



# ANATOMY OF SUSTAINABLE SERVICE-BASED BUSINESS MODELS

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## Abstract

To tackle current sustainability challenges, companies often need radical changes in their operative models, including their ecosystem and business models. One of the most promising sustainable business models is based on services. Our aim of the study is to explore what are the elements and patterns of sustainable service-based business models.

The method is a case study of four companies in the textile sector, which have developed and implemented a service-based business model aimed at a positive sustainability impact. Data is based on workshops, sustainability reports and web sites.

The results indicate that there are certain business model patterns that case companies have implemented in their business model. The sustainability impact of their current service-based business model focuses mostly on creating environmental and economic impact, while the social value dimension remains in a smaller role. This is an explorative study creating a preliminary framework for the anatomy of a sustainable service-based business. The framework can be then evaluated and modified in further studies in different industries.

## Keywords

Sustainability; service-based business; sustainable business model; business model innovation; case study

## 1. Introduction

## *1.1 Background*

To move towards sustainability significant innovation in all aspects of society is needed, including customer values and consuming practices, as well as technological and business innovation around our societal structures (Wells 2013; EMF 2017). To tackle sustainability objectives, companies often need radical changes in their operative models, business models as well as whole ecosystems. There is an urgent need for renewing business models, creating novel ecosystems, and redesigning end-to-end value chains into cycles to accelerate the transition toward sustainability and circularity (e.g. Bocken et al. 2016). There is a growing interest among academics as well as companies, legislators, NGOs, and governments in understanding how to innovate and implement sustainable business models. One of the most promising sustainable business models is a service-based business model. This is because services help to reach sustainability targets in several ways. First, transitioning from product selling to offering services encourages companies to extend the life-cycle of products by repairing, reusing, and remanufacturing products. Second, it also motivates companies to strive for efficient use of products, which can lead to cost and material efficiency in production processes (Tukker and Tischner, 2006; Tukker, 2015). In the service model, the end products are recycled instead of being in the possession of consumers after usage; hence the service model also closes the material loop.

## *1.2 Research question*

The shift from offering a service instead of providing ownership needs often a radical renewal in the whole business model. Thus, companies need a concrete understanding and tools to develop sustainable service-based business models. Therefore, our aim of the study is to explore what are the elements and patterns of sustainable service-based business models and what is the role of ecosystemic value creation in these models. Therefore, we pose the following research questions :

1. What kind of business model patterns can be identified in companies that are offering sustainable services?
2. What kind of combinations of business model patterns can be found?

This explorative qualitative study is a case study in the textile industry, which is one of the most polluting industries and facing several challenges regarding sustainability. We employ altogether four cases.

## **1. Methodology**

The method is a case study of four companies in the textile sector, which have developed and implemented a service-based business model aimed at a positive sustainability impact. We chose two Finnish textile companies that we have collaborated with in our project. Data is based on two workshops and their sustainability reports and websites. In addition, we took two well-known textile companies to complement our approach. The data of these two companies were collected by reading their sustainability reports and websites. Two of the companies represent textile manufacturing companies and two are offering a clothes-as-a-service model to their customers.

## **2. Literature review**

## 2.1 Sustainable service-based business models

In the emerging Circular Economy, services will have a profound role in a shift toward a more resource-efficient economy. Thus, companies are developing novel service business models and related business models which consider value creation and customer roles in value co-creation as central themes (Vargo and Lusch, 2004).

The concept of service has multiple meanings in terms of both scope and content (Edvardsson et al., 2005; Grönroos, 2001) since other researchers define the service concept ‘as an activity or series of activities of a more or less intangible nature that normally, but not necessarily, take place in the interaction between the customer and service employees and/or physical resources or goods and/or systems of the service provider, which are provided as solutions to customer problems. One of the most important characteristics of services in comparison to goods is that they are about processes, not things (Grönroos, 2001). The customer role in services is seen as active, a co-producer in the service production process. Another important notion is that consumers do not buy goods or services (Gummesson, 1995), but instead purchase offerings that render services, which create value.

To continue from the definition toward the categorisation of different services, the literature on SPSS has focused on exploring a deeper understanding of the servitisation process of sustainable services in both B2B and B2C contexts (Roy et al., 2009). Prior studies in the field of SPSS have found three types of services based on the role of the physical product (Tukker et al., 2006). Firstly, there are *product-oriented* services, which are centered on product sales, but they include additional services such as maintenance and take-back agreements. Product-oriented services focus mainly on product sales, where the idea is to create value by offering additional services for consumers, e.g. warranties or maintenance services. Thus, they are often called ‘product-life-extending services’ (Bocken et al., 2014), which aim to reduce energy, material, and machinery costs, resulting in benefits to the environment and the company. The product-oriented service model is suitable for products that are difficult to handle, respectively require technical expertise or regular maintenance, and/or are supporting infrastructure (Bartolomeo et al., 2003). The product-oriented service model maintains total customer ownership of the product itself; thus, these services differ only slightly from the classical buyer-seller relationship (White et al., 1999).

The second model is called *use-oriented services*, which are based on product leasing, renting, sharing, and pooling. The main difference between product-oriented and use-oriented services is the issue of ownership that remains with the service provider in the use-oriented model. Usage can be shared by several users in this model, as in, for example, car-sharing services. In this model, the responsibility for maintenance and disposal remains with the service provider. The model reduces the total number of products needed and consequently also lowers the material and energy input required for production. Further, the payment system in which customers only pay per unit of used service leads to an additional economic incentive for producers to decrease the amount of processed resources (van der Zwan et al, 2003).

The third model, *result-oriented services*, provide specific outcomes, such as the creation of a pleasant climate in offices (Kotler et al., 2013; Tukker et al., 2006). These services concentrate on the functions of a product instead of the physical product or its ownership (Ölundh et al., 2001; Mont et al., 2007). Hence, there is no determined product for the consumer; instead, satisfying the consumer's need is the focus (Tukker & Tischner, 2004). To be economically profitable, providers need to focus on efficiency, long relationships with their customers, as

well as energy and material savings (van der Zwan et al., 2003). Often models of payment are pay-per-service or functional result models in which the service provider and the customer agree on a result.

Furthermore, the access-based consumption model (Edbring et al., 2016; Mont, 2008) refers to a model in which the product use or its functions is sold, which is close to the use-oriented services or result-oriented services (Tukker et al., 2006). The selling performance - model started from the public-private partnerships embracing the transition towards a performance economy and is currently widely used to refer to the service model focusing on satisfying user needs in a sustainable way (Stahel, 2010). The difference between access-based and performance-based services is that in a use-oriented service (Tukker et al., 2006) or access-based service (Mont, 2008) consumer uses the pre-determined services, while in the result-oriented model (Tukker et al., 2006) or pay-for-performance model (Stahel, 2010), there is no determined product to be used; instead, the focus is on the gained performance. In the Circular Economy, reducing, reusing, and recycling (Widmer et al., 2018; Goyal et al., 2022) are the main principles of services. However, in line with Peronard and Ballantyne (2019), we see the need for extending this approach towards more holistic service entities, which will also open new business opportunities.

Domenech et al. 2019 have created a slightly different categorisation of services. With a product-as-a-service, they mean similar then Tukker et al. (2006) use-oriented services. Furthermore, the function guarantee model refers to a similar model to Tukker et al. (2006) product-as-a-service model. Material-as-a-service is an innovative model based on leasing materials instead of products that might in future breakthroughs as it embraces sustainability and will be also a viable solution to implement by using advanced technological solutions (Domenech et al. 2019). In Domenech et al. (2019) sharing platforms and digital solutions model, the platform operator doesn't hold the ownership as it is based on the c-to-c model. However, the platform operator still has a key role as a moderator and enabler of this business model.

The market of service-based business models for consumers is developing rapidly. There already exist plenty of good examples of consumer services that have made a breakthrough among large masses already exist. Car-sharing services have become popular, especially in large cities changing consumer practices and reducing the environmental impacts of private motoring (Ferrero et al. 2018; Migliore et al., 2020; Shaheen et al. 2012). The market is growing and there already exist several large companies such as Zipcar with over 900,000 members and 11,000 vehicles (Zipcar, 2017), and Car2Go with 2,000,000 members and 14,000 cars in several countries, including China (Green Car Reports, 2016). Also, house-sharing services have become a very popular option and made a significant impact on the whole market (Crommelin et al. 2018). Consumers are also used to selling and buying clothes via user-friendly second-hand web services and the market is constantly growing (Ackerman et al. 2017).

## *2.2 Clothing as a service -model*

Clothing as a service (CaaS) is seen as one of the most viable solutions to prevent fast fashion culture, offering customers also an opportunity for high-quality clothes without investing a large sum of money. Thus, there is a growing amount of startups and existing companies that have started to implement the model, offering clothing rental services for consumers. From the consumers' side, the shift from buying towards a service model requires quite fundamental changes in mindsets as well as in daily practices. To offer attractive business models for

consumers, companies need to gain an understanding of how they can offer better value with these new models and what are the main challenges. Furthermore, adopting a sustainable circular business model requires collaboration with a broad range of stakeholders (Stubbs & Cocklin, 2008; Antikainen & Valkokari 2016).

The textile industry is regarded as one of the most polluting industries in the world. Its environmental impact is caused e.g. by the use of harmful chemicals, high consumption of water and energy, generation of large quantities of solid and gaseous wastes, huge fuel consumption for transportation, and use of non-biodegradable packaging materials (Choudhury, 2014). Textile production affects the environment in all production stages from fibers to final products (Slater, 2003). Synthetic fibers are made from non-renewable natural resources, and a high amount of chemicals and irrigation water are needed for the cultivation of cotton. Wet production stages of textile production use fresh water to produce wastewater and require energy for drying afterward.

According to recent estimates, environmental impacts of textile production are predicted to increase due to increased textile consumption. It has been estimated that half of the clothes are used for less than a year, and also that the environmental impact of textiles can be reduced by 44 % of its wearing times is doubled (Ellen MacArthur Foundation, 2017) Zamani et al. (2017) showed the potential of CaaS model environmental benefits due to prolonged service life of garments. However, increased logistics may reduce the overall benefits.

### *2.3 The framework of the study: Sustainable business model patterns*

The debate on sustainable business models (SBMs) is currently very active (Lüdeke-Freund et al., 2018; Massa et al., 2017; Schaltegger et al., 2016a). One of the most well-known definitions of SBMs states that “Sustainable business models seek to go beyond delivering economic value and include a consideration of other forms of value for a broader range of stakeholders.” (Bocken et al., 2014, p. 484) To understand different sustainable business models more consistently, there is a growing literature path on creating sub-categories, archetypes, categorizations, typologies, generic strategies, ideal types for sustainable business models, and business model patterns (Dohrmann et al., 2015; Lüdeke-Freund et al., 2018; Tukker; 2004; Bocken et al., 2014; Stubbs and Cocklin, 2008; e.g., Albino and Fraccascia, 2015; (Abdelkafi et al., 2013; Amshoff et al., 2015; Gassmann et al., 2014; Osterwalder & Pigneur, 2009).

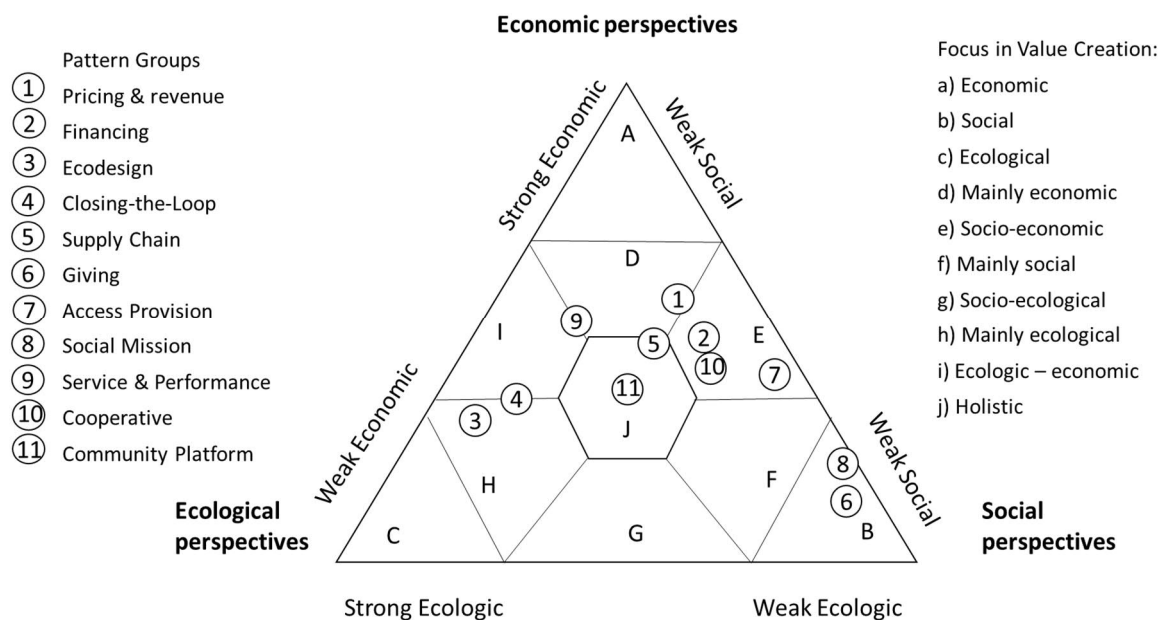
Referring to Alexander et al. (1977, p. 17), a business model pattern “*describes a problem which occurs over and over again in our environment and then describes the core of the solution to that problem in such a way that you can use this solution a million times over without ever doing it the same way twice.*” The patterns are usually selected by experience and empirical observations. In general, patterns can be tools to help in making tacit knowledge explicit. Furthermore, Remane et al. (2017) state that combinations of patterns are generalisable for different contexts and domains and can be used to solve different parts of the identified challenges. Gassmann et al. (2014) present a wide approach to business issues with 55 business model patterns. However, this research lacks the classification of the models under a specified meta-base structure. Remane et al. (2017) continued this with an extensive systematic database of 182 patterns, which was based on Business Model Canvas dimensions, to describe specific pattern characteristics.

As a continuation, Lüdeke-Freund et al. (2018) present a sustainable business model pattern with design principles, value creation, delivery and capturing activities, and different arrangements that are required to provide a useful problem-solution combination. Lüdeke-Freund et al. (2018) define a business model pattern in the following way: “*A sustainable business model pattern describes an ecological, social, and/or economic problem that arises*

when an organisation aims to create value, and it describes the core of a solution to this problem that can be repeatedly applied in a multitude of ways, situations, contexts, and domains.”

With their approach, Ludeke-Freund et al. (2018) aim to answer the need to use a formal and transparent methodology to offer actionable knowledge and insights into business model development. The goal of the pattern approach is to not only focus on the existing models and how they function, but it also aims to clarify which of the recurrent problems a business has that each SBM potentially solves and how this can be accomplished. Thus, Ludeke-Freund’s (2018) aim was to create a taxonomy for SBM that can serve as a basis for more unified and comparable studies of SBMs and offer a tool for companies to develop sustainability-oriented business models more consistently. As a result, Ludeke-Freund et al. (2018) found 45 patterns, which were divided into 11 groups in line with the ecological, social, and economic dimensions (triangle view) of sustainability, and evaluated their potential to contribute to value creation. We utilise the approach as an analysis framework for this study as we analyse our cases.

**Figure 1 The sustainable business model pattern taxonomy (triangle view) — group level. (Modified from Ludeke-Freund et al., 2018)**



In pattern group 9, Ludeke-Freund et al. (2018) present four different patterns on the service and performance business models, which have a strong economic perspective. These are in line with our discussion of the service-based business model literature review (e.g. Edbring et al., 2016; Mont, 2008; Tukker et al., 2006). However, some new models are missing such as materials as a service model (Domenech et al.; 2019).

**Figure 2 Service and performance SBM patterns (Lüdeke-Freund et al., 2018)**

G9 Service & Performance Patterns	Primary: mainly economic / Secondary: ecologi
P9.1 "Pay for success"	Mainly economic
P9.2 "Product-oriented services"	Mainly economic
P9.3 "Result-oriented services"	Ecologic–economic
P9.4 "Use-oriented services"	Ecologic–economic

### 3. Results

The results indicate that there are certain business model patterns that case companies have implemented in their business model. The sustainability impact of their current service-based business model focuses mostly on creating environmental and economic impact, while the social value dimension remains in a smaller role.

Closing the material loop and sustainability starts from the design of the products, which has been considered by the cases that also manufacture the products. Thus, differentiating aspect in SBM patterns was that the clothing manufacturing case companies included the product design perspective while the clothing rental companies employed the subscription model.

All of the cases have considered closing the loop aspect by including maximising resource efficiency, product recycling, reusing, and offering repairing services. The role of sustainability in the supply chain was also mentioned in three cases. The perspective was to focus on the societal and ecological sustainability of the supply chain highlighting the efficiency aspect and logistics. Pure Waste is currently piloting use-oriented services. Houdini also offers repair and maintenance as well as use-oriented services although their main incomes are still coming from product sales. Vaatepuu and Rent the Runway offers repair and maintenance services as a part of the subscription model.

**Table 1 Identified SBM pattern groups and patterns in cases**

Company	SBM pattern groups and patterns	
<b>Pure Waste, (Manufacturing company)</b>	Ecodesign: Product design	
	Closing-the-loop: Maximise material productivity and product recycling	
	Supply chain: Green supply chain mgmt	
	Service & Performance: Use-oriented services	
<b>Vaatepuu (Clothes-as-a-service provider)</b>	Pricing & Revenue: Subscription model	
	Closing-the-loop: Maximise material productivity, Product recycling, Repair, Reuse	
	Service & Performance: Product-oriented services, Use-oriented services	
<b>Houdini, (Manufacturing company)</b>	Ecodesign: Product design	
	Closing-the-loop: Maximise material productivity, Product recycling, Repair, Reuse	
	Supply chain: Green supply chain mgmt	
	Service & Performance: Product-oriented services, Use-oriented services	
<b>Rent the Runway (Clothes-as-a-service provider)</b>	Closing-the-loop: Maximise material productivity, Product recycling, Repair, Reuse	
	Supply chain: Green supply chain mgmt	
	Pricing & Revenue: Subscription model	
	Service & Performance: Product-oriented services, Use-oriented services	

## 4. Conclusions

Based on the results, we were able to identify certain sustainable business model patterns in the case companies. One of the common notions was that companies were simultaneously having many patterns of sustainability, which led to the identification of several patterns for each company. Therefore, one interesting path for future work will be to explore the different combinations of SBM patterns companies in different industries have developed and implied. In addition to the scientific contribution, this would offer valuable practical knowledge to the companies.

Although, in this study, we didn't find those, in the future Lüdeke-Freund et al (2018) patterns can be extended to cover also material-as-a-service or sharing-based business models. Material-as-a-service models aren't currently existing, but in the future presumably, also these models will break through as innovative solutions for embracing sustainability. In the clothing industry, sharing-based business models already exist, thus it would be an interesting area to be analysed with this framework.

This is an explorative study testing the applicability of the framework in creating both theoretical and practical understanding of the phenomenon. Thus, there are several paths to explore further. Enriching the collected data with other data sources such as interviews and business plans would create a more in-depth understanding of the SBM in the case companies and help to understand better the development and implementation paths of SBMs. Exploring and comparing different industries would be needed to provide a comprehensive approach to building and complementing the framework.

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