues to convince customers to make them experience the service mentally. It stimulates a clear and vivid mental image of the benefits of the service. Second, documentation involves providing relevant information about key attributes, features, and benefits of the service in three types: 1) activities related to consumption of the service, 2) facts about the service delivery system, 3) documentation of performance such as reference cases and cost calculations. Third, association is about linking an object, place or person to the service. Lastly, representation focuses on core attributes that are direct or indirect parts of the service, such as employees (Hill et. al., 2004; Kindström et. al., 2012). Kindström et. al. (2012) employed an empirical case study in the manufacturing sector involving five manufacturing firms to explore which visualization strategies are most appropriate to use in different stages of the PSS offering life-cycle (market sensing, development, sales and delivery). It was found that during the sales stage, especially documentation and envisioning strategies are useful in order to effectively arouse a customers' interest and make them believe in the concept. Tacit examples that could facilitate this are business cases, illustrations, communicating good examples, interactive dashboards, scenario discussions, and diagrams or graphs (Kindström, 2012).

Moreover, the empirical study of Hill et. al. (2004) has examined the effectiveness of these visualization strategies in the hedonic (such as travel agencies) and utilitarian (such as banks) service environment. The results indicate that visualizations that convey tangible cues and a vivid mental picture of a service's benefits lead to more favourable perceptions of the quality of the service offering. This is due to the fact that visual information is processed differently than written, verbal information, which results in better processing of information. Especially the documentation strategy was found to be effective in this study (Hill et. al., 2004).

2.2.4 Co-creation in PSS

As was mentioned before, scholars have acknowledged the importance of co-creation with and the involvement of customers during the sales process of PSSs (Terho et. al., 2012; Terho et. al., 2015; Ulaga & Reinartz, 2011; Vargo & Lusch, 2004; Tuli et. al., 2007). As such, the concept of value-based selling can be seen as part of the co-creation literature. Co-creation is an approach where customers are actively involved and take part in the design of a new offering.
It has been defined as an interactive and creative process in which customers are enabled to express their divergent needs (Piller et. al., 2011). Co-creation activities mainly take place in a setting of company-to-customer interaction which is facilitated by the company. The main goal is to obtain information about needs, ideas, and solutions that exist in the customer domain (Piller et. al., 2011).

Various frameworks have been created in literature which depict how co-creation and customer involvement could be facilitated (Tuli et. al., 2007; Piller et. al., 2011; Kindström et. al., 2012). Regarding the context of this research in which the sales process of BagFlex is considered, the co-creation activities will take place in the back end of the innovation process. Piller et. al. (2011), proposes a framework which distinguishes between co-creation activities at the back end of the innovation process. Within this framework, the use of toolkits is suggested as one of the means to facilitate co-creation. A toolkit is a development environment which enables customers to express their needs iteratively to a concrete offering. In that sense, the customer is provided with an interaction platform, where they can create a solution according to their needs and requirements (Piller et. al., 2011). A toolkit may be taken as relevant input for the design solution in this research. Since BagFlex seeks new ways to involve the customer in the sales process of their PSSs, a toolkit that builds on co-creation principles could be used as a means to achieve active customer involvement in the process of designing and assessing PSSs. In order to use toolkits efficiently, five basic requirements are given: (1) Trial and error learning: toolkit users should receive feedback on their solution to evaluate and improve further on it. (2) Solution space: the solution space of a toolkit should define all variations of the possible solutions. This implies that the solution space only offers solution variations that the manufacturer is able to produce. (3) User friendliness: describes the perceived quality of interaction with the toolkit by its users. This means that the user's perception of the toolkit can be influenced by the delivered quality and perceived benefit that is generated while interacting with the toolkit. (4) Modules and components library: these give users the possibility to choose from predefined solution blocks in which different modules and components can be combined. These libraries can also include additional functionalities such as visualization tools. (5) Transferring customer solutions: the best possible solution that was developed by the customer should be transferred to the manufacturer. This enables clear communication of the solution which is understood by both the customer and the manufacturer (Piller et. al., 2011).

Two types of toolkits are identified:
(1) Toolkits for user innovation in which the customer combines the existing modules and components of the manufacturer into a solution but also keeps experimenting with new and unknown solutions to satisfy their needs. This implies that the solution space of this type of toolkit is boundless by experimenting in a trial and error process in which new solutions for their needs can be created. *(2) Toolkits for customer co-design* in which the focus is on customization of the offering and the development of variants instead of developing new offerings. This type of toolkit offers users a choice of multiple building blocks (modules and components), which can be combined to create an offering according to the users' requirements. This implies that the solution space of co-design toolkits is limited and can be adjusted only according to its predefined building blocks (Piller et. al., 2011).

According to Zine et. al. (2014), the process of value creation is shifting from the traditional product centric view to customized customer experiences. Customers today are more demanding and therefore they are increasingly looking for opportunities to create value for themselves together with the PSS providers. By employing active involvement, customers would be able to customize the PSS offering and extract the desired value as per their specific requirements. For instance, by customizing the service of a PSS, the customer extracts value which could result in increased quality, optimized processes, higher productivity, better people morale, and improved service experience. By offering value co-creation through customized services, the PSS provider can obtain benefits such as the co-creation of knowledge and improved customer experience resulting in enhanced customer satisfaction and customer loyalty (Zine et. al., 2014). However, according to Luotola et. al. (2017), corresponding specific actions that explain how value co-creation is achieved are not widely identified yet. Therefore, there is a need for more empirical examples in which value co-creation is employed as part of a value-based sales process. Empirical examples would allow for more understanding in what is important when co-creating value (Luotola et. al., 2017; Cuevas et. al., 2015). Therefore, in this research context, BagFlex will serve as an empirical example. By offering customization of the PSS offering through active customer involvement, BagFlex could establish improved customer experience which should result in more customer satisfaction and loyalty. The outcomes of this research could thus in turn contribute to the literature on value co-creation and value based selling by providing the specific actions that are needed in these processes.

2.2.5 Summary

The concepts discussed in this chapter form the relevant context in which the design solution will be developed. Both value-based selling and co-creation principles are activities that take place during the sales process. The framework of Tuli et. al. (2007) can be linked to the current context of BagFlex as the first two steps of this framework (requirements definition and customization & integration) can be operationalized during BagFlex's sales process. Moreover, the visualization strategies suggested by Kindström et. al. (2012) can be employed as a concrete approach to support the value-based sales process and serve as relevant input for the creative development of the design solution. Besides, the framework of Luotola et. al. (2017) can be used as the desired theoretical context in which the design solution should be used. Further, the proposed toolkit by Piller et. al. (2011) gives insight for developing a means to involve the customer in the sales process of BagFlex. Also, the research of Zine et. al. (2014) serves as a motivation to offer PSS customization to the customer since it can lead to enhanced customer satisfaction and customer loyalty.
The following section will elaborate on the criteria that are used in PSS design and assessment in which the customer perspective is taken into account. These criteria serve as a basis for the design solution developed in this research.

2.3 PSS design and assessment with customers

As mentioned before, a first version of an assessment tool was developed for the product-service systems of BagFlex. However, this tool was mainly developed for internal use and did not include an extensive customer perspective. This implies that the tool did not take into account assessment criteria that were considered relevant from both the company and customer perspective on which the PSS could be further designed. Therefore, this subchapter will elaborate on PSS design and assessment in which the customer perspective is taken as an integral aspect. Analysing the methods and tools that are used for PSS assessment results in inspiration and knowledge that may serve as a basis for the further development of the design solution for BagFlex.

2.3.1 PSS design and assessment

PSS assessment is by nature a qualitative task which involves activities that are performed by multiple stakeholders (Kim et. al., 2015). PSS assessment should consider various stakeholders because the perspective of a PSS evaluator often depends on their functional domain. For instance, representatives from the finance department may be only concerned with profitability, while marketing representatives may focus more on customer value. Thus, different perspectives should be involved during the assessment of PSSs for a comprehensive and balanced evaluation (Kim et. al., 2015). Especially the customer perspective is important to include in PSS assessment since their requirements and values should be considered in order to realize sustainable PSS value. Therefore, existing studies in PSS assessment consider customer satisfaction for design alternatives (Mourtzis et. al., 2016). The feedback gathered from customer assessment provides the PSS provider with various ideas for improvement and further design. Hereafter, the improved PSS can be refined through next assessments (Kim et. al., 2015). One way of supporting the design of PSSs is the development of assessment tools. Over the past time, a considerable number of assessment tools for PSSs have been developed (Bocken et. al., 2019). This section elaborates on three studies that developed assessment tools for PSSs in which the customer perspective was taken into account. The tools slightly differ in purpose, but overall, they capture the high level goal of designing and assessing the PSSs according to several criteria from the PSS provider and its customers. Further, these studies all took place in a B2B context. An overview of the assessment criteria used in these tools are listed in Appendix B.

First, Kim et. al. (2015) has developed an evaluation scheme to assess a product-service system. The evaluation criteria were gathered from existing PSS assessment studies and consequently refined according to their relevance. During the refinement, the authors also developed new evaluation criteria based on experience in PSS development projects. This process was iteratively conducted. The final proposed set of assessment criteria includes economic, environmental, social and customer values. Further, the provider and customer perspectives and the PSS life cycle phases (design, production, sales, usage and disposal) are included. According to Kim et. al. (2015) past literature has not yet covered all of these aspects in the assessment of a PSS. Further it is argued that a holistic overview of criteria is valuable since this might identify various improvements of PSSs. The assessment scheme contains two perspectives: the sustainability layer which includes people, planet and profit and the customer value layer which involves quality and costs. Additionally, the scheme can be used to determine directions for improvement of the PSS based on a complete evaluation. Also, this scheme is aimed at serving as an aid for practitioners in PSS development.

The PSS model evaluation procedure involves four phases: 1) defining the evaluation scope; 2) selecting the relevant evaluation criteria; 3) scoring; 4) aggregating the scores. In step 3, the PSS model is scored by using a five-point scale because of its simplicity. The study reflects on three case studies to validate the proposed evaluation scheme. These case studies took place in the automobile and telecommunications industry. Kim et. al. (2015) states that the tool offers three advantages. Firstly, the proposed scheme is comprehensive enough to cover provider and customer perspectives as well as lifecycle phases of a PSS. Second, the proposed scheme can be used in various stages of the development of a PSS by selecting suitable criteria for the life cycle in which the PSS is evaluated. Lastly, the assessor can use the knowledge from the results of previous PSS evaluations for other PSSs which leads to more efficient and effective evaluations (Kim et. al., 2015)

Second, Bertoni (2019) argues that customer value and sustainability are often considered two opposite perspectives that need to be integrated. Therefore, sustainability requirements should not be discussed in isolation during PSS design, rather they should be traded-off with other customer satisfaction- and performance-related attributes such as quality, functionality, and costs. This is also in line with Doualle et. al. (2016), who states that sustainability values have to be integrated in a holistic view to support decision-making in PSS design. Therefore, sustainability has to be assessed in its wholeness rather than an addition of its environmental, economic, and social dimensions (Doualle et. al., 2016). Processes and tools for PSS design should thus facilitate participation of the customer in defining the evaluation of traditional value- and sustainability-related criteria (Bertoni, 2019). However, Bertoni (2019) states that it is far from evident how sustainability-related criteria should be defined in combination with traditional criteria such as quality and costs in PSS design decision-making. Therefore, the study proposes a five-step iterative process to support decision making for sustainable PSS design with the customer. By using Multiple-Criteria Decision Making (MCDM), PSS concepts are evaluated from a value perspective in which sustainability is one of the aspects that contributes to the overall value of the offering. MCDM is a technique to evaluate, score, and identify appropriate performance criteria for the purpose of achieving customer satisfaction. MCDM has been identified as one of the preferred methods in PSS assessment because of its simplicity (Mourtzis et. al., 2016). The empirical case study of the Bertoni's (2019) research took two B2B firms from the aerospace and construction industry into consideration when testing and implementing the framework. The outcome of the tool is depicted in a Figure 7 that visualizes the trade-off between provider versus customer value in the assessment of PSSs.

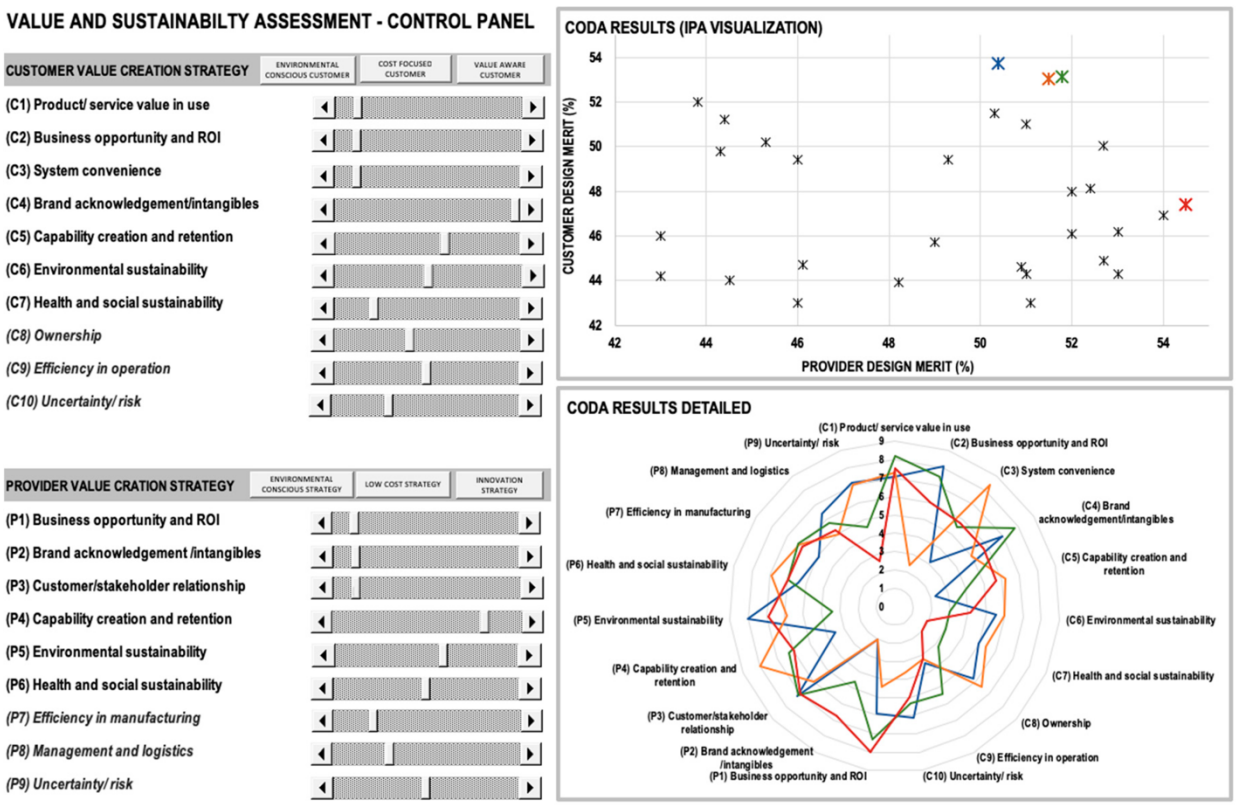


Figure 7. Value trade-off from customer and provider in control panel (left) and visualization of this value trade-off (right) (Bertoni, 2019)

Third, Tseng et. al. (2019) uses a comparable list of criteria to come up with a set of attributes to create a theoretical model and practical measures to assess PSSs in the construction industry. The study addresses that sustainable product-service systems have an interdependent and interrelated hierarchical structure consisting of aspects related to environmental, social and economic benefits. Therefore, measures of a PSS include qualitative information. Further, it is stated that collaboration between the PSS provider and customers is important to create an effective understanding of consumer needs and to enhance the product-service quality. A mathematical causal model is presented to generate theoretical insights and provide weighted criteria for improvements in PSS development. However, this causal model takes no form of a tool. The results of the study give an indication of which criteria foster more sustainable PSSs. The aspects of a sustainable PSS included employee perception, sustainable production, sustainable consumption and product-service quality. The total criteria list based on the three studies is depicted in Appendix B.

2.3.2 Shortcomings of tools

Despite the vast number of tools that have been developed over the past time, tools that fit company needs and expectations are scarce (Bocken, 2019). On the one hand, many popular tools are too generic and fail in capturing the focus on sustainability. On the other hand, many tools specifically developed for sustainability purposes remain unused. This is due to the fact that they have not been tested empirically and did not include users such as the customers and their needs in the tool development process. Baldassarre et. al. (2017) states that company's innovation efforts primarily focus on improving existing technologies and products but not on other key drivers like understanding customer needs. As a consequence, sustainable development might lead to incremental improvement, but not to the degree of change that would be required to address global environmental challenges.

Therefore, a fundamental shift towards integration of environmental needs within business activities by actively involving the customer seems necessary (Balsassarre et. al., 2017). Lastly, tools are considered too complex and demanding in terms of time commitment and number of steps in the process. For example, some tools include too many criteria which results in less efficient decision making by the user (Bertoni, 2019).
This results in the need for a more simplistic perspective on the development of tools. In order to tackle the former findings, Bocken (2019) proposes a 'tools checklist' which aims to support researchers and practitioners in future sustainability tool development. This checklist can be applied to this research as PSSs are a type of sustainable business models. The following requirements were included (Bocken et. al., 2019, p. 13):

1. *The tool is purpose-made for Sustainable Business Model Innovation.*
2. *The tool is rigorously developed from literature and practice insights.*
3. *The tool is iteratively developed and tested with potential users.*
4. *The tool integrates relevant knowledge from different disciplines.*
5. *The final tool version has then been used by practitioners, preferably multiple times, and an evaluation of this process is done to assess tool use and usefulness.*
6. *The tool provides a transparent procedure and guidance on how others can use the tool.*
7. *Broader sustainability objectives and impact are firmly integrated into the tool and safeguarded when tool application is facilitated by others than the tool developer.*
8. *The tool is simple and not too time-consuming.*
9. *The tool inspires or triggers (business) change.*
10. *The tool is adaptable to different (business) contexts.*

2.3.3 Summary

The tools, criteria, and methods discussed in this chapter will be used accordingly in the development of a design solution for the given problem context of this research. Firstly, the discussed studies gave insights in the methods and approaches on how to assess and further design a PSS when including the customer perspective. Secondly, the criteria that were used in these three studies are presented in an overview in Appendix B. This overview is taken as a starting point for the development of the assessment criteria for the design solution in this research.

3. Methodology

This chapter describes the research methodology which elaborates on the systematic plan for conducting this research. First, the research design will be discussed. Second, the literature review and the case study will be described, elaborating on the theoretical and empirical setting. Further, the data collection methods and data analysis are explained including the data quality issues regarding controllability, reliability, and validity. Next, the construction of design principles will be discussed which is followed by a description of the design solution development. Lastly, a description of the testing & validation of the design solution will be given.

3.1 Research design

As mentioned before, the aim of this research is to integrate the customer perspective into the sales process in B2B markets to design and assess sustainable PSSs. The explorative nature of this research fits a design science approach. Design science aims to develop knowledge that is focused on how to design solutions for field problems. This approach links knowledge from theory with insights from practice (van Aken et. al., 2012). Besides, the design science perspective is combined with an empirical case study approach. A case study is used when the aim of the research is to answer 'how' and 'why' questions and the behaviour of those involved cannot be manipulated. Also, case study research is exploratory in nature and provides an in-depth understanding of the phenomena that are studied (Yin, 2003). These conditions apply to this master thesis research since the main research question is a 'how' question and this research is explorative as specific answers can only be obtained by analyzing the full context of specific situations. BagFlex formed a suitable research environment for this case study since it operates in the implementation phase of different PSSs in which challenges are faced regarding the integration of the customer perspective during the design and assessment of PSSs. Therefore, the type of case study selected for this research is a single case study design, which concerns the sales process of BagFlex in which the PSS is designed and assessed together with the customer. This implies that the unit of analysis is the design and assessment of PSS, in which the sales process forms the context. In order to integrate the design science approach and empirical case study in a holistic framework which structures the process of the master thesis research, the Generic Design Science Cycle of Keskin & Romme (2019) is applied. The framework integrates multiple design science frameworks into one general one and includes four activities: *exploration* of the problem context; *synthesis* of findings and existing theories; *creation* of artifacts; *evaluation* of artifacts.

The Generic Design Science Cycle focuses on the use of design principles, which are created, adapted, acted and reflected upon throughout the research process. Design principles are a comprehensive set of propositions which are drawn from theory, that aid in creating design solutions and in testing these in practice. Design science methodology is thus used to develop design principles derived from theory for the creation of solutions for a problem in a specific context (Van Aken & Romme, 2009). These design principles build on CIMO-logic which was used in this research as a method to synthesize the literature. This will be further explained in section 3.3. The problem context of this research concerned how the customer perspective can be integrated in the sales process of BagFlex.

The solution design or artifact took the form of a tool that can be used during this sales process. The multiple steps of the Generic Design Cycle are depicted in Figure 8.

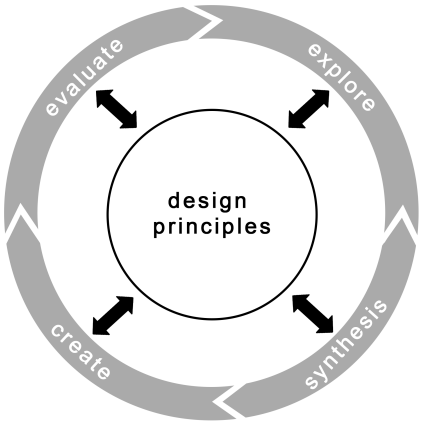


Figure 8. Generic Design Cycle, Keskin & Romme (2019)

The way in which the steps of this generic framework were applied and integrated in the context of this study is shown in Figure 9. The following sections discuss the steps that were taken during the research which includes the literature review, design principles, data collection, data analysis, solution design, testing & validation.

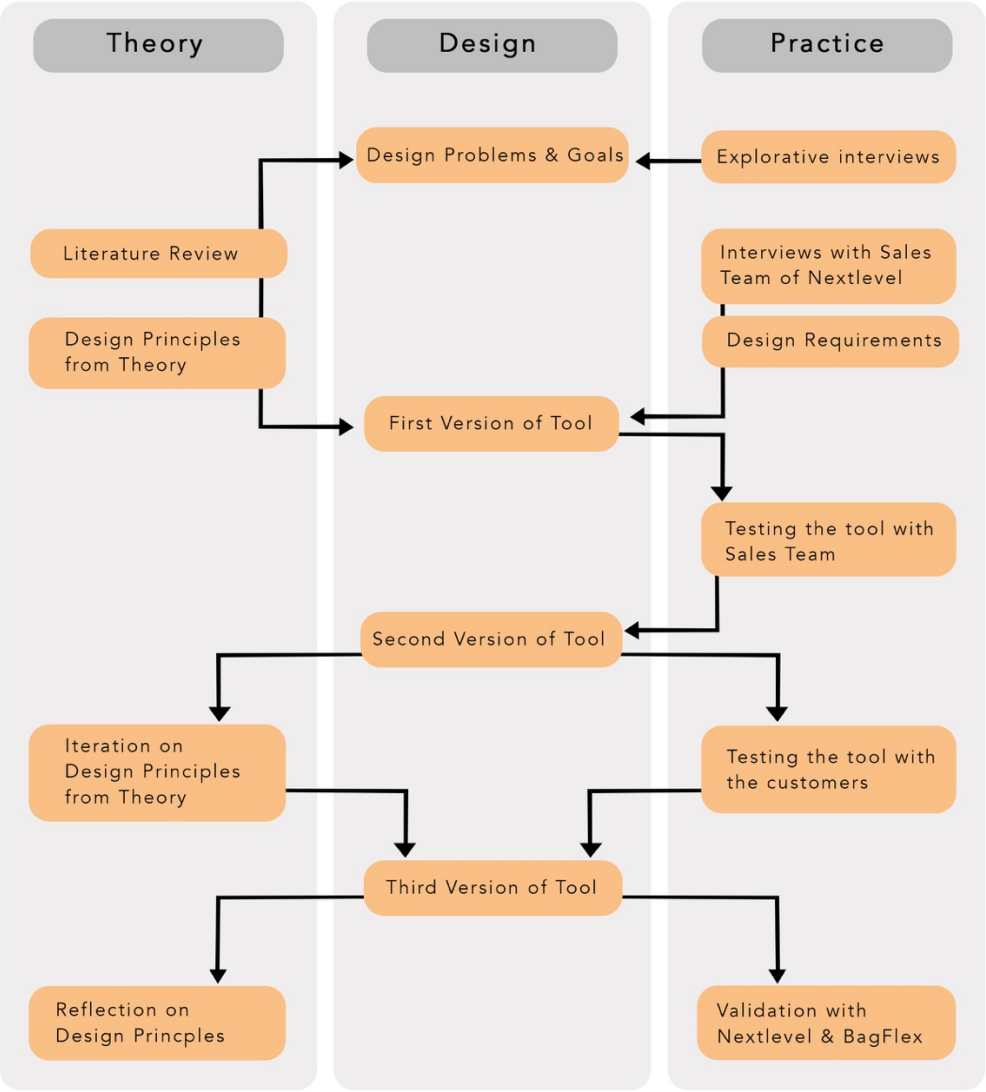


Figure 9. Research Design

3.2 Literature review

The goal of the literature review is to create an in-depth understanding of the perceived business problem and context. Therefore, an extensive literature review on relevant bodies of literature for this study was conducted to get acquainted with the concepts of product-service systems, PSS sales in B2B markets, and PSS design and assessment with customers. Articles were found through the Web of Science and Google Scholar since these search engines offer a wide array of literature including the tracking of citations. Next to using these search engines, recommendations on literature by the supervisors and professors from TU/e were used. Besides, the snowballing method was deployed in which new articles were detected by using the references from other relevant articles. The abstract of potential articles was first read to determine the usefulness and relevancy before reading the complete article.

The following keywords were used to search for the articles: *product-service systems; sustainable PSSs; PSS sales; B2B sales process; PSS assessment tools; customer involvement AND PSS assessment; PSS design with customers; sustainability assessment AND PSSs; sustainable business model design; co-creation AND B2B markets; customer involvement AND B2B sales.* In order to select suitable articles, several quality criteria were used. Firstly, the year of journal publication was taken into account as older articles (published earlier than 2000) would to a lesser extent be relevant. Besides, it was checked how many times the article had been cited in literature to indicate the impact score. Only articles cited more than 50 times were considered to ensure its relevancy in the literature. An overview of the sample of the articles is shown in Table 1 below. In total, 32 articles were included in the sample of the literature review. Firstly, the literature review was used to identify the relevant research gaps to which this study contributes. Further, the literature review provided insight into how the customer perspective should be integrated into the sales process in B2B markets for designing and assessing sustainable PSSs. Therefore, the review served to partly answer sub-question 1 of the research. Lastly, the literature review served to construct theory-based design principles. This implies that the design principles built on existing concepts and constructs from literature. Accordingly, these design principles were used as input to create a design solution for the problem context of the company.

Table 1. Overview Articles Literature Review

	Product-Service Systems	PSS sales in B2B markets	PSS design and assessment with customers
Articles	Barquet et. al. (2013); Barquet et. al. (2016); Bocken et. al. (2013); Bocken et. al. (2018); Boons & Lüdeke-Freund (2013); Lüdeke-Freund et. al. (2017); Tukker (2004); Tukker (2015)	Cuevas et. al. (2016); Hill et. al., 2004; Kindström et. al.; Luotola et. al. (2017); Panagopoulos et. al. (2017); Piller et. al. (2011); Terho et. al. (2012); Terho et. al. (2015); Terho et. al. (2017); Tolkamp et. al. (2018); Toyatari & Rajala (2015); Tuli et. al. (2007); Ulaga & Kohli et. al. (2018); Zine et. al. (2014)	Bertoni (2019); Bertoni et. al. (2017); Bocken et. al. (2014); Bocken (2019); Chou et. al. (2015); Kim et. al. (2016); Tseng et. al. (2019); Baldassarre et. al. (2017); Doualle et. al., 2016; Mourtzis et. al., 2016
Total	8	14	10

3.3 Design principles & CIMO logic

The design principles developed in this research were based on CIMO Logic. Design principles serve as input for designing a specific solution for comparable situations of the problem context (Denyer et. al., 2008). CIMO-logic includes context, intervention, mechanism and outcome. Context (C) describes the surrounding factors of both the external and internal environment, and the nature of the human actors that influence behavioural change. Interventions (I) contain the actions that influence behaviour to achieve a certain effect. The Mechanism (M) is triggered by the intervention in a certain context. The Outcome (O) is the result of the intervention in a specific problem context (Denyer et. al., 2008). The design principles supported in connecting the insights from theory to the creation of the design solution and in that sense in identifying the relationships between the interventions and outcomes.

3.4 Data collection

The following section elaborates on the data collection from the company and customer.

3.4.1 Data collection from company

In paralD to the literature review, an empirical case study was carried out to gather insights into the current needs and activities regarding the sales process and PSSs of BagFlex. First, multiple explorative interviews were conducted to identify a relevant business problem that would add to the formulation of the problem statement. These interviews were conducted with members of the BagFlex team. An overview of the insights from these interviews can be found in Appendix A. The second round of interviews was conducted with the sales team of NextLevel Logistics to discover the challenges and needs regarding the sales process of BagFlex. The insights from these interviews were then translated into design requirements, which were used as input for the design solution. Furthermore, the design requirements and design principles were formulated iteratively. Design requirements were informative in terms of design goals and outcomes, as such they were used for searching the literature scoping the design principles. The design requirements provided answers to the sub-research question 2 from a practical perspective. After the formulation of the design requirements, a first version of the design solution was created and consequently tested with the members of the NextLevel Logistics sales team. More information about the format of these user-tests is given in section 3.8. For the interviews and user-tests with the sales team from NextLevel Logistics, a set of diverse perspectives was included by consulting employees from different functions that were involved in the sales process of PSSs. For instance, the sample consisted of interviews taken with a Sales Manager, Sales Consultant, Sales Director, Commercial Solution Manager, Service Consultant, and Director of Customer Engagement. More details about the participants and planning of the interviews and user-tests can be found in Table 3.

3.4.2 Data collection from customers

Based on the interviews with employees of NextLevel Logistics, various criteria were identified which served as a means to select suitable customers for the interviews. The selected participants had to be similar with respect to several criteria.

First, the selected customers had to be considered as 'Innovative' in order to be a potential customer for BagFlex. At this moment BagFlex is considered a 'radical innovation' since it has not yet been widely applied by the airport industry. According to Rogers, customers can be divided into multiple segments when radical innovations are brought to the market (Rogers, 2010). These segments are depicted in Figure 10. The 'diffusion of innovation theory' by Rogers (1983), can also be applied to the context of BagFlex. According to Rogers (1983), Innovators adopt new technologies or ideas simply because they are new and tend to take risks more readily as they are the most venturesome. Further, Early Adopters tend to create opinions, which propel trends. Unlike innovators, Early Adopters are not so quick in taking on new technologies and ideas, but are more concerned about their reputation as being ahead of the curve (Rogers, 1983). For the interviews, only airports considered as Innovators and Early Adopters were selected as these characteristics would partly determine the airport's openness to acquiring a BagFlex system. The airports were selected based on an existing segmentation list that NextLevel Logistics utilizes to distinguish between the Innovativeness of airports. The list included the following criteria: Competitive Innovator; Visionary; Technology Geek; Technical Authority; Risk taking Attitude; Innovation Resources; Innovation Friendly Management. In this list, airports were assigned a score between 1 and 10 to determine their level of Innovativeness. Only airports scoring a 5 or higher were selected for this research.

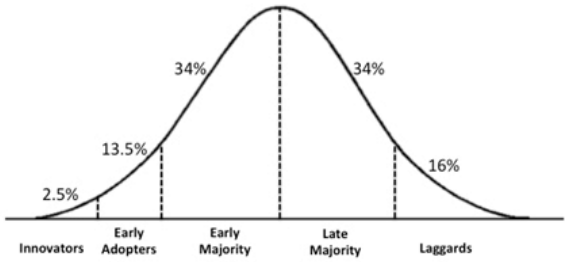


Figure 10. Diffusion of Innovation curve (Rogers, 1983)

Second, the customer had to have certain characteristics or requirements that resulted in a 'Fit with BagFlex'. These were derived from an existing list that NextLevel Logistics created. This list included the following criteria: Strong Growth, Seasonal/Event Driven Capacity, High Exception Handling (in which exceptional flows of baggage handling emerges); Labor Intensive Processes; Requirements for Temporary Solution; Functional Changes Ahead; Space Issues; Budget for Operational Expenditures (which includes service fees); Explicit Interest in BagFlex. These criteria determined to what extent there would be an opportunity according to the current state and requirements of an airport to offer BagFlex as a possible solution. Further explanations of these segmentation criteria can be found in Appendix C. Third, all customers had to be active in the same geographical scope. In this research, the Netherlands was taken as the scope. This was decided since the scope of the airport industry is quite broad which would increase the complexity and practicality of the research within the given time frame and with the given resources. Limiting the scope to the Netherlands implied that interviews and validation sessions could take place in person. This ensured an appropriate level of depth of the research as in-person meetings would be more valuable to test the design solution and more specific conclusions could be drawn from the outcomes. Within the limits of these three criteria, there was applied a maximum variation sampling to derive heterogeneity. Therefore, cases were selected that differed with regard to two main conditions influencing the degree to which customers would be open to designing and assessing a PSS: Size (represented by the amount of passengers per year the airport handles) and Future Investments (represented by a number between 1 and 10 which symbolizes the relative planned investments in future procurement for the airport). Taken together, this strategy led to diversity among cases. This increased the likelihood of selecting cases that displayed variety in the perspective on designing and assessing a PSS.

After the customer selection criteria were identified, a suitable selection of customers was made to identify the population of interest for the data collection. Four airports were eventually identified for the data collection. Details about the characteristics of these airports are depicted in Table 2.

The insights of the customer interviews served to partly answer sub-question 2. Insights from the customer interviews were mainly used for the testing of the design solution. The collected data covered information about an airport's strategy during the procurement of a baggage handling system and the value drivers that are used to design and assess product-service systems. The participants of the customer interviews are listed in Table 3.

Table 2. Selected customers and characteristics

Customer	Airport A	Aiport B	Airport C	Airport D
Innovation Score (1-10)	7,5	10	5,75	5
Fit with BagFlex score (1-10)	7,35	8,25	6,85	8,5
Future Investments (1-10)	9	1	2	1
Interviewees function	Airport Consultant in Procurement of Baggage Handling Systems Former COO	Finance & Strategy Manager Airport Operations manager	Innovation Manager	Airport Consultant in Procurement management

3.5 Interview Protocol

To prepare the interviews accordingly, multiple interview guides were created. An interview guide aids in comparing the answers of interviewees (Blumberg et. al., 2011). Therefore, the interview guides were checked by the supervisors to ensure its quality. The conducted interviews were semi-structured as this fitted the qualitative and explorative nature of the research. The use of semi-structured interviews allowed the interviewee for space to determine what was relevant in the context of the research problem such that important information could be pointed out.

For the interviews with the sales team of NextLevel Logistics, two interview guides were prepared. The first interview guide focused on the identification of challenges and needs regarding the sales process of BagFlex. The second interview guide focused on testing the design solution. Both interview guides can be found in Appendix D.

For the customer interviews, the interview guide was only focused on testing and validating the design solution. The interview guide for the customers can also be found in Appendix D.

During the process of conducting the interviews, questions and terminology of the interview guides were adjusted depending on the stakeholders that were interviewed. The estimated time for the interviews was approximately one hour. Also, all interviews were recorded since this would allow the interviewer to focus on the conversation instead of taking minutes. The recordings were necessary to produce accurate transcripts (Blumberg et. al., 2011). An extensive overview of the collected qualitative data is shown in Table 3. Besides, the planning, goals, and intended participants for the interviews are listed.

Table 3. Data collection for the research

Step	Activity	Weeks	Goal	Participants
Explore	Problem Identification & Problem Statement	2-9	Find relevant problem in the organization which can be solved by the development of a design solution.	Strategy & Sustainability Manager, System Engineer, Service Consultant, Commercial Solution Manager
Synthesis	Design Requirements	10-16	Gain insight into the current sales process, needs & challenges in the sales process, and relevant value drivers to construct design requirements	Director of Customer Engagement, Strategy Manager Airports, Commercial Solution Manager, Sales Managers, Sales Directors, Sales Consultants
Create	Design solution with company	16-20	Co-creating the design solution together with employees from the company. Gaining feedback on the usability and applicability of the design solution.	Service Development Consultant, Director Customer Engagement, Sales Managers, Sales Consultants, Sales Engineers
Create	Design solution with customer	20-23	Obtain input regarding the customer perspective on the usability and purpose of the design solution.	Aiport A , Airport B Airport C, Airport D
Evaluate	Testing & validating with company	23-26	Obtain input about how the tool should be integrated in the sales process	Sales representatives of NextLevel Logistics and BagFlex team members

3.6 Data analysis

The collected data from the interviews was analysed to develop insights for the research. The data was transcribed and analysed based on a set of procedures suggested by Van Aken et. al. (2012).

To analyse the data in a systematic way, a combination of the template approach and grounded theory approach was selected. Therefore, the coding scheme consisted of codes that were derived both from the collected data and the literature review. The template approach uses theoretical pre-understanding as a starting point for the coding procedures, which also applies to this research since the outcome should contribute to the relevant theory (van Aken et. al., 2012). The codes based on literature were derived from the concepts of PSSs, value-based selling, co-creation, and sustainability assessment in PSSs. In this way, insights from the interviews could be linked to the existing theory. In contrast, the grounded theory approach is suitable for the exploration of unknown information and is more data driven which also suits the explorative nature of this research. This coding approach was used to develop insights for the development and testing of the design solution. The grounded theory approach employs three procedures: open coding, theoretical coding, and selective coding. During the open coding, the data is categorized in codes that are not based on an existing code scheme. This implies that the codes are developed while coding which results in the development of concepts. Second, the theoretical coding procedure involves the discovery of relationships between the concepts that were found during the open coding. Finally, the last procedure involves selective coding in which the concepts and relationships that were found during the previous steps are elaborated on. Selective coding aims for the crystallization of the results (van Aken et. al., 2012).

In order to confirm the theoretical relevance of the first set of codes, the set was checked by the supervisors from TU/e. This list of theoretical and practice based codes was used during the first coding cycle which was performed by two researchers (the author of this thesis and a PhD student). The first coding cycle went as follows: first, the coding scheme based on existing theory and concepts was discussed such that the researchers agreed on the meaning of each code to ensure consistent coding. Also, codes were added based on what was expected to appear in the data, which aligns with the grounded theory approach. Next, both researchers coded a set of six transcripts separately by using the coding scheme. This was necessary as some of the content implied ambiguous definitions and interpretations (Saldana, 2009). By using double coding, the robustness of the research was also ameliorated. Thereafter, the results of the coding were compared and discussed. These discussions led to alterations in the coding scheme whenever the outcomes led to new insights. This cycle of coding was repeated until saturation was reached. This implies that additional collection of data no longer led to new insights (Saldana, 2009). Four meetings were needed to discuss the meanings of the codes and the additional new sub-codes.

During the first coding cycle, it was decided that the codes which were found from practice that involved the development of the design solution should be added to collect the feedback that would be needed to make design iterations. Therefore, the category 'Tool Design' was added in which different sub-codes that related to the design solution were considered. Also, in order to capture the relevant challenges and needs in the sales process, a sub-code for this element was added in the category 'Sales Process'. The first coding cycle resulted in a final list of codes. The final coding scheme including an explanation can be found in Appendix E.

During the second coding cycle, a new round of coding with two researchers was performed to check similarity between the coding procedures as no new codes were allowed to be added (Saldana, 2009). The additional three transcripts that were coded during this cycle displayed a high similarity in codes attached to the same content. In total, nine transcripts were coded by two researchers using the software Nvivo which is a software program for the analysis of qualitative data. In order to work more efficiently, and because of the proven resemblance in coding, the remaining ten transcripts were divided between the researchers.

3.7 Co-creation of Design solution

All the information gathered from both practitioners and literature was reduced into meaningful and actionable chunks which enabled the formulation of design principles and design requirements. These principles and requirements guided the development of the design solution in which all the information mentioned by the interviewees and literature was integrated. During the sessions in which the design solution was created and tested together with the company and customer, co-creation principles were employed. In order to do this, some techniques were taken from the 'Convivial Toolbox' handbook (Sanders & Stapper, 2012). This handbook proposes *generative design* as a method in which the researcher actively involves the people who are being served by the design in the process to help ensure that the designed solution meets their needs. A key characteristic of this method is the use of physical artifacts that serve as thinking tools throughout the creation process. Thus, the generative tool approach is a way to explore ideas and insights from people who will be served by the design solution. In the case of the co-creation sessions for this research, the following ingredients were included to construct these generative tools:

1. **Symbolic shapes** support in abstractions and formulating general relations, patterns, and rules.
2. **Cartoon expressions** often leave a variety of interpretations and can add an element of fun.
3. **Words** are used for expressing abstractions such as symbolic meaning and can be good triggers for people who are more comfortable with using words instead of thinking in pictures.

The openness and intuitiveness of these elements gave freedom to the participants to use them in expressing his or her intended meanings. Also, the participants were encouraged to participate in the 'creation' process by providing them with supplies such as markers, and blank spaces on the visuals that incentivized input (Sanders & Stapper, 2012). In this way, the tool was created together with the company and customer.

3.8 Testing & Validation

In order to provide insight into the practical contribution of the design solution, testing and validation was conducted. The first testing of the design solution was performed with representatives of the NextLevel Logistics sales team who are responsible for the communication with customers during the sales of PSSs. These involved representatives from the sales team such as Sales Managers, Sales Consultants and Sales Directors. The user-tests facilitated discussions and feedback loops which helped to simulate the interaction of the intended users with the design solution. *User-tests* are tests where users perform predefined tasks while being observed and recorded (Daae & Boks, 2015). This process was iterative in nature, which implies there was a constant interplay between analysis and design based on experimentation (Baldassare et. al., 2017). During these tests, it was evaluated whether the designed solution worked in terms of functionality, completeness, performance, and usability. The user-tests were conducted through meetings in which the design solution was explained and demonstrated. Moreover, all user-tests were recorded and transcribed in order to accurately gather and integrate the insights. Also, the most important insights were written down or illustrated by the participants by providing them with paper, markers and visuals of the tool on which they could draw. This helped in integrating the most important feedback in the further development of the tool. The feedback from these user-tests was applied to the design solution to make a first iteration. This second version of the design solution was also tested with multiple customers representatives, using a similar user-test format. Consequently, their feedback was applied to make a second iteration on the design solution. After the second iteration of the design solution, a last validation was conducted with the internal employees of BagFlex and representatives of the NextLevel Logistics Sales Team.

During this validation, the final design solution was evaluated based on the pragmatic value it adds for the company. This validation was conducted by performing a scenario play in which possible conversations that would occur during the sales process were simulated.
This validation provided an answer to the last sub-question. This validation phase was thus focused on the reflective insights of the project in which the practical contribution of the solution to the specific company context became evident.

3.9 Controllability, reliability, validity

According to Yin (2003), the most important quality criteria to assess the quality of the research include controllability, reliability, and validity. Concerning controllability, it is evaluated to what extent the research results are controllable. This methodology section aims to ensure controllability by describing each step of the research process in detail. Besides, the Appendices include the results of all interviews. Moreover, chapter 5 describes the outcome of the analysis which enables for controllability of the results.
The quality criterion reliability entails the extent to which the results of the research such as data collection procedures are independent of particular characteristics and can be applied to other studies (Yin, 2003). Three types of reliability can be identified: reliability concerning the researcher, respondents, and the research instruments (van Aken et. al., 2012). Reliability of the researcher is obtained by using three strategies. Firstly, the cross-checking method was conducted in which two researchers independently develop coding results that afterwards are compared. Secondly, reliability regarding the researcher was ameliorated by applying standardization of the data collection process. By creating interview guides, more structure was given to the process and personal traits of the researcher would be less determining during the interviews. Thirdly, standardization was established by using the coding programme NVivo which allows the researcher to analyse the data systematically (van Aken et. al., 2012). Reliability concerning the respondents was obtained by composing a diverse sample of participants for the interviews and user-tests. An objective view on the subject was formed by selecting representatives with multiple perspectives (van Aken et. al., 2012).
Finally, validity refers to the extent of the accurateness of the research findings (Yin, 2003). This research applied construct validity. Construct validity was obtained by an evaluation of the supervisor on the data collection procedures. For instance, the coding scheme was evaluated in which it was assessed whether the concepts of the literature were accurately applied. Also, throughout the data collection phase, the established procedures were constantly improved. These improvements contained adjusting the specificity and focus of certain interview questions in order to enhance the quality of the gathered data. Lastly, external validity refers to the extent to which the research findings are generalizable across other disciplines and studies (Yin, 2003). However, the external validity of this research seemed questionable and will be further explained in the discussion section.

4. Design Principles

Based on the literature review, theory-based design principles are constructed using the CIMO-logic for the development of the design solution. The design principles are used to provide a guideline on how the customer perspective should be integrated into the sales process of B2B markets to design and assess sustainable product-service systems. Four design principles have been formulated which are based on the concepts and theories discussed in the literature review. The design principles concern the following topics from literature:

1. Customer involvement in value creation
2. Assessing the sustainability values of customers
3. Communicating the PSS values
4. Usability and applicability of the tool

4.1 Customer involvement in value creation

Literature has proposed value-based selling as a means to convey the value of complex solutions such as PSSs to the customer (Terho et. al., 2017). Salespeople who practice VBS focus on proactively crafting and promoting market offerings that have potential to add value to the customer through cost savings or performance enhancements. VBS finds its foundation in the co-creation logic and stresses the importance of seller-customer interaction for effective co-creation value (Terho et. al., 2015). According to Zine et. al. (2014), customers today are more demanding and therefore they are increasingly looking for opportunities to create value for themselves together with the PSS providers. Customer involvement in the value co-creation process would lead to customization of offerings. By customizing the service of a PSS, the customer extracts value which could result in increased quality, higher productivity, and improved service experience. By offering customized services, the PSS provider potentially obtains benefits such as knowledge co-creation and improved customer experience resulting in enhanced customer satisfaction and customer loyalty (Zine et. al., 2014). In addition, various frameworks have been created in literature which depict how co-creation and customer involvement could be facilitated (Tuli et. al., 2007; Luotola et. al., 2017; Piller et. al., 2011). Piller et. al. (2011) proposes the use of toolkits as a means to employ co-creation with the customer at the back end of the innovation process. A toolkit is a development environment which enables customers to express their needs iteratively to a concrete solution. In that sense, the manufacturer provides users with an interaction platform, where they can customize a solution according to their needs using the toolkit's available solution space (Piller et. al., 2011). When an offering provides substantial value opportunities to a customer, the customer should have a strong incentive to buy the offering, even at a higher price. Therefore, VBS is associated with the development of long-term relationships with the customer since salespeople proactively manage customer expectations during the initial sale and after the sale (Terho et. al., 2015).

CIMO 1: If an organization wants to integrate the customer perspective within the B2B sales process to design and assess sustainable product-service systems (C), it should employ co-creation principles such as active customer involvement in which the customer has the opportunity to customize the PSS offering (Luotola et. al., 2017; Zine et. al., 2014; Piller et. al., 2011) (I) to facilitate the process of value creation in which the customer is enabled to extract the desired value as per their requirements in the offering (Zine et. al., 2014) (M) which leads to improved customer satisfaction and stronger customer relations on the long-term (Zine et. al., 2014; Terho et. al., 2015) (O).

4.2 Assessing the sustainability values of customers

PSS assessment should be focused on customers and their requirements in order to realize sustainable PSS value. Therefore, existing studies in PSS assessment consider customer satisfaction for design alternatives (Mourtzis et. al., 2016). However, according to Bertoni (2019), customer value and sustainability are often considered two contradictory perspectives that need to be integrated in the evaluation of PSS design and assessment. According to Doualle et. al. (2016), sustainability values have to be integrated in a holistic view to support decision-making in PSS design. This implies that sustainability has to be assessed in its wholeness rather than an addition of its environmental, economic, and social dimensions (Doualle et. al., 2016). Therefore, sustainability requirements should not be discussed exclusively in PSS design, rather they have to be traded-off with other customer satisfaction- and performance-related attributes (Bertoni, 2019). Processes and tools for PSS design and assessment should thus facilitate participation of the customer in defining the evaluation of traditional value- and sustainability-related criteria (Bertoni, 2019). His research investigates how multi-criteria decision making (MCDM) models should be applied to select PSS concepts from a value perspective, by considering sustainability as one of the aspects contributing to the overall value of the solution to facilitate the process of PSS design (Bertoni, 2019). MCDM is a technique to evaluate, score, and identify appropriate performance criteria for the purpose of achieving customer satisfaction. MCDM has been identified as one of the preferred methods in PSS assessment (Mourtzis et. al., 2016; Bertoni 2019).

CIMO 2: If an organization wants to integrate the customer perspective within the B2B sales process to design and assess sustainable product-service systems (C), it should adopt a MCDM approach that integrates traditional and sustainability related value criteria (Mourtzis et. al, 2016; Doualle et. al., 2016; Bertoni, 2019) (I) in order to analyse sustainable and traditional value trade-offs (Bertoni, 2019) (M) to raise awareness on opportunities and challenges for the next iterations in PSS design (O).

4.3 Communicating the PSS values

Tukker (2015) has stated that the adoption rate of PSSs is relatively low and that failure rates are relatively high. This can be explained by the customer's resistance to moving away from ownership and not doing enough preparations for the practical changes that a PSS brings (Tukker, 2015). Consequently, companies should find out how to create and offer value to their customers. However, communicating the value of a PSS is often more difficult and complex due to the intangibility of the service performance (Anderson et. al., 2007; Hill et. al., 2004). Therefore, it is argued that visualizations can be used as an approach to illustrate, demonstrate, and communicate the value of complex service offerings to the customer (Hill et. al., 2004; Kowalkowski et. al., 2009; Kindström et. al., 2012). Kindström et. al. (2012) proposes several strategies that can be used to visualize the PSS value. The study employs an empirical case study in the manufacturing sector involving five firms to explore which visualization strategies are most appropriate to use in different stages of the offering life-cycle (market sensing, development, sales and delivery). When visualizing the PSS value, three types of value categories can be identified; product-based, service-based, and relationship-based value. Four visualization strategies are suggested which consequently help in conveying the product, service, and relationship based values of a PSS: envisioning, association, documentation, and representation. It was found that during the sales stage, especially documentation and envisioning strategies are useful in order to effectively arouse a customers' interest and make them believe in the concept. Tacit examples that could facilitate these strategies are business cases, illustrations, communicating good examples, interactive dashboards, scenario discussions, and diagrams or graphs (Kowalkowski et. al., 2009; Kindström, 2012).

These findings are also in line with the results of Hill et. al. (2004) who suggests that visualizations that convey tangible cues and a vivid mental picture of a service's benefits lead to more favourable perceptions of the quality of the offering. This is due to the fact that visual information is processed differently than written, verbal information, resulting in better remembrance of information (Hill et. al., 2004). Moreover, visualizing the intangible values of a PSS could build up the customer's perceived value of the offering which could potentially arouse their interest and make them believe in the concept. As such, firms can build relationships and trust with their customers which should facilitate future renegotiations and secure future sales (Kowalkowski et. al., 2009; Kindström et. al., 2012).

CIMO 3: If an organization wants to integrate the customer perspective within the B2B sales process to design and assess sustainable product-service systems (C), the product-, service-, and relationship-based value of a PSS should effectively be communicated in a clear and consistent way by using documentation and envisioning as visualization strategies (Hill et. al., 2004; Kowalkowski et. al., 2009; Kindström et. al., 2012) (I) to build up the customer's perceived value and expectations of the PSS offering (M) which positively influences the customer's interest and makes them believe in the concept (O).

4.4 Usability and applicability of the tool

Bocken (2019) argues that many developed tools remain unused as they are not practically applicable. This may be due to the fact that they have not been tested empirically and therefore fail the company's needs and expectations. Also, some of these tools are considered to be too complex in terms of time commitment and number of steps in the process. Besides, many tools developed for soDy sustainable innovation objectives, remain unused as they do not include other relevant considerations of the company (Bocken, 2019). Therefore, Bocken (2019) has listed design requirements that can be used to enlarge the applicability and practicality of the tool for sustainable business model design within a company. Firstly, the tool should be iteratively developed and tested with potential users. This implies that the tool should be tested by practitioners, preferably multiple times and evaluation of this process should be done to assess the tool use and usefulness. Secondly, the tool should integrate relevant knowledge from different disciplines within the company and from customers. Thirdly, the tool should provide a transparent procedure and guidance on how others can use the tool. Fourthly, the tool should be simple and not too time-consuming. This is in line with Bertoni (2019), who states that tool design should be simple enough to be understood by team members across disciplines and roles (Bocken, 2019).

CIMO 4: If an organization wants to integrate the customer perspective within the B2B sales process to design and assess sustainable product-service systems by using a tool (C), it should include iterative development, user-testing, relevant knowledge from different disciplines, transparency, and simplicity as requirements (Bocken, 2019) (I) to ensure that all the relevant needs of the company and customers are taken into account (M) which makes the tool more desirable to use for the members of the sales team and practically applicable for the organization in general (Bocken, 2019) (O).

Conclusion design solution

After conducting the literature review and constructing the design principles, it was decided that the design solution would take the form of a tool that guides the sales process of BagFlex during the involvement of customers in order to design and assess sustainable product-service systems.

5. Results

This chapter elaborates on the results of this research. First, the product-service systems offered by BagFlex are analysed. Second, the sales process of BagFlex is described to provide an accurate understanding of the current research context. The proceeding analysis identifies the challenges and needs addressed during the interviews with the sales team. Hereafter, the iterative development of the tool with the company and customers is described. The following section discusses the steps of the final design solution. Finally, a reflection is conducted in which it is analysed whether the tool generated the formulated outcomes of the design principles.

5.1 Product-service systems for BagFlex

Currently, there are four PSS models offered by BagFlex. These models differ on the basis of the payment/ownership type and service type. These two categories both consist of two different models (payment/ownership type A and B, service type 1 and 2) which can eventually be combined into four different product-service systems of which the specifications are shown in Table 4. Also, to create a deeper understanding in how BagFlex's PSS models link to the existing theory, the table also shows how each PSS model relates to the classification according to Tukker (2004). This classification gave insight into the differences between each PSS model of BagFlex on a conceptual level. Further, the term 'Flex-Vehicles' refers to the Automated Guided Vehicles on which BagFlex operates. By offering these different modules, BagFlex is able to construct the best solution according to the needs of the customer.

Payment & Ownership Type

The type of payment/ownership the customer can choose is divided in type A and B. In payment/ownership type A 'buy Flex-Vehicles', the customer buys the fixed equipment and the Flex-Vehicles separately. Fixed equipment in this case refers to the conventional conveyor belts which are together sold with BagFlex as 'hybrid systems'. Besides, a service fee is charged depending on the service type the customer chooses which mainly involves the software that is needed to run the Flex-Vehicles. This implies that BagFlex owns the software on which the Flex-Vehicles run which enables them to update the Flex-Vehicles with the latest software. This implies that the customer obtains ownership over the fixed infrastructure and the Flex-Vehicles.

Payment/Ownership type B 'lease Flex-Vehicles' also includes buying the fixed equipment and includes a service fee. However, this service fee includes the Flex-Vehicles. This implies that not the customer, but BagFlex owns the Flex-Vehicles. Because of this shift in ownership, BagFlex is enabled to take back the Flex-Vehicles after its lifetime which enables them to refurbish, recycle, or reuse the materials. In this way, BagFlex applies a more sustainable life cycle for its products.

Service type

Service type 1 is called 'flexible system capacity' since the customer pays a certain service fee to *use* the system according to their specific needs. This implies that the maintenance and updates of the Flex-Vehicles and the software are covered by BagFlex. Also, the airport receives active involvement of BagFlex by proactive advice (for example, regarding process improvements) and by a hotline support that can be consulted in case of emergency questions. By offering a 'flexible system capacity' service, BagFlex provides a performance commitment on the reliability of the system. However, within this service model, the airport operates the system. This implies that operations and optimization improvements are not included in the contract and thus fall under the responsibility of the airport.

Within this model the flexible system capacity is emphasized since NextLevel Logistics can ensure the technical availability of the system.

In sum, this service type offers the following benefits to the customers:

- performance commitment from BagFlex
- outsourcing of maintenance of the system to BagFlex
- up-to-date software to ensure an optimal performance
- performance dashboarding (e.g. battery levels and monitoring of energy consumption)
- preventative maintenance

Service type 2 is called 'flexible operational capacity' since all operational activities are covered by BagFlex. In this case, airports only have to indicate their capacity needs and accordingly, BagFlex will deliver this capacity. Service type 2 covers more service activities in comparison with service type 1. BagFlex will maintain, operate and optimise the system, and takes responsibility for meeting capacity needs. In other words, the baggage delivery performance is specified with a focus that is aligned with airports' requirements. Also, if the requirements or capacity needs change over time, BagFlex is able to anticipate by changing the operations of the system. This guarantee is not included in service type 1.
The additional benefits for customers on top of the first service type are as follows:

- full outsourcing of the baggage handling system and operations to BagFlex
- full alignment between the airport and NextLevel Logistics on key operational values
- full responsibility from BagFlex for all process outcomes under its scope
- continuous improvements executed by BagFlex in order to enhance the quality and reliability of the system.
- continuous assessment into ways of reducing energy consumption while maintaining performance.

Table 4. Product-service systems of BagFlex

	Model 1A	Model 1B	Model 2A	Model 2B
Payment/ownership type A or B	Type A: one-off payment + **buy** Flex-Vehicles + service fee	Type B: one-off payment + **lease** Flex-Vehicles + service fee	Type A: one-off payment + **buy** Flex-Vehicles + service fee	Type B: one-off payment + **lease** Flex-Vehicles + service fee
Service type 1 or 2	Type 1: (limited) Flexible **system** capacity	Type 1: (limited) Flexible **system** capacity	Type 2: (extended) Flexible **operational** capacity	Type 2: (extended) Flexible **operational** capacity
Customer ownership	Fixed equipment + Flex-Vehicles	Fixed equipment	Fixed equipment + Flex-Vehicles	Fixed equipment
BagFlex ownership	Software	Software + Flex-Vehicles	Software	Software + Flex-Vehicles
Tukkers classification (Tukker, 2004).	Product-oriented	Use-oriented	Use-oriented	Result-oriented

5.2 Sales process

The sales process of BagFlex includes two parties: (1) the BagFlex team and (2) the NextLevel Logistics sales team. As mentioned before, BagFlex forms one part of the entire NextLevel Logistics sales process since as for now, the innovation is only sold in combination with a conveyor belt resulting in the offering of hybrid solutions. This implies that the Sales Team of NextLevel Logistics will sell BagFlex and not the BagFlex team itself. Further the sales team of NextLevel Logistics reports to the customer centres of which they are part. Within NextLevel Logistics, there are four customer centres that are established around the world: (1) EMEA (Europe, Middle East, Africa); (2) North America; (3) APAC (Asian Pacific); (4) United Kingdom.
These customer centres handle all the business activities in the given area.

As the Director of Customer Engagement of BagFlex stated:

"My responsibility is to help each of the customer centres and sales teams. As opportunities come in, I more or less consult the customer centres, I help them to push BagFlex over the edge or to give them direction on how they should sell it with the given customer. And it's unique because they actually lead the sales process from the NextLevel Logistics perspective. I'm coming in from BagFlex as one of the solutions and try to integrate that into the NextLevel Logistics process that's being done. But I have to fit what we do at BagFlex into their current process, so that's why they lead and then I just give inputs and try to support them with our solution to find those opportunities."

The sales process of BagFlex consists of three phases ending with a final Bid Presentation in which it is decided by the customer whether the solution is approved and acquired.

Phase 1. Opportunity seeking

Firstly, there will be sought a possible 'lead' which is considered an airport who may become a potential client for BagFlex. Although possible opportunities for BagFlex are predominantly considered by the BagFlex team, the members of the NextLevel Logistics Sales Team are also enabled to do this. However, information regarding possible opportunities will always flow via the sales team of NextLevel Logistics as they are eventually responsible for the contact with the customers. These activities are part of the opportunity identification phase of BagFlex. If there is indeed enough potential to start a project with a customer, the project will receive a 'green light' and the process of implementing BagFlex can officially start. This activity is called the 'Decision to Engage'.

Phase 2. Design

The following steps are part of the design phase which is focused on creating and selecting the concept solution together with the customer. During this phase, the context and requirements of the airports are first analysed and consequently multiple high level concepts are created by the Sales Engineers. As mentioned before, most airports employ the conventional conveyor belt systems for their baggage handling. Because the airport industry is considered quite rigid and conservative, it remains hard to sell an innovative solution such as BagFlex. Therefore, BagFlex is mostly offered as a hybrid system: a combination of BagFlex and the conveyor belt system. In this way, it is easier to reduce the uncertainty experienced by airports when acquiring a BagFlex system. Also, under specific circumstances, it can be more beneficial to acquire a hybrid solution instead of soDy a conveyor belt system or BagFlex system. These circumstances contain for example terminals that include both long straight distances and complex areas with limited space. Conveyor belts are more beneficial to place at long straight distances while the BagFlex system runs more efficiently in complex areas because of the mobility and scalability of the Flex-Vehicles. Consequently, by combining these systems together, advantages that can be obtained are higher efficiency and flexible capacity adjustments. After the requirements of the airports are determined, the hybrid concepts are worked out into detail. Hereafter, the best concept is selected, and finally a layout of the chosen concept is created. This ultimately results in the selection of the total system concept. After this final concept is selected, the design phase is completed.

Phase 3. Contract Detailing

The first part of the contract detailing phase consists of a number of diverse activities that are concurrently conducted. It involves the creation of the planning of activities, tender & compliance list (in which the requirements of the airport are included), a technical review of the approved concept, and the detailing of the BagFlex service contract. After these activities are completed, the expected costs are calculated which are divided in Operational Expenditures (OPEX) and Capital Expenditures (CAPEX). Especially for BagFlex this distinction is pivotal since OPEX translates into the service costs that are involved in acquiring the BagFlex solution and CAPEX involves the one-off payment for example the fixed equipment and conventional conveyor belt elements of the solution. After the costs are calculated the sales team estimates the total system value and agrees together with the customer on the value price which eventually results in the Total Costs of Ownership (TCO). Subsequently, the sales team comes up with a final agreed pricing strategy. The phase that follows focuses on the legal elements of the solution and includes the document of Terms & Conditions and a final proposal of the technical and service quotation which will be listed in the final contract. This contract is sent to the customer and elaborated on in a final Bid Presentation in which it is decided whether the customer will proceed to work with NextLevel Logistics, or still chooses for another competitor. If NextLevel Logistics is chosen, the contract gets signed and BagFlex is officially sold.

Tender Regulations

When airports make a big investment in for example the Baggage Handling Systems (BHS) above a certain amount of money, airports are required to publicly tender this. A tender contains a list of specifications and requirements that an airport has for a specific project such as the procurement of a novel BHS. The tender plays a crucial role during the sales process as the requirements in this list will determine to what extent the supplier is able to deliver a certain solution. Multiple suppliers will make an offer to the airport based on the tender, and during the Bid Presentation that was mentioned in the section of the sales process, the airport will choose the solution of the supplier that fits their tender best. This implies that the sales team of NextLevel Logistics has to compete with other suppliers by creating a solution that best fits the given tender. According to the interviews with the sales representatives, the tender is never published in the same phase of the sales process as customers can decide whenever they want to publish it.

Conservative airports draw up very detailed tender specifications that hinder innovation, while less conservative airports only specify the functionalities the solution should meet. In that sense, the former is called *'solution based'* tendering in which conservative airports draw up specifications in such a way that the solution is already more or less determined. This type of tender contains technical details that the BHS should comply with and also detailed costs specifications that are CAPEX oriented (one-time investment). In contrast, the type of tendering that less conservative airports use is called *'performance based'* tendering in which the airports leave some degree of freedom to the market to come up with their own solutions. This type of tender mostly determines the performance related requirements such as the amount of bags the system should be able to handle per hour. Thus, strict tendering regulations hinder BHS suppliers in offering innovative solutions, as the tender regulations eliminate the possibility to bring up alternative solutions such as BagFlex. In contrast, *'performance based'* tenders can be influenced during the sales process by the sales team of NextLevel Logistics. This indicates that the sales team could influence the tender to a certain extent before it is published by talking with the customer about alternative solutions such as BagFlex. Figure 12 depicts where the tender can be influenced during the sales process.

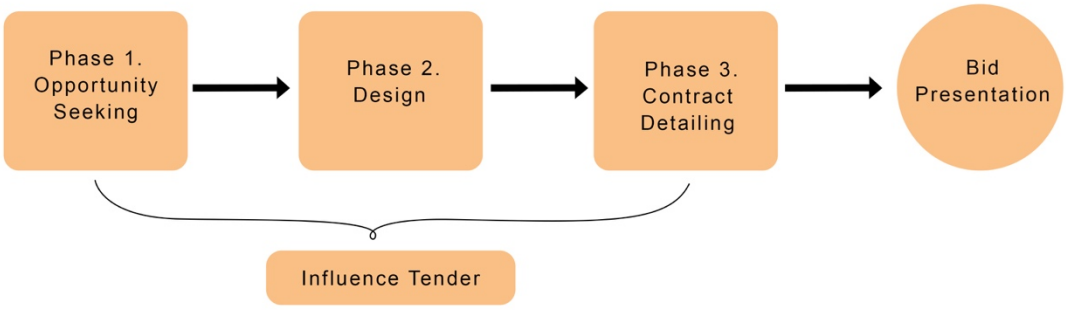


Figure 12. Sales process steps for performance based tenders

Table 5 gives a clear overview on the differences in responsibilities of the sales team and BagFlex Team. Also, the steps of the BagFlex sales process are linked to the framework of Tuli et. al., (2004). As discussed in chapter 2.3.2, this framework partly matches with the sales process of BagFlex. The 'opportunity seeking' and 'design' phase of BagFlex's sales process aligns with the requirement definition stage of the theoretical framework, as it both involves addressing the customer's current needs, such that these can be taken into account in the development of goods and services (Tuli et. al, 2007). Besides, the third phase 'contract detailing' aligns with the customization & integration phase. According to Tuli et. al. (2007), customization & integration involves designing, modifying, or selecting products that fit into a customer's environment and that work well with each other. These activities are mostly executed during the 'contract detailing' phase as the final concept of the BHS should be delivered at the end during the Bid Presentation. Table 5 shows in more detail how the steps of Tuli et. al. (2004) align with the activities of the BagFlex sales process. By analysing similarities between the sales process from practice and literature, it could be identified where the company positions itself with regards to its sales strategy. This information is necessary to understand the type of context in which the tool will operate both from an academic and practical perspective.

Table 5. Responsibilities of BagFlex and NextLevel Logistics within sales process

	Tuli et. al.(2004)	BagFlex	Sales Team
Opportunity seeking phase	Requirement Definition		Decision-to-engage
Design phase	Requirement Definition	Define BagFlex concept	Define conventional concepts
			Define total system concept
			Define requirements of customer
Contract Detailing phase (Solution Concept)	Customization & Integration	Deliver detailed service model of BagFlex system	Planning of project
			Tender & compliance list
			Technical concept approval of conventional system
Contract Detailing phase (Costs)	Customization & Integration	Calculate BagFlex OPEX	Calculate costs of the total system
		Calculate BagFlex CAPEX	Determine agreed value price (TCO)
Contract Detailing phase (Legal & Contract)	Customization & Integration	Provide BagFlex's technical and service chapters for the quotation	Provide technical and service quotation

5.3 Challenges and Needs in Sales Process

During the interviews at the company, several challenges were identified by the sales representatives. These challenges mainly concerned the difficulties that were experienced during the sales process of BagFlex. Also, the sales representatives addressed certain needs regarding the sales process that can be considered as important criteria that should be integrated in the solution. This section elaborates on an overview of the identified challenges and needs which were transformed into design requirements for the development of the design solution. The following challenges were first identified:

Reduce internal resistance to selling PSSs

As mentioned before, BagFlex is integrated in the NextLevel Logistics sales process as a possible solution. However, it was mentioned that each member of the sales team deploys different perspectives and approaches towards the customer:

"There are different kinds of salespeople and the majority of them are let's say more focused on the technical aspects. Others are more focused on the relationship and only a few are focused on the main pains and gains of the customer, which is where we as salespeople can actually be of value." - Sales Manager A

This traditional mindset of salespeople has led to a selling approach in which mainly technical and cost related aspects are discussed during sales meetings. Also, traditional minded salespeople predominantly bring up conventional solutions of NextLevel Logistics since these are considered as 'safe and proven options'. Since the conventional solutions are widely implemented, the quality of the technology and performance have already been proven towards the customer.

The customer is thus easier to convince in buying conventional solutions, and therefore the selling of these solutions is experienced as more straightforward in comparison with innovative solutions such as BagFlex.

"Everyone is very used to selling conveyors: steelwork with a price that naturally requires a completely different perspective in contrast with selling BagFlex in which the product and services are intertwined." - Sales Manager A

During the interviews, it became evident that sales representatives of NextLevel Logistics even show resistance to selling BagFlex. This is also due to a lack of supporting materials, training, knowledge, and tools regarding the selling of BagFlex. Because these are lacking, the sales representatives are not sure under what circumstances they can bring up BagFlex with the customer.
Therefore, it was addressed that the design solution should guide the sales team under which circumstances BagFlex could be considered as a possible solution for the customer.

"I think internally not everyone is convinced yet about the added value of BagFlex which probably explains why part of the team is hesitant to bring BagFlex up as a solution with the customer." - Sales Manager B

Also, since BagFlex is considered as a novel innovation of which its technology still has to be proven, only a specific type of customer would be suitable to approach for the sales team. This also contributes to the internal resistance among sales employees to sell BagFlex.

"I always tell people before they go into talking about BagFlex or try to sell BagFlex to first check whether it's the right customer. That's the most important thing. If they're not innovative, if they're not forward thinking, if they're not open to service models, don't try to convince them. Not at this stage". - Commercial Solution Manager

From this statement, it becomes evident that the guidelines for selling BagFlex are present in the organization. However, these guidelines have not yet been made explicit in the form of tacit materials of tools, and therefore stay rather vague to the sales team which leads to resistance when selling BagFlex. Therefore, by transforming the guidelines on how to sell BagFlex into a supporting tool, this resistance could potentially decrease.

<u>Compare conventional solution to PSS solution</u>
As was mentioned before, the tender process is relatively important as the requirements and specifications that the airports will list can be influenced by the sales team of NextLevel Logistics during the sales process. The sales representatives addressed the need to have some materials that could support them in convincing the customer about an alternative solution than a conveyor belt by explaining the benefits of an innovative solution such as BagFlex. Most of the tenders are traditionally focused on conventional solutions such as conveyor belts. Therefore, it should become evident what the benefits of the BagFlex solution are in comparison with a conveyor belt. Besides the BagFlex solution on its own, the benefits of a hybrid system should also be discussed since BagFlex is mostly sold in combination with a conveyor belt.

"I think that it is especially crucial that we substantiate what BagFlex offers compared to traditional solutions. That is probably about the same values where a traditional solution may score less, but we have to get that conversation out of the gut and make it explicit. So, in order to be able to sell BagFlex now, we just have to gain enthusiasm around the technology. Then we have to help the customer and ourselves to validate that intrinsic choice." - Sales Director A

Further, it was addressed that an explanation that highlights the benefits of a hybrid system also serves for educating the customer, as they are not always fully cognizant about all the benefits a new type of solution such as BagFlex could bring for them.

"Look, it's a conservative industry and people are also a bit reluctant to do something new quickly. A conveyor belt itself is a nice piece of equipment, in that sense, it's robust and very reliable, so it is not necessarily bad, only for certain operations better solutions exist. So, I certainly don't think they can fully estimate the benefits of BagFlex, but I also think it's up to us to educate. " - Sales Director B

An important benefit that is often overlooked by customers involves the flexibility benefit of the BagFlex solution. In case the capacity needs (number of handled bags) of an airport changes over time, a BagFlex system allows to add or remove some Flex-Vehicles. However, for a rigid construction as a conveyor belt this is not an option, and therefore traditionally airports have to make investments for the long term (approximately 30 years) in which the expected capacity is embedded in the system from the beginning.
Because of this, airports have to make large investments without knowing if the predicted capacity will indeed be used as predictions often deviate from reality. In that sense, BagFlex offers higher cost-effectiveness as in this case an airport only has to invest in the capacity that is needed at that moment.

"A traditional baggage handling system is not really fit for scalable growth. Eventually you can add conveyors and you can take them off, but from a process kind of view it's quite horrendous. These changes require a new tender, procurement process, and new operations. Especially for making changes in the operational environment, it's a nightmare. However, this could be prevented by a BagFlex solution which enables you as an airport to grow along with the demand you have now". - Sales Manager A

"For me, flexibility is really the basis of BagFlex. So, when you hit this topic, it can be a tipping point for the customer because this might show where we're getting better at. If you can make that clear then you have, I think, already won a lot in convincing the customer". - Sales Manager B

The benefits of flexibility, scalability, and cost effectiveness were identified important elements that should be explicated to the customer and integrated in the tool.

<u>Simplicity and efficiency in tool use</u>
It was mentioned that the meetings with customers are often organized time efficient during the sales process. Therefore, using a tool should be intuitive, simple, and time efficient. Also, it was addressed that the concentration curve of customers is likely to decrease after a certain amount of time. Therefore, it was emphasized that novel information that is given in a meeting with the customer, should not take too long.

"I think we have to make it as easy as possible for the customer because it's already a task for them to use a tool. We're asking them to do something else in their daily work. So, you have to make the tool intuitive, simple and quick to prevent irritation from happening." - Commercial Solution Manager

<u>Explore specific customer needs of PSSs</u>
The sales team of NextLevel Logistics mentioned that it is quite difficult to have a conversation with the customer that is not rooted in cost and technical related requirements. According to several sales employees, most of the customers are only used to discussing topics such as the needed investment and the options for some types of conveyor belts. However, when the customer already has some type of solution in mind (mostly the conveyor belts) it becomes difficult to bring up BagFlex as an offering. Therefore, the intention of the conversation needs to be adapted in the beginning of the sales process in order to change the direction of the solution that the customer has in mind.

It was addressed by the sales representatives that specific customer needs regarding a PSS are hard to identify. Therefore, an approach is needed which helps to identify more specific customer needs to discover the customer's openness to acquiring a PSS.

"If we only say: okay, you need to have so much of this and so much of that, we will be compared with other suppliers just based on price. First of all, that's difficult to win because we are not a cheap company. Secondly, it's also difficult to maintain a healthy profitable business if you just focus on the short term needs. For instance, we need a car, you get a car. No, what do you really need? You need to travel in style or whatever. The same actually goes with the system, so there is some underlying need that every customer has." - Sales Manager A

The following Design Requirements were listed:

Design Requirements	
DR I	Reduce internal resistance to selling PSSs
DR II	Highlight the benefits of BagFlex/hybrid system
DR III	Simplicity and efficiency in tool use
DR IV	Exploring specific customer needs of PSSs

5.4 Iterative tool development

The following section elaborates on the development process of the tool which consisted of several iterations and resulted in multiple versions. Based on the feedback from the sales team and customer representatives, the tool was simultaneously designed and revised. The first tool version was based on the insights from the sales team. The second tool version was based on the insights from the customer interviews.

First iteration

The first version of the tool was created based on the design principles and design requirements that were formulated after conducting the literature review and the interviews with the sales team of NextLevel Logistics This first version of the tool can be found in Appendix H. The first version of the tool was further co-created and tested with the sales team of NextLevel Logistics including sales engineers, sales consultants, and sales managers. Also, representatives of the BagFlex team were included such as the commercial solution manager, sustainability manager, and service consultant. The participants reviewed and walked through the tool to give feedback. The feedback from the interviews provided insights into how the tool fits the processes and goals of the company as well as the customers. Further, insights were obtained regarding the usability, applicability, and completeness of the tool. This also involved a rough design of the type of steps that the tool should consist of. The following steps were identified: step 1) assessment of the value drivers together with the customer; step 2) exploration of the customer needs; step 3) explanation of the benefits of a hybrid/BagFlex offering; step 4) design and assessment of product-service systems. At the end of this design cycle it was also suggested to add an introduction of the tool as the first step in using the tool. The insights that were gathered for each step of the tool are depicted in Table 6. The feedback of the company regarding these steps was subsequently used to create a second version of the tool which was then tested with the customer.

Table 6. Insights of testing first version of the tool

Intro	Provide more clarity towards the customer in explaining why the tool is being applied. Include a short introduction of the product-service systems. Mention what the sales team wants to achieve together with the customer.
Step 1	Align the terminology of the values that are mentioned with those of the customer: use a shared language. Include a section in the value assessment where the customer is able to add any missing values. Include a section to take notes for the customer if they have any remarks.
Step 2	Limit the amount of topics that reflect the needs of the customer in a PSS and use them as 'discussion facilitators'. Also limit the amount of detail to prevent confusion among users (both sales team and customers).
Step 3	Provide an explanation of the hybrid system by adding additional graphs and simplistic images such as pictograms. Also illustrate the conveyor belt and its characteristics so the comparison of a traditional solution versus an innovative solution is clear towards the customer.
Step 4	Don't mention all the details in the visualization of the product service systems, but visualize only those elements that are needed to make the customer understand the offering.

Second iteration

The first iteration that was made based on the insights from testing the first version of the tool resulted in the second version of the tool. This second version was subsequently used for the user-tests with the customers and can be found in Appendix I. Also during these tests, relevant feedback was gathered and consequently applied to the tool. In this way, a second iteration of the tool was made in which both the company and customer perspective were taken into account. During the customer interviews, it was asked to act as if the tool would be used in a procurement setting for a novel baggage handling system. The interview guide for these customer interviews can be found in Appendix D and the interview analysis can be found in Appendix G. The most important feedback from testing the tool with the customer are listed in Table 7.

Table 7. Insights of testing second version of the tool

Intro	Introduction was overall perceived as clear.
Step 1	- Provide tacit explanations for every criterion in the customer context. Also, overlapping criteria should be deleted.
Step 2	- Also provide tacit examples here. Overall an extensive discussion could be facilitated by the dashboard. Some headings needed to be changed in order to communicate more clearly towards the customer.
Step 3	- Include an image that depicts the difference in costs between a conveyor belt and hybrid/BagFlex system. - Next to the capacity, also list the amount of money that is required in investing in a hybrid system versus a traditional one. - Visualize the system of BagFlex and of a conventional one to make the message clearer.
Step 4	- Highlight the difference in costs between the payment/ownership models. This difference will be important in our consideration of which service model to choose. - Present the PSS models as a menu of options, in which it is emphasized that this is not the end-solution yet.

5.5 Design Solution

As mentioned before, the design solution involves a tool that integrates the customer perspective in the sales process to design and assess product-service systems. From the interviews with the sales team of NextLevel Logistics it was decided that the solution is a communication tool that should be used by the members of the sales team during the sales process of BagFlex. Also, based on the insights from interviews with the sales team and the customers, it was decided that the tool contains a number of visuals in paper or PowerPoint presentation format which facilitates especially the first introductory meetings with the customer in which there has not yet been decided on a solution. The large versions of these visuals are all depicted in Appendix J.

The following section provides insights into the specified steps of the communication tool and the integration of the design principles and design requirements: step 1) assess the value drivers together with the customer; step 2) explore the customer design needs of a PSS; step 3) explain the benefits of a hybrid/BagFlex system; step 4) design and assess product-service systems. Each step of the tool was developed according to the listed design principles and design requirements of which an overview is depicted in Table 8.

Table 8. Design Principles and Design Requirements linkage to Design Solution

Design Principles									
DP I	Customer involvement in value co-creation								
DP II	Assessing the sustainability values of customers								
DP III	Communicating the PSS values								
DP IV	Usability and applicability of the tool								
Design Requirements									
DR I	Reduce internal resistance to selling PSSs								
DR II	Highlight the benefits of BagFlex/hybrid system								
DR III	Simplicity and efficiency of tool								
DR IV	Exploring specific customer needs in PSSs								
Steps of the tool		DP I	DP II	DP III	DP IV	DR I	DR II	DR III	DR IV
Intro	Introduction to the tool being used	✔			✔	✔			
Step 1	Assess the value drivers with the customer	✔	✔						
Step 2	Exploring customer needs			✔		✔		✔	✔
Step 3	Explain the benefits of a hybrid/BagFlex offering			✔			✔		
Step 4	Design and assess product-service systems	✔		✔				✔	

Introduce the goal & use of the tool

The tool starts with an introduction that is used towards the sales team of NextLevel Logistics, and can optionally be used towards the customer to explain why the tool is being used and what the goal of its use is. It includes: an introduction to PSSs and the benefits they can bring; the goals of the tool; the process steps in a few words. Further, the introduction step covers design principle I and IV. DP I 'Customer involvement in value creation' is part of the introduction as it tends to explain why customer involvement will be important in the sales process of PSSs. In that sense, the introduction creates awareness among the sales team to actively involve the customer. DP IV 'Usability and applicability of the tool' is part of the manual that gives the sales team guidance in how and when the tool should be used. This in turn increases the usability and applicability of the tool. Further, this step also addresses design requirement I, since this introduction will provide the sales team with guidance during the sales process of PSSs.

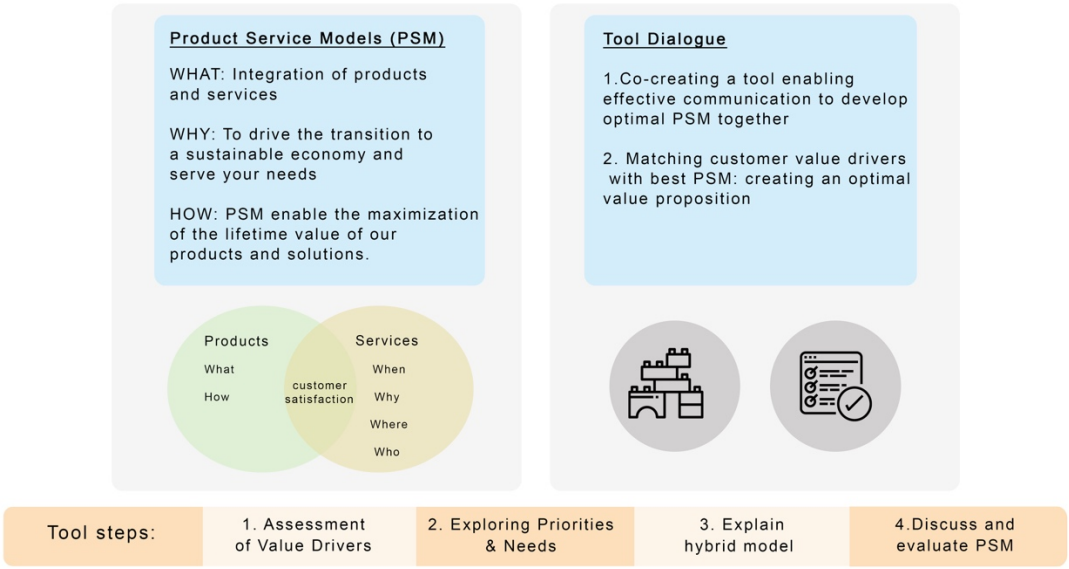


Figure 13. Introduction of tool

Step 1: Assessing the customer's value drivers

After the introduction, the first step of the tool is to assess the value drivers of the customer by using a scoring card method. In this step, the goal is to determine what the high-level strategy of the customer is and how this strategy is divided over a selection of key values. For each key value, several criteria are listed which should be assessed by the customer. These criteria were formed during an iterative process in which input was gathered from the sales team and the customers. The iterative process of the adjustments on the criteria list can be found in step 1 of Appendix H, I, and J. Based on the interviews, three key values were eventually identified that were found relevant for both the company as well as for the customer: (1) Corporate Responsibility, (2) Profitable Growth, (3) Operational Excellence. For each key value, a set of criteria was formulated. Besides, a supporting list was created for the sales team in which each criterion contains a description and tacit example for BagFlex. This list could be used when filling in the scorecard with the customer and is depicted in Appendix K. The total final list consists of eleven criteria. The explanations for each criterion are depicted in Table 9. The following section elaborates on the key values and criteria list.

Table 9. Key values and criteria

Key values	Criteria	Explanation
Corporate responsibility	Energy usage	The amount of energy used to run the whole baggage handling system
	Material usage	The extent to which materials of the baggage handling systems are optimal utilized.
	Employee health and safety	Providing a work environment in which the well-being, safety and health of employees is guaranteed.
	Openness & trust in stakeholder relationships	Working peacefully together in a complex network of stakeholders including unions, police, local and global governments, airlines, handlers, etc.
Profitable Growth	Total Costs of Ownership	The total costs of the baggage handling system for the customer and the predictability of what amount has to be paid next semester.
	Scalable Growth	The predicted growth for an airport is uncertain and can vary heavily from year to year.
	Optimized space utilization	Increase the profit per square meter by limiting the space of non-profitable systems and increase the space for profit generators.
Operational Excellence	Operational performance	The daily operations: how the operations can be measured in terms of capacity of handled bags per hour, number of mishandled bags per hour, and availability of the system.
	Resilience of operation	Extent to which unexpected interruptions to critical operations can be solved or handled on the spot.
	Flexibility to adapt to functional future changes	Being able to deal with changing demands to operational processes that occur over the long term.
	Process optimization	Consistently improving operations over time and reducing waste in operational processes.

The key values identified in the assessment list align with those used in literature. The first key value is 'corporate responsibility' which incorporates the sustainability values regarding planet and people related criteria. The content of this key value also aligns with the literature on PSS assessment (Bertoni, 2019; Kim et. al., 2015). The first criterion is 'energy usage' which explores whether an airport finds it important to reduce the amount of energy that the baggage handling system utilizes. The second criterion 'material usage' includes the optimization in usage of materials by recycling, refurbishing, or reusing them. These two criteria are also employed in the PSS of BagFlex as the Flex-Vehicles use electric energy which reduces the CO2 footprint and, in case the company stays in ownership, the design is returned to NextLevel Logistics for refurbishment or recycling which contributes to circular material usage. The third criterion is 'employee health and safety' which refers to the well-being of the employees that work with the baggage handling system such as the operators and handlers. The implementation of a novel system such as BagFlex could have direct consequences in the working conditions for employees working in the baggage handling area at the airport.

BagFlex could potentially improve working conditions since continuous improvements on the system could result in higher work efficiency. Lastly, the criterion 'openness & trust in stakeholder relationships' was included which refers to the complex environment in which an airport operates. The procurement of a baggage handling system often affects a wider range of stakeholders such as the airlines, unions, governments, and handlers. For instance, the implementation of a new system could affect the relationships with the airlines and handlers. Therefore, a peaceful and harmonious collaboration with all of these parties might be prioritized by the customer.

In literature, sustainability incorporates the 3P perspective which refers to people, planet, profit (Bocken, et. al., 2019). However, during the interviews it was addressed that the relevance of profit as part of sustainability is quite difficult for customers to assess. Rather, profit could be taken as a key value on its own since it was identified as an important value driver for the customer. Therefore, the second key value is 'profitable growth' and includes criteria that assess to what extent a customer is focused on certain aspects that potentially could increase their profit. The first criterion is 'Total Cost of Ownership' (TCO) which explains to what extent the customer is focused on the predictability of the total costs instead of the immediate investments needed to purchase a baggage handling system. TCO includes both the operational expenses such as a service fee and the capital related expenses such as a one-time investment. Customers with limited budgets tend to prioritize TCO the most as this is a good indicator of the predictability of the costs. The rest of the criteria focus on aspects that tend to influence profitable growth in the long term. The criterion 'scalable growth' considers that the growth of an airport is often uncertain and unpredictable. Since this growth can vary heavily from year to year, scalable growth is considered as an important means that allows an airport to grow accordingly along with the eventual fluctuations. In this way, the airport is able to save costs on investments for unnecessary capacity. The last criterion 'optimized space utilization' takes into account that unutilized space within an airport comes down to missed opportunities to make profit. By limiting the space of non-profitable systems, more space can be made available for other profitable operations. This is also applicable to BagFlex since Flex-Vehicles that are not being used could be stored space efficiently.

The third key value is operational excellence, which in literature relates to the product/service quality (Bertoni, 2019). During the interviews with the customers, it was discovered what specific operational criteria are considered within the procurement of a baggage handling system. The first criterion includes operational performance which considers the day-to-day operations of the baggage handling system. It includes a specified performance commitment of the supplier in which operations can be measured in terms of capacity of handled bags per hour.
The next criterion is 'resilience of operation' and relates to what extent unexpected events can be solved or handled on the spot. For instance, in case some technical difficulties occur and some part of the baggage handling system cannot function, an airport should have a backup system ready that is able to cover some part of the operations. Therefore, airports have to invest in a redundant system that can be used in these types of situations. However, the amount of redundancy that an airport takes into account differs since an airport can choose to cover for the whole operation, or only one part. The third criterion is 'flexibility to adapt to future functional changes'. This involves the ability of an airport to deal with changing demands to operational processes that occur over time. For example, screening machines for bags are integrated in the conventional conveyor belts. However, it occurs that these screening machines have to be replaced from time to time due to new regulations. If this is the case, the whole conveyor belt needs to be disassembled because of its fixed and rigid infrastructure. This leads to interruptions in the baggage handling operations. BagFlex allows for more flexibility as the Flex-Vehicles are not fixed and easy to move around.
The last criterion is 'process optimization' which refers to the trend of airports who are increasingly looking into digitization such as big data in order to optimize processes to further improve operational excellence.

BagFlex employs process optimization by using advanced software to upgrade functionalities of the system. These enhancements improve quality at a system, maintenance, and operational level.

During the first step of the assessment, the customer will provide a score on each criterion by using a 5-point scale. This method was selected since this scale was considered as engaging and intuitive to the minds of participants during the user-tests. Besides, a 5-point scale has also been employed in existing PSS assessment tools and studies since this scale makes the assessment simple and understandable for decision makers (Kim et. al., 2015; Chou et. al., 2015). During the second step of the assessment the customer is asked to select the top three criteria per aspect and rank them accordingly. In this way, it becomes evident what criteria are prioritized by the customer. This exercise results in a scorecard in which the customer reflects on their strategy regarding the procurement of a BHS.
Step one covers design principle I and II. DP I 'Customer involvement in value co-creation' is included as this step requires the customer to map their value drivers together with the supplier. This creates a clear overview of the customer values both for the supplier and the customer.
DP II 'Assessing the sustainability values of customers' is included since during step 1 it is evaluated how the sustainability values of the customer are assessed together with profitable growth and operational excellence. In this way, the sales team will gain some insight about the high-level strategy of the customer in the procurement of a baggage handling system.

Figure 14. Step 1: Assess the customer key values

Step 2. Exploring customers' design needs for PSSs

After the customer has filled in the scoring card which reflects their high-level strategy, step 2 goes more into depth by exploring the customer needs regarding a PSS. The goal of this step is to discover the extent to which a customer would be open to implement a particular type of PSS. During this step, the customer is presented with a dashboard in which various characteristics of the PSS are listed in the form of an axis. The customer is asked to place the button on the axis according to their needs. Consequently, a discussion is facilitated in which the customer can express their perspective on the listed characteristics.

The following elements were included in the dashboard:

1) **Out-sourcing of service vs. In-sourcing of service**. These characteristics discuss to what extent the customer wants to outsource their service activities or operate their own service activities. Since the service is integrated in a PSS, this would fit an out-sourcing focus of the customer. This is the most general characteristic as it explores whether a customer is actually open to a PSS.
2) **OPEX focus vs. CAPEX focus.** This characteristic entails whether the customer has more OPEX or CAPEX budget available. CAPEX budget refers to paying a higher amount of money as a one-time investment.
   OPEX budget refers to operational expenses in which the costs are divided and build up over a certain amount of time. This type of budget includes the service fee that the PSS of BagFlex employs. Reflecting on the PSS models of BagFlex, the model in which the Flex-Vehicles are bought increases the CAPEX expenditures while the model in which the Flex-Vehicles are leased increases the OPEX expenditures.
3) **Pay for the result vs. Pay for the use**. When a customer chooses for 'pay for the result', it is specified what the result of a BHS should bring and subsequently the customer only has to pay for this result. In that case, all activities that have to be conducted to achieve that result will be all covered by the supplier. When a customer chooses for 'pay for the use', the customer pays only for the technical availability of the BHS. This implies that the supplier will make the BHS available for its use by the customer. However, the customer should operate this system by themselves and result driven goals are not covered by the supplier. In this case, 'pay for the results' refers to BagFlex's service model 'flexible operational capacity' and 'pay for the use' refers to the service model 'flexible system capacity'.
4) **Adaptability vs. fixed scenario.** This involves the extent to which the customer wishes to have the flexibility to adapt their activities and operations regarding the BHS according to unforeseen events that may influence requirements. In this case, the customer makes a higher investment to prepare for unforeseen events in the future. This means that the customer has the certainty of being able to adapt to these events. Another option is a fixed scenario in which the customer assumes that no unforeseen events will take place and therefore will not incorporate the possibility to adapt to changes in the budget. Therefore, only incorporating a fixed scenario requires a lower investment. In the case of a fixed scenario, the customer predicts the long term capacity a baggage system should cover and makes this investment already in the first year. This strategy relates to BagFlex's service model 'flexible system capacity' in which the customer has the option to minimize the adaptations in capacity. In the case of adaptability, the customer does not predict the capacity over a longer period and only invests in the capacity that is needed at that moment. When the demand changes, the customer has the possibility to increase or decrease capacity which relates to the BagFlex's service model 'flexible operational capacity'.

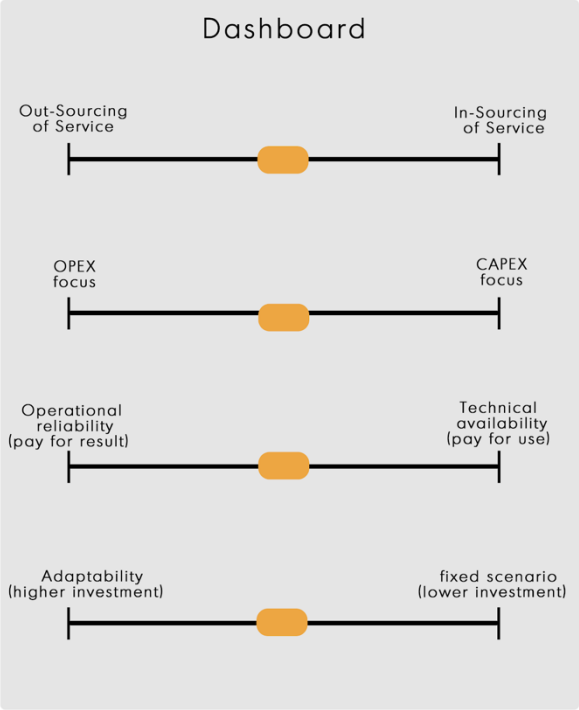


Figure 15. Step 2: Explore design customer needs for PSS

After the dashboard is assessed, it should become clear which characteristics of the PSS are preferred by the customer. The dashboard allows the sales team to discover together with the customer how a certain PSS offer could look like and which characteristics could be included.
This step includes design principle III 'Communicating the PSS values' By discussing and evaluating multiple aspects of servitization, this dashboard helps in increasing the customer understanding of a PSS which supports the creation of an offer that fits customer preferences. Value-based selling is employed since product specific solutions are not yet discussed and an open discussion is facilitated in which customer needs are thoroughly explored. Further, design requirements I, III and IV are included. DR I 'Reduce internal resistance to selling PSSs' is included since this dashboard helps especially in bringing up the most relevant topics of a PSS in a sales conversation with the customer. This should guide the sales team in finding the relevant discussion points with the customer regarding a PSS. DR III 'Simplicity and efficiency of tool' is incorporated as this dashboard only incorporates a few characteristics to keep it simple. DR IV 'Exploring customers specific needs' is included as this dashboard transforms customers' needs into a tacit visualization that can be used to gain insights on creating a suitable offer for the customer.

Step 3. Explain the benefits of hybrid/BagFlex system

The third step explains the benefits of a hybrid system in comparison with a conventional system. The goal of this step is that the sales team can use these visualizations to first explain to the customer under which circumstances an innovative solution that employs a PSS is more beneficial than a conveyor belt. Multiple visualizations are depicted on the slide. The visualisations explain a scenario in which a customer can choose for a conventional system or hybrid system. When selecting a conventional system, a customer needs to make investments in infrastructure for redundancy, extra capacity and future flexibility. However, for customers that expect future changes, it is unsure whether these investments will be justified in the long term. This indicates that investments for a baggage handling system being made in the beginning might be unnecessary.

If a customer selects a hybrid solution, the BagFlex component offers flexibility which implies that Flex-Vehicles can be added or removed depending on the change in capacity. By providing this scalability and adaptability, it is not needed for a customer to make immediate future investments. Instead, BagFlex enables customers to only invest in actual capacity demands. Money that is saved can be used for other purposes that a customer finds relevant. These benefits of cost-effectiveness and flexibility are important elements to convince the customer to select a hybrid solution instead of a conventional one. Moreover, an example from a business case is illustrated to underpin the aforementioned benefits. This step includes design principle III: 'Communicating the PSS value.' as an explanation of the benefits and values of a hybrid system will increase the customer understanding in the reasons to implement a PSS. Next, DR II 'Highlight the benefits of hybrid/BagFlex system' aligns with step 3. By using visualizations that show under which circumstances a conventional solution might be less cost-effective and flexible, the customer can be convinced so that BagFlex becomes a possible solution.

Figure 16. Step 3: Introduce hybrid systems – was confidential

Step 4. Design and assess product-service systems

In this last step, the product-service systems are presented in the form of different modules. The modules are aligned with the two categories of service type and payment/ownership type discussed in section 5.1. In this way, the supplier and the customer are enabled to discuss the insights that were obtained during the previous steps to create a suitable PSS offering.

The service types include 'flexible operational capacity' and 'flexible service capacity' and illustrate what different services a customer could expect when selecting one of the models. The payment/ownership types include 'buy Flex-Vehicles' and 'lease Flex-Vehicles' which show how the costs in both types would differ for the customer. For example, 'buy Flex-Vehicles' would involve a higher CAPEX budget and 'lease Flex-Vehicles' a higher OPEX budget. The customer has thus the option to select a combination of the modules according to their needs, or the supplier gives some advice based on the values and needs identified in the previous steps. The goal of this step is to co-create the best solution offering together with the customer.

In these results, it was found that depending on the type of airport, it differed what criteria were prioritized and consequently, what type of PSS would best apply. Especially the size of an airport played an important role in how the criteria were assessed. The size of an airport determined the difference in scale of operations, budget, and overall strategy which affected the type of PSS that eventually was selected. For example, Aiport A would apply the result-oriented PSS model (2B) since this airport already employs multiple outsourcing activities. Also, because of implications due to the scale of operations, the key value operational excellence was especially prioritized. In contrast, smaller airports such as Airport B prioritized profitable growth more as these types of airports possessed over smaller budgets which led to a more conservative approach in their procurement strategy. Also, because of the small scale of Airport B, a deviation from a future scenario would not have a big impact on their operations and therefore, paying a higher amount of service fee was not considered to be necessary. This involved the preference of staying in control of operations. Therefore, Airport B selected a product-oriented PSS (1A).

This step includes design principles I, and III. DP I 'Customer involvement in value co-creation' is included as this step allows for co-creating a PSS offering based on the identified values and needs of the customer. Especially during this step, the PSS offering can be designed according to the customer needs. DP III 'Communicating the PSS value' is included since the visuals used in this step elaborate on the services and costs that are involved in each offering. By elaborating on these topics, the customer's understanding in a PSS increases. Further, design requirement III is included: 'Simplicity and efficiency of tool'. The visualizations were made as simple and minimalistic as possible on purpose. This was done since this step does not require a detailed explanation about exact numbers of the offering, rather it enables a high level understanding of the offering that would fit the customer.

The simplistic communication of the visuals was achieved by using a pictogram illustration style.

Figure 17. Step 4: Discuss product-service systems – was confidential

5.6 Evaluation & Validation

To evaluate the usability of the tool, an internal validation session was organized in which both sales representatives from NextLevel Logistics and employees from BagFlex participated. The session took the form of a scenario play as the participants played the role of an airport or sales representative and used the tool according to their own interpretation and expectations. The scenario play was recorded and transcribed to accordingly analyse the data. During this session, it was explored what the added value of the tool was and how it should be used in practice. Moreover, the formulated outcomes and added value of the tool were explored and validated during the customer interviews. The following section elaborates on the outcomes of the tool by reflecting on the design principles based on the results from the validation session and from the customer interviews. Lastly, additional insights and findings that were found during these interviews are discussed.

5.6.1 Reflection on design principles

A reflection on the design principles is conducted to analyse whether the interventions generated the formulated outcomes during the interviews with the company and customers.

The same context (C) applies to all CIMO's, therefore this part is left out in each design principle.
Context (C): The organization wants to integrate the customer perspective within the B2B sales process to design and assess sustainable product-service systems.

Customer Involvement in value creation

CIMO 1: The organization should employ co-creation principles such as active customer involvement in which the customer has the opportunity to customize the PSS offering (I) to facilitate the process of value creation in which the customer is enabled to extract the desired value as per their requirements in the offering (M) which leads to improved customer satisfaction and stronger customer relations on the long-term (O).

Design principle 1 was validated by asking the customers how they would consider their relationship with NextLevel Logistics if a sales conversation was supported with the tool. It was addressed by multiple customer representatives that the tool would help in establishing stronger partnerships and collaborations with NextLevel Logistics.

"This tool is an example that NextLevel Logistics is not a short-term thinker. We appreciate it when you think of us as real partners, so a partner for the long-term and not for short-term selling. With this tool, you really take us by the hand in the process of deciding on a solution." - Strategy & Operations Manager, Airport B

However, it should be noted that the timespan of the project was too short to measure an actual increase of customer satisfaction on the long term. Further, the contrast between the traditional sales approach of NextLevel Logistics and the value-based sales approach of the tool was pointed out. This indicates that some customers would prefer to experience a value-based sales approach when it comes to procuring a novel baggage handling system.

"I remember from the past that we missed this approach in the first baggage hall. That thinking along a bit. NextLevel Logistics simply said: "we are a store, we only offer this." So, I think it would be good for NextLevel Logistics to take a different approach there." - Innovation Manager, Airport C

Assessing the sustainability values of customers

CIMO 2: The organization should adopt a MCDM approach that integrates traditional and sustainability related value criteria (I) in order to analyse sustainable and traditional value trade-offs (M) to raise awareness on opportunities and challenges for the next iterations in PSS design (O).

By assessing the criteria for the value categories corporate responsibility, profitable growth, and operational excellence, it was discovered how different customers would prioritize these in the procurement of a novel baggage handling system. Once the sales team understood how customers assessed these PSS related criteria, it became more feasible to suggest a PSS solution that better fitted those needs. In this way, more effective decision-making in PSS design was facilitated. It was addressed multiple times that assessing the criteria would help in steering the discussion the right way in order to offer a suitable PSS for that customer.

"This criteria list would help to steer the discussion into the area where we would like to be in. So, for example, if you are talking about energy usage, normally you talk about customer specifications of certain drives for the system. But that request comes from somewhere. So, the fact that our customer wants to buy an energy efficient system probably comes from environmental care that is high on their agenda. This map would help to identify those needs." - Sales Manager A

Thus, assessing the PSS gave the sales team some input on the customer perspective that led to new insights on adjusting the design of the PSS offering. In this way, the PSS design could be refined.

Communicating the PSS values

CIMO 3: The product-, service-, and relationship-based value of a PSS should effectively be communicated in a clear and consistent way by using one or more visualization strategies (I) to build up the customer's perceived value and expectations of the PSS offering (M) which positively influences the customer's interest and makes them believe in the concept (O).

A dashboard which allows the customer to express their thoughts and needs on a PSS, and visuals that explain the characteristics and differences between various PSS types were employed as visualization strategies to increase a customer's understanding. During the user-tests, it was also confirmed that customer representatives could better understand the value of a PSS in relation to their own operations.

"For me, it became much clearer that the scale of your baggage operation affects the scale of your whole installation and therefore, how convenient a product-service model could be." - Financial manager, Airport B

However, it was expressed by some customers that by explicitly bringing up the PSS during the same session, it could be perceived as if NextLevel Logistics is pushing their solution to them. Consequently, the customer's interest in a PSS could decrease.

"You have to dig into what we as a customer really want and sell that instead of pushing either Option A or B immediately. You can make us understand the value, but at the same time it can feel as if we are forced into a solution." - Former COO Airport A

Therefore, it was suggested that the last step of the tool (discuss PSS offerings) should be performed during a second session with the customer to prevent a decrease in interest. In this way, the customer would have some time after the first meeting to absorb the information from the first steps of the tool.

Usability and applicability of the tool

CIMO 4: The organization should include iterative development, user-testing, relevant knowledge from different disciplines, transparency, and simplicity as requirements (I) to ensure that all the relevant needs of the company and customers are taken into account (M) which makes the tool more desirable to use for the members of the sales team and practically applicable for the organization in general (Bocken, 2019) (O).

This principle was included by conducting multiple tests with representatives from the company and the customer. During the user-tests it was explored what relevant considerations should be included in the tool. This has led for instance to adjustments in the criteria list. Also, multiple iterations were applied on the visualizations and the information provided on these visuals. Further, the practical applicability of the tool was validated with the company and customers. It was suggested that the tool would be useful in the beginning of the buying process in which the customer has not yet decided on a specific solution. During this stage, introductory meetings take place in which the customer's vision on the desired solution could still be influenced. More specifically, a workshop setting was suggested as the suitable meeting style that would fit the use of the tool. During a workshop, there would be enough time to go through all the steps of the tool. With respect to the current sales process of BagFlex, the tool could thus best be used during phase 1 (opportunity seeking) and phase 2 (design) to ensure it is applied correctly.

"Just consider the intake talks, even though you don't have to sell something, but that you just sit around the table with customers periodically with this tool to ask: "How are you?" - Innovation Manager Airport C

Besides, to increase applicability, it was addressed what types of representatives from the customer side, this tool should be used with. According to the customer representatives, the tool should be used in the presence of a combination of representatives from e.g. operations, assets, and finance departments to obtain a clear and accurate overview of an airport's value drivers and considerations in a procurement process.

5.6.2 Additional insights

Next to the outcomes of the design principles, some additional insights in using the tool were discovered.

Firstly, it was mentioned that the tool could help NextLevel Logistics to distinguish itself from the competition by employing a different sales approach. NextLevel Logistics positions itself as a premium company that maintains higher prices. However, this strategy also requires a sales approach in which the customer is considered more as a strategic partner. It was addressed that by using the tool, the focus of the sales approach would shift from technical to more strategic which is considered a distinctive capability in comparison with the competitors.

"Eventually what you see is that as long as you focus on the technical and cost related part of the market, it will be difficult to be competitive only on that. I think this tool also helps to steer the discussion towards areas in which we outperform most of the competition." - Sales Manager A

In that sense, the tool would fit the long term strategy of the company.

"I think this tool resembles the way where we are going as a company. Where we become true partners of our customers and really help them in developing the baggage system." Sales Manager B

This competitive advantage was also recognized by a customer.

"I think the tool enables NextLevel Logistics to show the expertise they have and the way they can think along with the customer. That's important because a customer has to recognise the professionality of an organisation like NextLevel Logistics. So, this tool could help NextLevel Logistics to gain the confidence of a customer based on the proficiency that they have thought through the business model of the customer." - Former COO Airport A

In addition, it was mentioned that the tool could help in influencing the tender process in which the customer ultimately draws up the system specifications. The sales representatives mentioned that based on the scoring of the criteria, they would be able to give the customer some ideas on how they would solve a certain baggage handling requirement eventually. Especially when the scoring would show that a traditional conveyor belt would not be the best solution for that customer, new innovative solutions such as BagFlex will then be more relevant to bring to the table.

"I think one of the biggest hurdles that we have to overcome as an industry is okay, how do we get beyond that standard way of tendering and describing in a very detailed way how the system should look like. So, this tool could for sure help to have this discussion with the customer to change the perspective on the tender requirements." Sales Manager A

Further, an important discussion topic during the validation session was the type of customer this tool should be used with. Especially for step one of the tool (assessing the customer's value drivers) some contradiction emerged. Some sales representatives argued that the tool should be used with soDy new customers accounts as the customer's value drivers would then still be unknown. According to them, existing customer accounts who have an established relationship with NextLevel Logistics would expect that their values are already known. Other sales representatives argued that assessing the value drivers of existing customers accounts would also be of value. Eventually, all the participants agreed that the tool should be used with new and existing customers.

"I think also with existing customer accounts, our NextLevel Logistics colleagues and the customer even can learn a lot from these very open questions, which normally, we don't really ask. Customers that we already know can be approached in a different way. You can present it like: it's nice to see you again, it's been a while. We just want to understand you still align with our thoughts on where you are going." - Commercial solution manager

Moreover, it was mentioned that the tool could also be used internally to communicate the benefits and unique selling points of BagFlex to the sales team. Especially to the members of the sales team who are not yet convinced on the benefits of BagFlex and therefore show resistance to selling it.

"If you walked the sales representative through the answers of the customer that was given in the tool and explain to him like: this customer is so willing to go innovative, is so willing to see the value of sustainability and you can sell this for so much more money. In that way, the tool might help to get buy-in quicker internally." – Director of Customer Engagement

To conclude, all the outcomes of the design principles were mostly generated by the design solution. Also, the additional insights confirmed the added value of the tool. The tool could be further improved to fully support the design principles and to solve the issues that were addressed during the interviews. Recommendations on further improvements of the tool will be discussed in section 6.2.3 limitations & future research.

6. Conclusion and Discussion

In this chapter, conclusions are drawn that summarize the answers to the research questions. Next, the results of the research are reflected upon by discussing the theoretical implications, practical implications, limitations of the study, and the related future research options.

6.1 Conclusion

This study employed an empirical case study conducted at BagFlex to answer the main research question: "*How to integrate the customer perspective into the sales process in business-to-business markets to design and assess sustainable product-service systems?".*
Three research sub-questions have been formulated that collectively provide an answer to the main research question.

1. *How does the sales process of product-service systems look like for the company?*

First, the different product-service systems of BagFlex were analysed. In total, four product-service systems are offered by BagFlex which differ in service type and payment/ownership type.
According to their characteristics, the PSSs of BagFlex were also assigned to the PSS classification by Tukker (2004). This resulted in the identification of one product-oriented PSS, two use-oriented PSSs, and one result-oriented PSS. Also, the level of circularity and sustainability differed for these types of PSSs since Flex-Vehicles can only be taken back for recycling, refurbishing, or reuse in the use and result-oriented PSSs. By describing the PSSs that BagFlex offers, a better understanding was created of how these models could be presented during the sales process towards the customer in the tool. Second, the sales process of BagFlex was analysed. The sales process of BagFlex involved three phases: 1) *opportunity seeking* in which potential customers for BagFlex are sought, 2) *design* in which the concepts of the PSS offering are worked out, and 3) *contract detailing* in which elements such as planning, pricing and technical details of the offering are determined. The final offering is presented during the Bid Presentation in which the customer decides on whether to proceed to work with NextLevel Logistics. Besides, insights from practice were analysed from an academic perspective. It was found that the *opportunity seeking* and *design* phase aligned with the *requirement definition* phase and the *contract detailing* with the *customization & integration* phase of Tuli et. al. (2007). By analysing similarities between the sales process from practice and literature, it could be identified where the company positioned itself with regards to its sales strategy. This information was necessary to understand the type of context in which the tool would operate both from an academic and practical perspective.

2. *What relevant challenges and needs should be included to create a design solution according to the company's and customer perspective?*

First, to identify relevant challenges and needs regarding BagFlex's sales process, interviews with the sales team of NextLevel Logistics were conducted. During the interviews, the sales employees expressed the need to reduce internal resistance to selling BagFlex, which is due to BagFlex's novel technology and business model. Further, sales employees pointed out the need to compare the BagFlex solution or hybrid solution with conventional conveyor belts in order to convince a customer of the benefits. Moreover, sales employees addressed the challenge of identifying specific customer needs regarding a product-service system. Besides, the need for simplicity and time-efficiency in using the tool was emphasized. Second, the customer perspective was analysed by gathering the relevant needs regarding the use of the tool. During the user-tests, customers mostly expressed their needs on the PSS assessment criteria. The needs of the customers regarding the procurement of a BHS resulted in the formulation of three key values: corporate responsibility, operational excellence, and profitable growth.

Depending on the type of airport, it differed what needs were prioritized and consequently, what type of PSS would best apply. Especially the size of an airport played an important role in how the needs differed. For instance, a large airport prioritized operational excellence more as the impact of any disruptions would be higher in comparison with smaller airports. Therefore, it is more beneficial for larger airports to outsource more activities in order to spread the risk. In contrast, smaller airports prioritized profitable growth more as these types of airports possessed over smaller budgets which led to a more conservative approach in their procurement strategy. Moreover, feedback was given on the steps of the tool. Several customers addressed the need to include a comparison of general cost structures between BagFlex and a conventional solution. Also, it was suggested that BagFlex and a conventional system should be visualized to make the message clearer.

3. *How to integrate the customer perspective into the B2B sales process in the case of BagFlex?*

To provide an answer to the last sub-question, a design solution was created which takes the form of a tool consisting out of a number of visuals in paper format that can be used during the sales process of BagFlex by the sales representatives and the customer. During the sales process, the sales representatives use this tool interactively with the customer in which four steps are performed to eventually come to a suitable PSS offering which fits the identified value drivers and needs of the customer. The first step involves a scoring card in which the customer's value drivers are assessed by evaluating 11 criteria categorized in 3 key values. The second step involves the exploration of customer design needs regarding the PSS of a BHS in the form of a dashboard design. During the third step, the benefits of a hybrid and BagFlex system are explained to the customer, supported by various graphs and visuals. Finally, the fourth step presents the service and payment/ownership modules in which the customer and sales team together create a PSS offering. Regarding the use of the tool it was suggested that it should be used in the early stage of the buying process as during this stage, the customer's vision on the desired solution can still be influenced. The type of meetings in which the tool could be used were identified as introductory meetings and workshops. It was addressed by multiple sales and customer representatives that the tool allows for potentially building stronger customers relationships by the facilitation of dialogues in which customer needs are more thoroughly explored. Moreover, it was confirmed that by assessing the customer's values and criteria, the tool supported the creation of better customer solutions.

6.2 Discussion

The discussion section elaborates first on the theoretical implications. Thereafter, the practical implications are discussed. Lastly, the limitations of the study and ideas for future research will be explicated.

6.2.1 Theoretical Implications

This study contributes to the literature with the insights that came forward from the testing of design principles. This implies that existing knowledge from theory is complemented with empirical findings. By doing so, this research contributes to the literature in the fields of PSS assessment, value-based selling, and co-creation.

First, this study makes a contribution to the literature on PSS assessment. The proposed PSS assessment scheme provides an integrated knowledge base from theory and practice and was employed as an intervention to test improved decision making in PSS design. The assessment scheme included both the provider and customer perspective and consists out of three value categories including corporate responsibility, operational excellence, and profitable growth. In that sense, sustainability as well as traditional related values are integrated in the assessment.

This is in line with Bertoni (2019) who states that sustainability requirements should not be evaluated in isolation during PSS design, rather they should be assessed together with other customer value- and performance-related attributes. From the user-tests it appeared that the assessment of these different value criteria gave the sales team some input on the customer perspective that led to new insights on adjusting the design of the PSS offering. In this way, the PSS design could be refined. For instance, it was found that especially the size of an airport played an important role in how the criteria were assessed and consequently what PSS was selected. Due to the scale of operations, Airport A already employs various outsourcing activities which led to the selection of the result-oriented PSS. On the other hand, smaller airports such as Aiport B preferred to have more control over all operations and therefore selected a product-oriented PSS. Based on these insights, the PSS design could be further refined.

Further, the developed assessment scheme is predominantly covered by current literature on PSS assessment. For instance, the key value corporate responsibility resonates with the sustainability values of previous studies on PSS assessment (Bertoni, 2019; Tseng et. al., 2019; Kim et. al., 2015). Also, profitable growth aligns with existing studies who refer to this aspect as profit (Kim et. al., 2015), or business uncertainty and risk (Bertoni, 2019). This implies that these key values can be considered as relevant in PSS assessment across multiple sectors in the B2B market since previous studies have been conducted in other areas such as the automobile, aerospace, and telecommunications sector (Kim et. al., 2015; Bertoni et. al., 2019). One important difference with current literature involved the findings on the third key value: operational excellence. In literature, this value relates to product and service quality. Corresponding criteria in literature include aspects such as durability, reliability, and performance of the product quality. For the service quality, aspects such as tangibles, responsiveness, and assurance of the service are included (Kim et. al., 2015; Bertoni, 2019; Tseng et. al., 2019). However, for this study, these criteria remained quite general and could not be applied to the context of the baggage handling industry. Therefore, this research proposes a specific set of criteria related to operational excellence which are considered within the procurement of a baggage handling system by the provider and its customers. Since no research regarding PSS assessment in this specific sector in the B2B market has yet been conducted, this list adds to the existing literature on PSS assessment. Moreover, most studies have focused on PSS assessment in early stage decision making in the PSS design process (Bertoni, 2019; Tseng et. al., 2019; Mourtzis et. al., 2016). In contrast, this study covers the late stage in PSS design by balancing the company and customer value perspectives in the sales phase. Because of this late stage sales perspective, the assessment scheme of this study is less extensive with 11 criteria in comparison with assessment schemes of previous studies. However, the proposed scheme does capture the most prioritized values that are considered from a customer perspective in the PSS sales process. Therefore, due to the simplicity of this assessment scheme, it can best be applied for efficient interactions and communications between a company and its customers.

Next, by including the customer perspective in the tool, this study adds to the research gap addressed by Bocken (2019) who stated that many tools for sustainable business model design and assessment are not being used in practice as relevant customer needs are not taken into account. Therefore, in this research, the customer has been actively involved during the development, design, and testing of the tool, which ensured the integration of their needs and preferences in the final design. The customers identified their type of employees they would prefer to use the tool with as representatives from e.g. operations, assets, and finance departments to obtain a clear and accurate overview of all value drivers in their procurement process. Also, the customer identified a workshop style as a suitable meeting type for using the tool with the company. These insights should enhance the practical applicability and usability of the tool. Thus, by employing customer involvement in the tool development as an intervention, the practical applicability and usability of the tool was enhanced as an outcome.

Referring to the broader literature, this study also contributes to the co-creation literature, in particular to the literature on value-based selling, as this approach to selling is applicable to the context of BagFlex. According to Terho et. al. (2017) current research is limited to the organization's perspective and more research regarding the customer perspective on VBS is needed.
The outcomes of the user-tests in this research gave some first indications of how customers perceive value-based selling. Co-creation principles such as PSS customization and value assessment were employed as interventions in the tool to discover whether this would lead to improved customer satisfaction and stronger customer relationships. The insights from this research show that customers have reacted positively on a VBS approach as they prefer to discuss their needs from a holistic perspective which helps in formulating a solution that better fits their requirements. Also, the offering of customization by offering different PSS modules was perceived as positive by the customers. Further, it was addressed by multiple customer representatives that the tool would help in establishing stronger partnerships and collaborations with NextLevel Logistics. These insights confirm with current literature as it is stated that the offering of customized services and the deployment of a VBS approach could potentially lead to improved customers satisfaction and stronger customer relationships (Terho et. al., 2015; Zine et. al., 2014).
However, according to Terho et. al. (2017), evidence suggests that some customers interpret VBS as the seller's attempt to capture more value and enforce higher prices, rather than co-creating superior value in the customer use situation. The results of this study partly confirm this theory as it was expressed by some customers that by explicitly bringing up BagFlex's PSS during the tool session, it could be perceived as if NextLevel Logistics is pushing their solution to them. However, most of the customers acknowledged the positive added value of employing a VBS approach and did not mention the enforcement of higher prices as an underlying motive of VBS with NextLevel Logistics.
In addition, the VBS approach in this research was supported by deploying a visualization strategy to communicate the value of the PSS offering. A dashboard which allows the customer to express their thoughts and needs on a PSS, and visuals that explain the characteristics and differences between various PSS types were employed as interventions to increase a customer's understanding in the offering. During the user-tests, it appeared that the customers could better understand the value of a PSS in relation to their own operations and therefore see the value of a BagFlex solution. This insight confirms the theory of Kowalkowski et. al., 2009 and Kindström et. al. (2012) who state that employing visualization strategies in PSS sales aid in building up a customer's perceived value of the offering which arouses their interest and makes them believe in the concept. Moreover, an additional insight from the validation session was that the tool could also be used as an internal instrument to positively influence the sales employee's perception on the benefits that BagFlex can bring for a customer. This insight aligns with the study of Kindström et. al. (2012) in which the need for the use of internal visualizations was highlighted in order to manage PSS transitions within companies.

6.2.2 Practical implications

Regarding the practical implications for BagFlex, the following suggestions are made. Firstly, the developed tool contributes to improving the current sales process for the sales representatives as it becomes more feasible to sell a PSS when the customer understands its value and contributes to the design and assessment of the offering. Since the tool builds on concepts of value-based selling and co-creation, the tool enables the company to transform their customer relationships from transactional sales relationships to value-added exchange relationships to enhance strategic and collaborative partnerships. In particular, it was addressed during the validation session that the tool would be useful in the beginning of the buying process. Most customers have then not decided yet on a specific solution and could still be influenced on the criteria they incorporate in the requirements of the solution.

In this way, it would be possible to influence the tender as much as possible. This aligns with the literature on value-based selling and co-creation as Toyatari & Rajala (2015) stress the importance of proactively influencing customer views early in the buying process. Early engagement in a customer's buying process allows for the possibility to demonstrate value, challenge prevailing assumptions, and influence the solution vision or tender criteria (Toyarari & Rajala, 2015). With respect to the current sales process of BagFlex, the tool could thus best be used during phase 1 (opportunity seeking) and phase 2 (design) to ensure it is applied correctly. It was addressed that during these two phases, there is more freedom to build and influence the customer's vision on the desired solution. Also, these phases are suitable to influence the tender as much as possible which could reduce the competition with other suppliers. As selling a PSS requires a value-based sales approach, it seems useful to explore how the current sales process and sales activities of BagFlex should be transformed to better enable VBS and the use of the tool. The theoretical framework of Luotola et. al. (2017) could be used to understand where the tool would be applicable in a value-based selling process. This framework consists out of three phases: (1) problem identification & value demonstration (pre-sales); (2) designing a solution for a customer problem (detail sales); (3) reaching certainty (final sales) (Luotola et. al., 2017). Comparing this framework to the current framework of BagFlex, there is some high-level overlap. However, the framework of Luotola (2017) focuses more on implementing a value-based perspective throughout the entire sales process which is not yet incorporated in the current process of BagFlex. Considering the theoretical framework, the tool would be especially applicable in the first phase, the *pre-sales*. During the *pre-sales* the customer should become confident in the value potential of a solution (Luotola et. al., 2017). This implies that the customer should first accept NextLevel Logistics as value-co creator. Moreover, they should understand the benefits of sharing information on their value drivers, operations, and business problems with NextLevel Logistics. Hereafter, the tool could help in making the customer see the benefits of a solution concept. Also, the tool might be partly applicable during the second phase, the *detail sales*. This phase involves increasing the customer's commitment to the proposed solution, which is achieved when the customer starts to see that the solution exists in their business environment and trusts that the supplier is able to deliver the solution through its offerings (Luotola et. al., 2017). Thus, the stages and activities of the theoretical framework by Luotola et. al. (2017) can be used as actionable guidelines that inform the sales team on how current sales practices should be transformed into a value based selling approach to implement the tool effectively. This input can also be used to change the BagFlex sales process over time. Figure 18 depicts how the current sales process relates to the theoretical framework and during what stages the tool should be used.

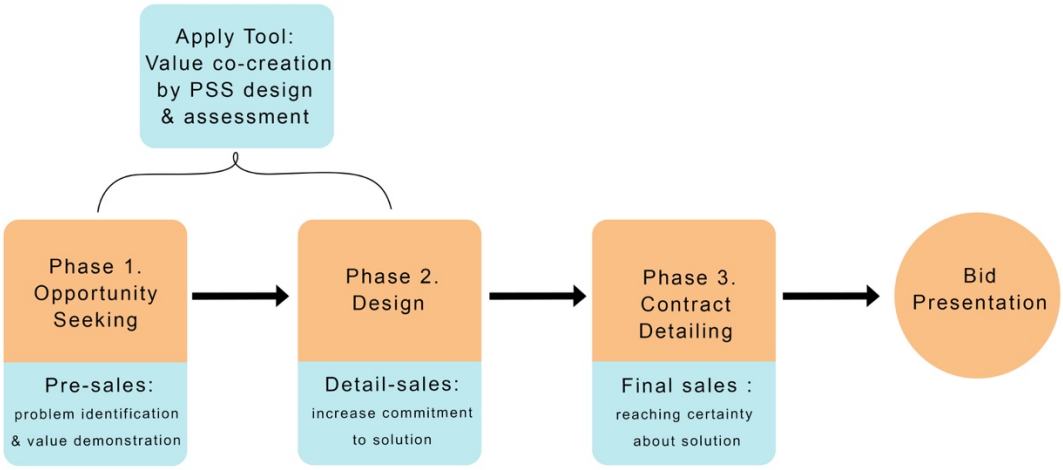


Figure 18. A value-based sales process in the case of BagFlex

However, using the tool with the customer requires a certain mind-set from the sales team. Sales employees should be willing to act as value creators in which they should try to better understand each customer's business situation in order to enhance customer value-creation (Luotola et. al., 2017). Yet, it was addressed that some sales representatives of NextLevel Logistics are not yet convinced about the benefits of a PSS which makes it more difficult for them to discuss such offerings with potential customers. Therefore, next to using the tool together with the customer, it can also be utilized as educational training for sales representatives on the benefits and unique selling points of a PSS. In this way, the tool could potentially contribute to reducing resistance among sales employees to selling PSSs.
Further, the specific type of meetings to use the tool should be further specified. As for now, it was identified that suitable moments to use the tool include workshop settings and introductory meetings with customers that take place in the early phase of the buying process. However, when exactly these types of meetings take place and how they can be initiated more often could be further identified within the organization. For this, it is suggested a strategy-agenda is composed: *under which circumstances should the tool be employed?* As the suitable circumstances under which the tool is valuable to use are likely to change, the strategy-agenda should be updated regularly to accordingly inform the sales team.
In addition, from a practical perspective, this research attempts to provide support to PSS evaluation. The proposed scheme forms a comprehensible yet simplistic overview of criteria in which both company and customer perspectives are included. Hence, a feedback mechanism after the assessment should be developed. The evaluation results of the customer should be reflected on and used for constructing a PSS improvement plan. In case the customer wants to refine or revise the PSS, detailed guidelines that discuss the design elements of the PSS should be constructed.
Lastly, the methodology that was used in this research to develop the assessment criteria and the tool for BagFlex, could be applied to other innovative solutions of NextLevel Logistics that employ a PSS to further increase its applicability.

6.2.3 Limitations & future research

Firstly, the data of this research was collected from only one company and a limited number of customers from one geographical region. Therefore, the insights on the sales process and PSS assessment may be only applicable to a particular organizational or industry setting similar to those of the case study. This indicates that the quality of the findings and the generalizability of the research to other disciplines or industries are questionable. In order to increase the robustness and external validity of the research, more case-studies should be employed, varying in terms of geographical region and industries.
Moreover, regarding the customer interviews, only a limited number of employees for each airport participated. Hence, within an airport, there are multiple functions that might influence the results of the research. For instance, a financial manager might have a different view on the tool than a sustainability manager. However, it was not possible during this research to talk to the stakeholders and employees from all departments of the airports, indicating that the conclusions for each airport might depend on the type of function or interest the interviewee had. Therefore, if different stakeholders within the same sample of airports would be involved in the user-tests, the outcomes could have been different. Accordingly, for similar situations in future research, it is suggested to involve multiple stakeholders from each airport in the user-tests.
This advice also applies to the PSS assessment criteria which were not predefined during the user-tests, but naturally emerged by insights of the participants. It was noticed that sometimes the rationale behind the assessment of the criteria turned out to be ambiguous, as in some cases the participants could not fully capture the exact meaning of the criteria in their own context. In order to increase objectivity in the assessment of the criteria, more stakeholders from different departments in an airport could be included.

Regarding the design solution of this research, more iterations are necessary to finish the final version. The tool needs further testing, validation, and redesign in order to accordingly implement it within the organization. The tool was now developed in the form of various visualizations that could be printed on paper, or be presented in the form of a PowerPoint presentation. However, as was addressed by multiple interviewees, the tool could also be taken one step further by making it a digital application that could be used in an online environment. Further research could focus on designing the tool in a digital format which would allow for more systematic data collection about customers that could be used for future projects and recognizing opportunities. In that sense, a digital online tool would enable improved data extraction of customer input compared with the current paper or presentation version of the tool. This is also in line with Toyatari & Rajala (2015) who state that building a database of documented evidence of value creation may be useful in future sales endeavours with new customers and in managing existing customers.

Besides, during the user-tests, it was addressed that it is hard to convince customers to choose for a PSS when attributes related to cost-effectiveness are missing. More quantitative information regarding the costs of a PSS offering would be preferred in order to convince the customer properly about the benefits such a service can bring. Therefore, a next step in the development of the tool could incorporate a calculative mechanism in which customers will be able to obtain detailed information on the specific costs of the PSS, based on their requirements. Creating a solution in which the relevant data of the customer could be used as input to calculate the precise costs of a system would be valuable to convince the customer on acquiring a PSS. This could be in the form of visualizing different scenarios in which predicted and unpredicted events are depicted including the costs that will be involved with a conventional system versus a hybrid/BagFlex system. It was addressed by multiple customers that such a tool would be crucial in winning them over for a PSS. Lastly, an important limitation of this research concerns the fact that the implementation of the tool was not studied, as the period of time available for this research was limited. This indicates that specific long term outcomes on the sales, design, and assessment of the PSS by the tool are not identified yet. However, to specifically analyse the outcomes of the tool, one could track whether the tool is successfully implemented and has resulted in the desired outcomes such as the completion of co-created PSS propositions that accordingly achieve increased measurable customer satisfaction and loyalty over the long term.

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8. Appendices

Appendix A. Summary exploratory interviews

Participants	Role	Pains & Needs	Possible solutions
1	Strategy & Sustainability Director	Circularity and sustainability are important characteristics of BagFlex and need to be integrated in the sales pitch, because customers will want to know about this.	Find a way to bring up sustainability related topics during the sales with the customer.
2	Commercial solution manager	Selling BagFlex requires a different approach than selling conveyor belts. The sales team is not used to selling product-service models in the beginning. Customers often do not recognize the value of a product-service model and therefore, they are not interested in solutions like BagFlex. The NextLevel Logistics and the BagFlex team have to work together as one team and what comes out of the customer centre is one solution, but it has a mix of the NextLevel Logistics stuff and a mix of BagFlex and that's kind of a challenge.	Use a more collaborative and value-based approach to sell product-service models. Make the customer understand the value of a product-service model. Enable sales team of NextLevel Logistics with the right training and tools on selling BagFlex
3	System Engineer	The NextLevel Logistics Sales team often lacks in-depth knowledge about the technical aspects of the BagFlex solution. The technical aspects have consequences for long-term benefits such as cost effectiveness that should be communicated towards the customer.	Provide the NextLevel Logistics Sales Team with more technical information about the BagFlex solution.
4	Director of Customer Engagement	There's a sales process that NextLevel Logistics has created over the years. Well, for BagFlex, if we were an independent company, we don't have any of that. We kind of just go with it. We're giving some of those processes, but we have to fit into the NextLevel Logistics way of working, but also keep it agile enough with BagFlex that we don't get stuck, we don't get hung up on a process to avoid having an opportunity get through.	Integrate the BagFlex sales process into the NextLevel Logistics sales process Align the needs of the NextLevel Logistics sales team with those of the BagFlex team Improve communication between BagFlex and NextLevel Logistics

Appendix B. PSS assessment criteria from literature

Kim et. al. (2015) Aspects	Kim et. al. (2015) Criteria	Bertoni (2019) Aspects	Bertoni (2019) Criteria	Tseng et. al. (2019) Aspects	Tseng et. al. (2019) Criteria
1.Sustainability (planet)	Environmental management	1.Environmental sustainability	Production of CO2, pollutants, and waste	1.Sustainable production	Waste generation
	Profit Sharing		Noise		Emissions
	Working-environment (working hours, health & safety)		Consumption of natural resources		Consumption of water and energy
					Workplace health & safety
2.Sustainability (profit)	Fixed costs	2.Business opportunity	Revenue generation opportunity	-	-
	Operational costs		Partnership opportunity	-	-
	Revenue		New markets opportunity	-	-
3.Sustainability (people)	Employment equity	3.Health and social sustainability	Quality of life of workers and labor	2.Employee perception	Justice in working content
	Acceptability		Quality of life of local communities		Chances for self-actualization
	Influence on society		Health of workers and labor		Employee benefits such as welfare & care
					Employee participation in decision making
4. Customer Value	Product related quality	4.Product/service value in use	Ease of use	3.Product-Service quality	Tangibles (physical facilities)

(quality)	Service related quality		Availability of the system		Reliability
	Customer support		Customizability		Responsiveness
	System convenience		Troubleshooting		Service assurance
			Productivity		Empathy for customer needs
5.Customer value (costs)	Costs for customer	5.Uncertainty and Risk	Maintainability of the PSS (planned and unplanned)	4.Collaborative advantage	Stakeholder relationships
					Organizational structure
					Information systems technology

Appendix C. Explanation segmentation variables for customer interviews

Innovativeness				
Innovativeness criteria	**Explanation criteria**	**Scoring guidelines: 10, 5, or 1 point per criterion**		
		10 points	**5 points**	**1 point**
Competitive Innovator	Actively looking for competitive advantage	Actively seeks out Innovations that improve its competitive position by reducing cost, improving the operation, attracting new customers	Open to new solutions to increase its competitive edge	Looking only at proven existing solutions
Visionary	Ability to find new users for a technology	Sparring partner for discussing and identifying applications of new Technology	Open to understanding the value of a new technology	Will only see value when proven
Testers	Seek and invest in new trials	>3 trials in past three years >Acceptance culture of "Smart failures"	> 1 trial in past three years > Trials only accepted if low risk	No trials
Technology Geek	Like to be unique and share new products (it makes them feel good)	Will be interested in any technology which is out-of-the-box, state of the art.	>Is enthusiastic, but realistically critical about new technologies >Will actively promote new solutions that have been proven successful, but be critical of lesser solutions	Feels apprehension when presented with a non-proven new solution
Technical Authority	Exert some kind of technological leadership in their environment	Regular technical speaker at industry conferences. Recognised and consulted as an expert by peers in the industry.	Known in the market to have implemented several innovations	>Feels comfortable with known technologies >Would consult with others if needed
Risk taking attitude	Will use a solution that hasn't been proven in real life situations	Is open to sharing risk and will not be scared off by unproven, incomplete solutions	Can be convinced in using new technology if offered a back up plan	Will only use proven technology

Innovation Resources	Freeing up time and money for innovation.	Yearly available budget for innovations Innovation Department in place	Budget and resources made available ad-hoc and allocated without too much struggle to Innovations	No Budget for Innovations
Innovation friendly Management	Management willing to actively work to eliminate bureaucratic impediments to innovation.	>Early Adaptors in Top and Middle Management >Ability and Authority to solve impediments to innovations	At least one person with authority and ability to ensure innovations can be implemented without too many impediments	> Strictly followed procurement rules > Strict technical specifications to comply to, leaving little room for innovation

Fit with BagFlex				
Opportunity attractiveness factors for BagFlex	**Explanation of factors**	**Scoring guidelines: 10, 5, or 1 point per criterion**		
		10 points	**5 points**	**1 point**
Redundancy 75% or higher	Offering high redundancy will be a important selling point compared to a conventional system	Offering higher redundancy than a conventional solution will be a winning USP	High Redundancy is an important USP	Not more than usual
High Exception Handling %	There are a lot of exceptional bags flows within this airport/process, causing either a lot of manual labour or a complicated system	Very much so	Some	Not more than usual
Strong Growth	A very strong growth is expected, therefore the size of the conventional system will be oversize for many years, whereas BagFlex would enable to scale it up as the volume grows	Very much so	Some	Not more than usual
Seasonal / Event Driven Peak Capacity	There is either a one-off peak triggered by an event such as World Cup, etc.. Or a yearly recurring peak whereas the rest of the year is very calm (for instance skying resort)	Very much so	Some	Not more than usual

Labor Intensive Process	There is currently a labor intensive process that could be replaced by a BagFlex solution	Very much so	Some	Not more than usual
Functional Changes Ahead	We already know that the system we will put down will need to be changed in short to medium term, for instance because of connections to a new to build system, new regulations, new processes	Major changes	Some changes	No changes
Capex/ opex	Customer is interested in leasing and not owning the system to spread their cost and limit the risk	The customer is very much interested in leasing	The customer is interested but somewhat hesitant for leasing	The customer prefers the standard buying procedure and will not like leasing
Explicit interest in BagFlex	The BagFlex option was discussed and the customer was interested	The customer is very interested for this specific opportunity	The customer is interested but somewhat hesitant for this specific opportunity	Customer is not interested not at all and very risk averse

Appendix D. Interview guides

Interview Guide A – NextLevel Logistics Sales Team Challenges & Needs

This interview consists of 3 phases: Introduction, General questions, and Specific questions.

Phase 1 - Introduction

- Graduate student Innovation Management at BagFlex
- Developing an approach in which a holistic perspective is used during the sales process which also takes into account aspects such as sustainability and corporate identity since these 'soft' values tend to be relevant when airports are considering whether BagFlex is a fit for them. So not only looking a technical/cost related aspects.
- Goal of the interview: obtaining information about the sales process of NextLevel Logistics and BagFlex including the challenges and needs being experienced.
- Can we record this interview? Your information will be handled confidentially.

Phase 2 - General Questions

- Could you tell me something more about your role within NextLevel Logistics?
- In which areas have you been active as a Sales Manager/Consultant/Director?
- What is your experience thus far in selling BagFlex?
- How does the Sales team interact with BagFlex and obtain their information about BagFlex?

Phase 3 – Specific questions sales process

i) Can you describe your **sales process** in terms of activities / phases / steps / decision moments? Or, are there specific phases or steps that you can distinguish?

What is the difference between a sales engineer and sales manager in responsibilities and in which phases of the sales process do they play a role?

Who has more interaction with the customer? The sales manager or the sales engineer?

ii) How are these **phases/steps** structured or organized? Which **people** are involved? What other departments of NextLevel Logistics during the sales process are involved?

iii) Are there **existing tools/mechanisms** designed for the use of the sales team when interacting with the customers? Find out how the proposed tool could be **used in combination or integration** with these existing tools and what the 'willingness to use' is.

iv) What is the **information that flows** between the sales team and customers at different phases of the sales process? Are these flows face-to-face, or via the internet? Relatively: how much contact is there **face-to-face** and how much via **technology?**

v) What is the role of customers in the sale process, and how and when does the sales team interact with them?

vi) What information do you usually try **to gather from the customers** in your interactions, and why? E.g. their business model, operations, expectations from a PSS, how they understand and value sustainability, etc.

vii) What are the particular **weaknesses** in the sales process of PSS that needs addressing in the case of NextLevel Logistics? Based on these addressed

weaknesses find out how these translate into a certain **need** for the sales team

viii) What are the **main hurdles in selling product-service** models in comparison with products or other NextLevel Logistics offerings? Is it more difficult for customers to **understand** a PSS concept and its value? Based on these hurdles find out which one is the **most difficult** to tackle, and find out how the sales team **copes** with these hurdles at this moment.

ix) When **are PSS and service business models considered in the sales process? (After technological considerations? OR at the start?)**

x) What is **the role of the customer perspective** in solving the above-mentioned conflicts between PSS service models and traditional business models?

xi) What is the customer perspective in implementing PSS in general? What are the different **segments that arise based on customer perspectives on PSS**? How could these segments be used during the user-tests and co-creation phase and in during the use phase of the eventual tool.

xii) To what degree are the PSS service models at BagFlex **customizable** to accommodate the customer's perspectives? (More service consultant oriented question, however could be asked while showing the visual of the tool).

End questions:

- What other people would you recommend speaking to for this project?
- Do you have any other remarks or comments?

Interview Guide B – NextLevel Logistics Sales Team
User-tests of Tool with sales team

Phase 1 - Introduction

- Graduate student Innovation Management at BagFlex
- Developing a tool aimed at supporting the conversation between the customer and the sales team.
- Goal of the interview: Obtaining your feedback regarding the tool, it is still open for discussion and adjustments. Exploring what your vision is on using this tool during the sales process of BagFlex.
- Can we record this interview? Your information will be handled confidentially.

Phase 2 - Tool co-creation

Introduction Tool: Talk about the tool that serves to facilitate the conversations during the procurement process in which different Product Service Models can be discussed, designed and evaluated according to your values and needs.

- Introduction (5 minutes)
  - Give context: in order to better convey the value of this innovation and its product-service models the following tool was developed.
  - Introduce the tool goal and steps (Introduction slide)
  - STATEMENT: Now we will go further through the steps of the tool, and what we just introduced will become clearer.

- Step 1. Assessment Value Drivers including intro (10 minutes)

User steps

  - Explain how the key values would be used, and what you want to achieve with it.
  - Go through every criteria with the customer (Corporate Responsibility, Profitable Growth, Operational Excellence) and validate whether these are relevant to them.
  - Are the criteria per key value meaningful to you? What would you change?
  - Which key values would you leave out or add? (What finds the customer relevant to discuss during these sales conversations?).
  - How do you like the way the weights are shown? (maybe more numerical or different scale)

- Step 2. Exploring your priorities and needs (15 minutes)
  - Explain the goal of this dashboard: it serves as the link between the criteria list to further explore what the needs of the customer are regarding openness and readiness to acquire a product-service model.
  - Explain how the dashboard shows trade-offs between different characteristics (such as outsourcing vs DYI, OPEX vs CAPEX)
  - What do you think about the way these trade-offs are shown? Buttons? Balance? Checking boxes?

- Do you think you are better able to express your needs by doing this interactive exercise?

- Step 3. Hybrid Systems (5 minutes)
  - Explain the visual(s) that illustrate the difference between BagFlex and a conventional system.
  - Is it clear how the hybrid solution works (BagFlex is always sold in combination with a conventional solution).
  - Is it clear what the potential benefits of BagFlex could be for the airport? (Cost effectiveness, flexibility, redundancy).

- Step 4. Product Service Models (10 minutes)
  - Explain the differences between the four visuals of the product-service systems and what you try to visualize.
  - Are these visuals clear to you? Is it clear what you can expect as a customer once you decide to go for BagFlex? What would you change?
  - Explain Maintenance, Operations and Optimization. Would the customer in a scenario have the need to specify or discuss these activities?

End questions:

- What other people would you recommend speaking to for this project?
- Do you have any other remarks or comments?

Interview Guide C - Customer Interviews

User-tests of Tool with customers

This interview consists of 5 phases: Interviewer Introduction, General questions, Buying process, the Tool, and the Process related questions.

Phase 1 – Introduction (5 minutes)

- Introduce yourself as researcher from TU/e project with NextLevel Logistics
- Introduce the PSS (presentation)
- We are developing a tool aimed to support the conversation between the customer and the sales team of NextLevel Logistics. The goal of this interview is to understand your needs as a customer so that the tool can be designed accordingly.
- The approach of the tool is a holistic view which takes more into account than just technical/cost related aspects. For example, aspects like sustainability ambitions and corporate identity, since these values tend to be relevant when airports consider BagFlex.

The purpose of this tool is to create an optimal value proposition in a co-creation setting together with the customer.

- Can I record this interview? Everything will be anonymized and there is always an option to stop the recording or speak off the record.

Phase 2 – General Question (5 min)

- Could you introduce yourself and your role?

Phase 3 – Buying Process of BHS (15 min)

- Can you describe the buying process at <company x> in terms of phases and decision moments?
- To what extent does the tender determine the possible solution? (functional tendering vs. Solution tendering).
- Which people are involved in the procurement process?
    - What background do these people have? (Finance, Operations, Sustainability..)
- Who are the decision makers who decide which solution to buy?
    - Are the people having conversations with our sales department also part of the decision-making unit (DMU)?
- What key aspects are assessed when buying a baggage handling solution? What supporting materials are used during this assessment?
- What is included in the tender? In terms of strictness and openness to innovation.
- Is there a gap between the long-term airport goals and the requirements they put into the tender?

(Missing information that is needed to decide on various offerings of suppliers).

- Would the Decision Making Unit like any information specific to sustainability performance or for example baggage handling systems? Why yes/no?

(First part of interview: 25 minutes)

Introduction Tool: Talk about the tool that serves to facilitate the conversations during the procurement process in which different Product Service Models can be discussed, designed and evaluated according to your values and needs.

Phase 4 – Tool (55 minutes in total)

- Introduction (5 minutes)
    - BagFlex was chosen as the example of a PSM that will be used in this tool
    - Give context: in order to better convey the value of this innovation and its product-service models the following tool was developed.
    - How familiar are you with BagFlex?
      If not familiar, show the BagFlex movie.
    - Introduce the tool goal and steps (Introduction slide)
    - STATEMENT: Now we will go further through the steps of the tool, and what we just introduced will become clearer.

- Step 1. Assessment Value Drivers including intro (10 minutes)

User steps

- Explain how the key values would be used, and what you want to achieve with it.
- Go through every criteria with the customer (Corporate Responsibility, Profitable Growth, Operational Excellence) and validate whether these are relevant to them.
- Are the criteria per key value meaningful to you? What would you change?
- Which key values would you leave out or add? (What finds the customer relevant to discuss during these sales conversations?).
- How do you like the way the weights are shown? (maybe more numerical or different scale)
- The customer should also assign weights eventually to all the criteria that are listed.

- Step 2. Exploring your priorities and needs (15 minutes)
    - Explain the goal of this dashboard: it serves as the link between the criteria list to further explore what the needs of the customer are regarding openness and readiness to acquire a product-service model.
    - Explain how the dashboard shows trade-offs between different characteristics (such as outsourcing vs DYI, OPEX vs CAPEX)
    - What do you think about the way these trade-offs are shown? Buttons? Balance? Checking boxes?
    - Do you think you are better able to express your needs by doing this interactive exercise?

- Step 3. Hybrid Systems (5 minutes)
    - Explain the visual(s) that illustrate the difference between BagFlex and a conventional system.
    - Is it clear how the hybrid solution works (BagFlex is always sold in combination with a conventional solution).
    - Is it clear what the potential benefits of BagFlex could be for the airport? (Cost effectiveness, flexibility, redundancy).

- Step 4. Product Service Models (10 minutes)
    - Explain the differences between the four visuals of the product-service systems and what you try to visualize.
    - Are these visuals clear to you? Is it clear what you can expect as a customer once you decide to go for BagFlex? What would you change?
    - Explain Maintenance, Operations and Optimization. Does the customer has the need to specify or discuss these activities?

Process related questions (very important for thesis) (10 minutes)

- Is the tool simple enough? Practical enough? Why?
- Do you think the tool is able to translate your **expressed needs and values** into a suitable value proposition?
- How do you think this tool will **add value to the buying** process?
- Does this tool help in increasing your **understanding** of Product-Service Models? Why?
- Do you think you will be able to make **more effective decisions** regarding choosing a product service model? Why?
- Do you think this tool helps in strengthening **the relationship** with your supplier (NextLevel Logistics)? Why?
- Do you think this tool can enhance your level **of satisfaction and loyalty** as a customer? Why?
- During which phase (or phases) of the buying process should this tool be used according to you? (During what kind of conversations with the supplier?)

Appendix E. Coding Scheme

The coding scheme is depicted in the table below. The codes are based on the interview questions from the Interview Guide in Appendix D and theory from the literature. The first category involves the Product Service Systems to obtain insights in the role that PSSs have in the organization. The classification from Tukker (2004) was included to see whether there are similarities between practice and theory. Further, the unique selling points of BagFlex are included to discover what the perspective of the sales employees is on the innovation. The second category is Sales Process which serves to gain insight in the current sales process of NextLevel Logistics and how this relates to the theory by Tuli et. al. (2007). Also, challenges and needs of the current sales process were explored. The third category is about the design solution 'Tool Design' and includes codes to get insight in the company's and customer's perspective on the desired solution to better sell PSSs. The fourth category includes the 'Design Principles' in which it was explored whether the expectations from theory matched or mismatched the outcomes from the user-tests with the company and customer.

Category	Code	Sub-code	Files	References
1. Product Service Systems			4	12
	Product-oriented PSS		3	6
	Use-oriented PSS		2	4
	Result-oriented PSS		2	3
	BagFlex usp's			
		Cost-effective	2	3
		Flexibility	4	7
		Operations	2	4
		Scalability	2	2
		Sustainability	4	6
	Hybrid Solution		2	3
	Challenges with service models		3	7
	Explaining services to customer		2	2
2. Sales Process				
	Customer requirements		5	11
	Education sales team		4	6

Category	Code	Sub-code	Files	References
	BagFlex fit and customer segmentation		6	9
	Sales process steps		1	5
		Customization & Integration	2	5
		Requirements definition	1	4
	Sales team challenges and needs		3	7
	Tender Process		3	14
	Value Based Selling		2	3
	Value co-creation		6	12
	NextLevel Logistics vs BagFlex alignment		1	6
3. Tool Design			1	1
	Customer evaluation criteria		1	1
		Adaptability vs Fixed scenario	2	4
		Corporate Responsability	3	13
		Operational Excellence	3	13
		OPEX vs CAPEX	5	9
		Pay for result vs Pay for use	2	5
		Profitable Growth (costs)	3	13
		Service vs Control	1	2
	Customer examples		1	8
	Step1		3	6
	Step2		1	1

Category	Code	Sub-code	Files	References
	Step3		5	9
	Step4		3	4
	Tendering requirements		2	6
	Tool goal and use		12	32
	Tool concerns		4	4
4. Design Principles				
	DP1 Intervention			
	DP 1 Outcome	Value creation with PSS supplier	3	8
		Customer satisfaction	5	5
		Improved service experience	3	3
	DP2&3 Intervention			
		Sustainability value in PSS	3	4
		Visualization of PSS values	4	11
	DP 2 & 3 Outcome			
		Customer satisfaction	5	8
		Customer understanding of PSS	4	6
		Decision making in PSS design	2	9
		Positively influence PSS expectations	2	4
		Stronger customer relationship	6	9
	DP 4 Intervention			
		Efficiency, simplicity, transparency of	3	5

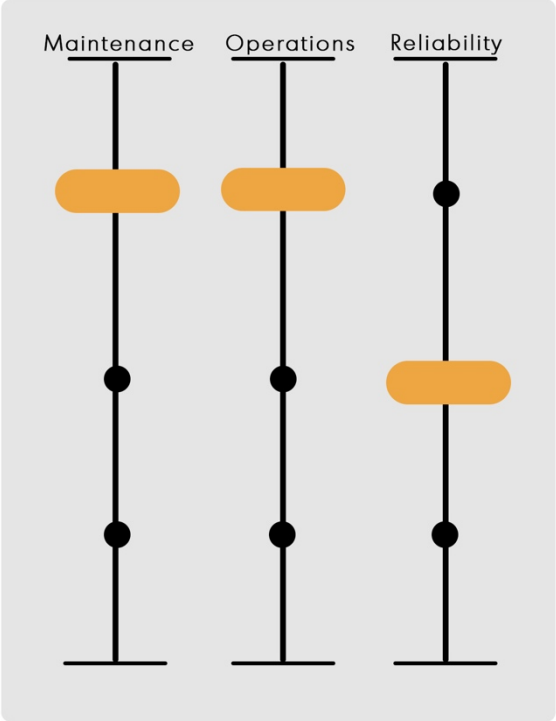
Category	Code	Sub-code	Files	References
		tool		
	DP 4 Outcome			
		Desirability to use tool	2	4
		Practical, usability	4	8
		Simplicity	2	5

Appendix H. First version of Tool

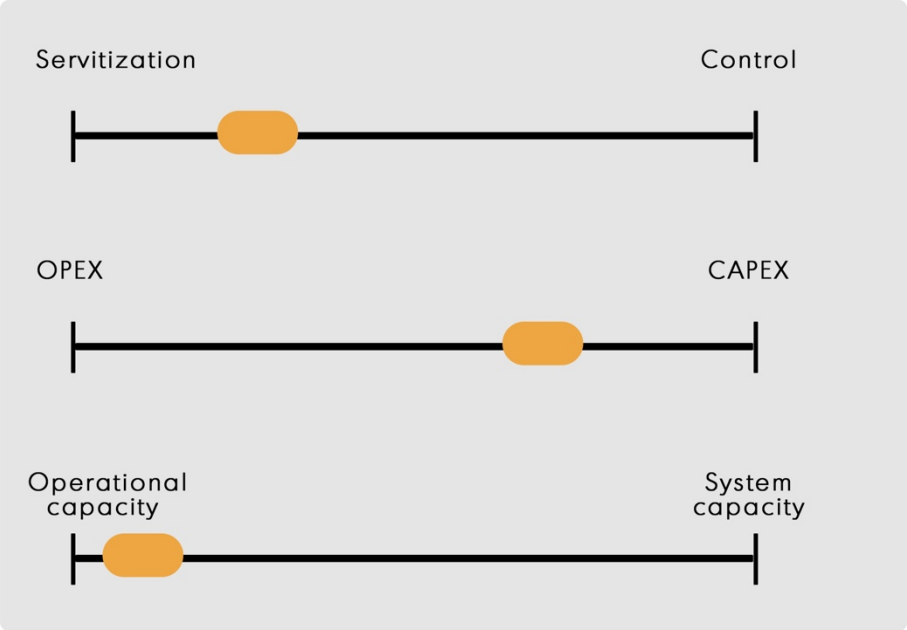
Step 1. Assess value drivers of customer

Key Values		weight
 Environmental Responsibility	Material Usage	
	Resource Usage	
	Modular Design	
 Employee Perception	Workplace health	
	Working conditions	
	Participation & Learning	
 Risk Management	CAPEX reduction focus	
	OPEX reduction focus	
	Risks related to newness of the system	
	Financial risks related to performance contracts	
 Opertaional Excellence	Operational Performance	
	Convenience of Service Model	
	Operational efforts required	
	Flexibility to adapt to functional changes	
 Costs	Costs for customer / increase Return On Investment	
 Corporate Identity	Innovativeness	
	Willingness to be Green	
	Openness to adopt service models	
	Stakeholder Relationships	

Step 2. Explore customer needs

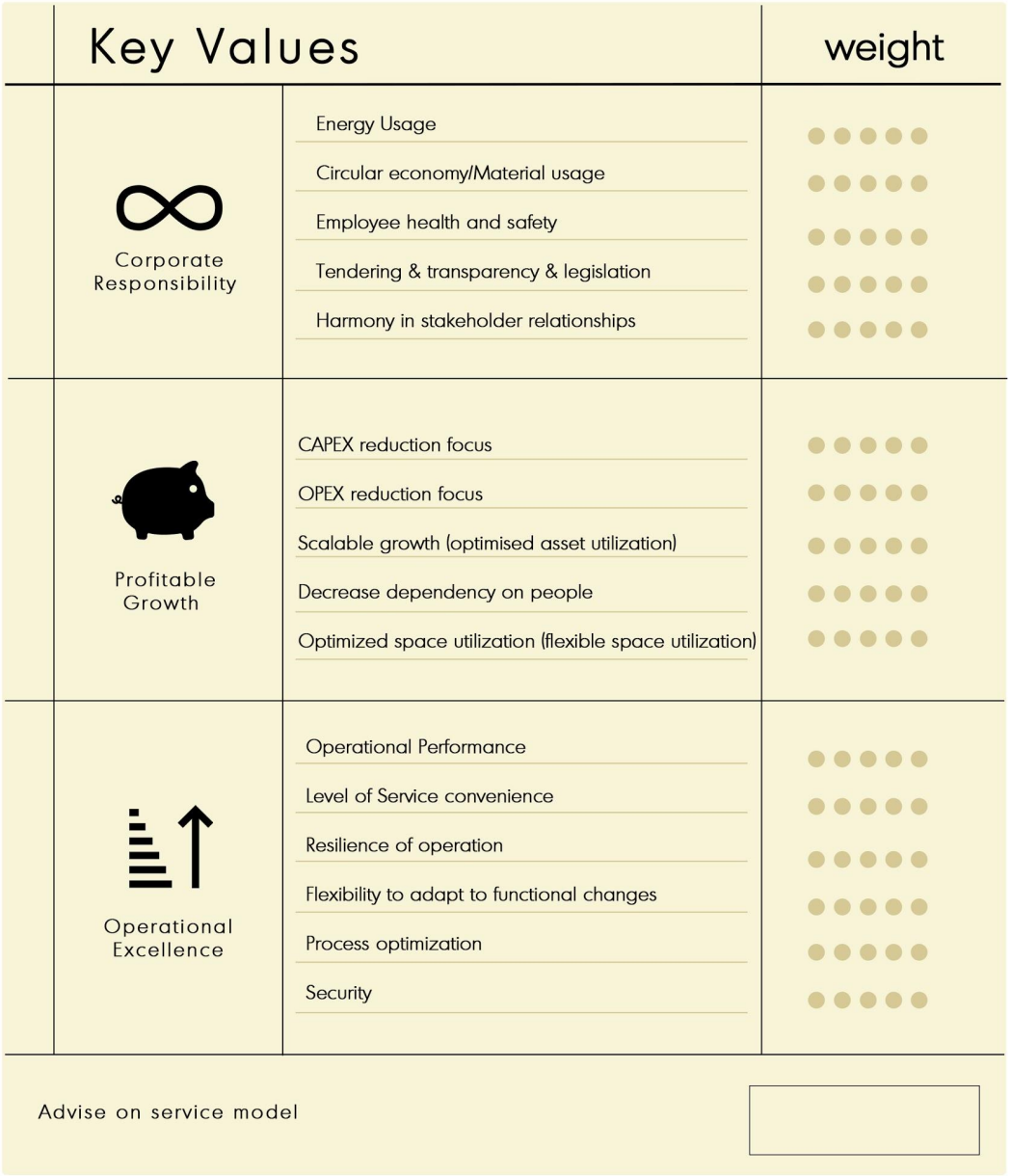


switch between KPI's/service model option

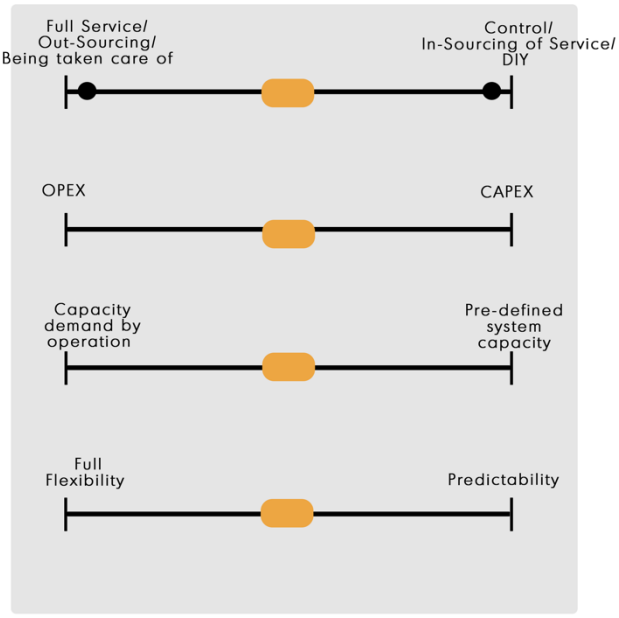


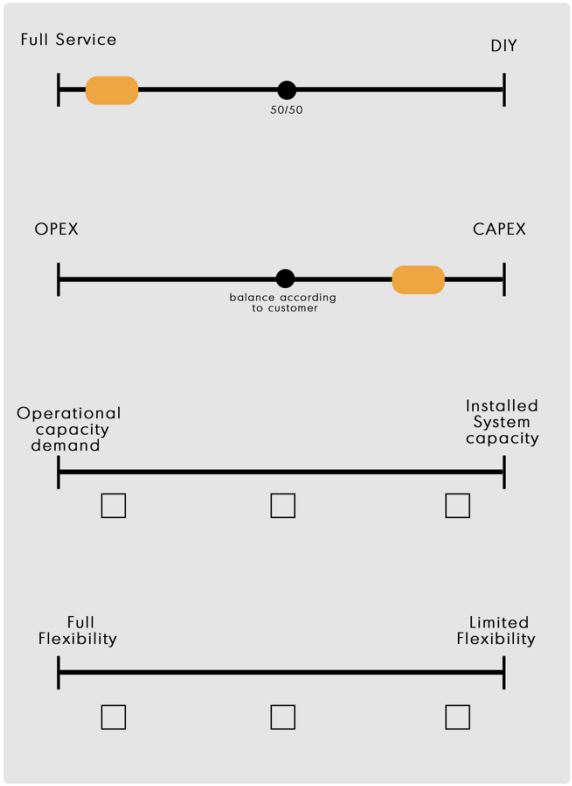
Appendix I – Second Version of Tool

Step 1. Assess value drivers of customer



Step 2. Explore customer needs (two format options)

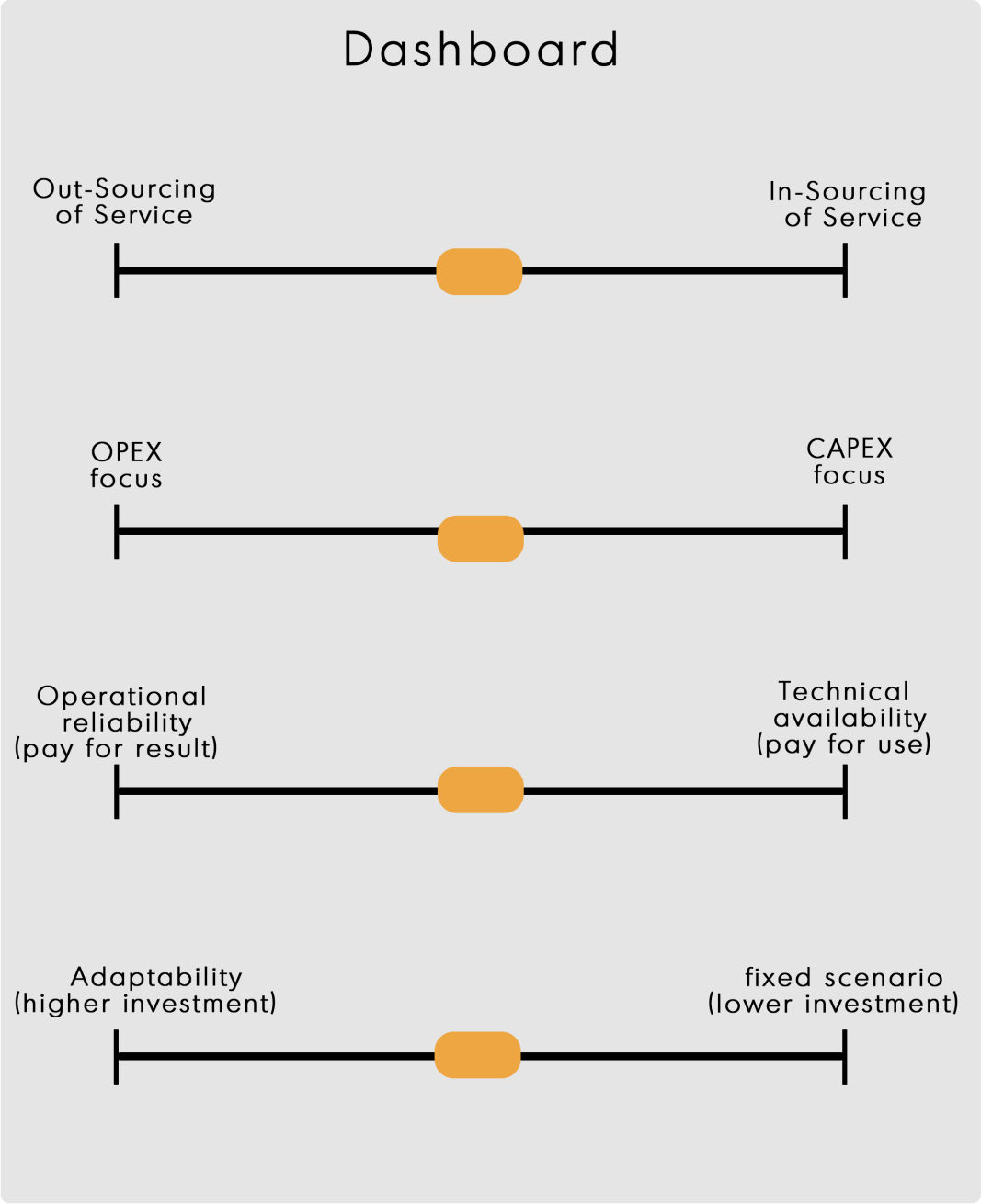




Appendix J – Final version of Tool

Step 1 – Asses value drivers of customer

Name & function:			score 1 ● ● ● ● ● 5	top 3	notes
 Corporate Responsibility		Energy Usage	● ● ● ● ●		
		Material (re)usage	● ● ● ● ●		
		Employee health and safety	● ● ● ● ●		
		Openness & trust in stakeholder relationships	● ● ● ● ●		
			● ● ● ● ●		
			● ● ● ● ●		
 Profitable Growth		Total Costs of Ownership	● ● ● ● ●		
		Predictability of costs	● ● ● ● ●		
		Scalable growth	● ● ● ● ●		
		Optimized space utilization	● ● ● ● ●		
			● ● ● ● ●		
			● ● ● ● ●		
			● ● ● ● ●		
			● ● ● ● ●		
 Operational Excellence		Operational Performance	● ● ● ● ●		
		Resilience of operation	● ● ● ● ●		
		Flexibility to adapt to functional future changes	● ● ● ● ●		
		Process optimization	● ● ● ● ●		
			● ● ● ● ●		
			● ● ● ● ●		
			● ● ● ● ●		


Dashboard
Out-Sourcing of Service
In-Sourcing of Service
OPEX focus
CAPEX focus
Operational reliability (pay for result)
Technical availability (pay for use)
Adaptability (higher investment)
fixed scenario (lower investment)

Appendix K. Criteria list including examples for sales team

1. Corporate Responsibility

	Description	Examples for BagFlex
Energy usage	The amount of energy used to run the whole baggage handling system	BagFlex offers reduced energy usage.
Material (re)usage	The extent to which materials of the systems are optimal utilized.	BagFlex offers optimal material usage by refurbishment, recycling, and reuse.
Employee health & safety	Providing a work environment in which the well-being, safety and health of employees is guaranteed.	Role of BagFlex?
Harmony in stakeholder relationships	Working peacefully together in a complex network of stakeholders including unions, police, local and global governments, airlines, handlers, etc.	BagFlex could affect the relationships with handlers and unions. à negative

2. Profitable Growth

	Description	Examples for BagFlex
Scalable growth	The predicted growth for an airport is uncertain and can vary heavily from year to year.	There might be a need for a solution (BagFlex) that fulfils short-term needs and which adapts to a scale up or down depending on growth developments of the airport.
Optimized/flexible space utilization	Increase the profit per square meter by limiting the space of non-profitable systems and increase the space for profit generators.	Apply BagFlex to airports that cope with peak demands (winter/summer).
TCO	TCO and predictability of what amount has to be paid next semester	These TCO and predictability of costs might differ for different service models of BagFlex. BagFlex offers service fee in which CAPEX investments are minimized.

		Service contract and fee can be adapted according to the needs of the airport.

3. Operational excellence

	Description	Examples for BagFlex
Operational Performance	The daily operations: how the operations can be measured in terms of capacity of handled bags per hour, number of mishandled bags per hour, and availability of the system.	BagFlex offers high reliability, system availability, and continuous improvement by using the NextLevel Logistics software.
Resilience of operation	Avoid as much as possible interruptions to critical operations.	BagFlex is able to solve critical interruptions by its resilient system design in which for example less maintenance personnel is required to fix issues.
Flexibility to adapt to functional changes	Being able to deal with changing demands to operational processes.	The mobile infrastructure of BagFlex implies flexibility towards changing demands by e.g. adding AVG's to the system.
Process optimization	Consistently improving operations over time and reducing waste in operational processes.	BagFlex offers continuous software improvements and updates on the system.