

EPR-SYSTEMS AND NEW BUSINESS MODELS FOR SUSTAINED VALUE CREATION: A STUDY OF SECOND-HAND CLOTHING NETWORKS IN SWEDEN

Rudrajeet Pal

University of Borås/Department of Business Administration and Textile Management

ABSTRACT

The paper aims to explore and map diverse business models and their core drivers in the used clothing network in Sweden followed by identification of the emerging patterns and their differential degrees of value creation. Information was gathered through desktop survey and semi-structured interviews. 14 different operating business models were identified, out of which 8 each can be categorized as service-based and resell-based, either with or without product ownership. Some business models were common to both categories. The paper contributes to the understanding of environmental and economic gains of each business model - the key to value creation of responsible business models.

Key Words: used clothing, business model, extended producer responsibility, value creation, Sweden.

1. INTRODUCTION

The increased pace of consumption and disposal of textiles and clothing is causing significant global environmental impacts. This has necessitated the need to consider post-consumer textile wastes (PCTWs) as a valuable resource, seeing that PCTWs are created faster than they can be absorbed or recycled [1]. Value creation from these textile and clothing wastes through reuse and redesign practices constitute a relief to the issues regarding both new production and the current disposal system. Current statistics suggest the annual consumption and disposal of textiles and clothing in the Nordic countries is about 15 kg/person (of which 60% is clothing); out of this nearly 8 kg are collected and incinerated as household wastes, while 3 kg are donated to collecting organizations from which only about 0,9 kg are sold for reuse within the Swedish borders, while the rest is exported [2]. Incineration and export of used clothing constitute an environmental issue in lost material value which could have been reused and in later loops recycled [3]. This clearly states resource (in)-efficiency and subsequently lack of maximizing value that can be drawn from the used clothing. These impacts can be partially reduced through a greater reuse of used clothing in many new/innovative ways driven by the extended producer responsibility (EPR) schemes or models.

EPR schemes or models aim to extend the producers', and other actors', responsibility for the product to the post-consumer stage [4], by increasing the demand for downstream activities of collecting, sorting and reusing or recycling, and/or extending the active lifetime of the product for higher utilisation of products [5]. Watson et al. [4] in this regard has highlighted eight out of 24 EPR schemes or models those are critical and pertinent to used clothing value networks, viz. (i) mandatory EPR schemes, (ii) voluntary individual EPR (own brand), (iii) in-store collection with partner, (iv) leasing of own brand, (v) re-sell of used own brand (either in-store or online), (vi) clothing libraries, (vii) repair and fitting, and (viii) luxury second hand shops. Trade-offs exist in the patterns underlying these EPR-models in terms of

being individual or collective, mandatory or voluntary, and upstream or downstream in participation of various actors in the network [4, 6].

These EPR schemes or models have resulted in various actors in the existing used clothing network to implement different types of activities or initiatives, such as collection of second hand clothing (with or without partners), reselling used clothes via own stores, clothing libraries, renting/leasing of clothes, redesign and reuse or exchange platforms, etc., into their business strategies and therefore try to maximise the value potential in the used clothing network. Majority of these activities have resulted in rapidly developing new/innovative business models essential in various ways, viz. through new product systems or broader economic responsibility and collaborations for leading sustainable value creation [7]. Existing actors predominantly adopted five different business models, viz. (i) product take-back schemes, (ii) reuse and reselling, (iii) collaborative consumption, (iv) design for extended life, and (v) re-design and repurposing [4].

However, various aspects are still underexplored both in theory and practice. First, it is not yet explicit about the difference between the EPR-models and operating business models. Watson et al. [4] claims that some of the EPR-models can also be considered as business models. Second, a clear distinction between types of *activities* and different business models is still missing. As Watson et al. [4] highlights an individual company may engage in diverse activities related to reuse and recycling which together may constitute one overall business model. On the other hand, a single company can also operate with multiple business models through different combinations of activities thus creating a range of unique business models in the same company as advocated by Teece [8]. Finally, a clear mapping of these identified business models is also crucial along their constituent elements, viz. value proposition, key activities, and profit formula [9] to identify associated emerging patterns and hence how they are essentially contributing towards EPR and maximising value.

In this context, the paper aims to first, explore and map the diverse business models and their core drivers, followed by identification of the associated business patterns both individually and among the operating businesses. Finally a relation is established to existing EPRs and their existing state of value creation.

2. METHOD

Information for the present research was gathered in two stages. At first, thorough desktop survey was conducted by referring to relevant reports, articles, websites and studies to illustrate various business models/activities, EPR models and their underlying characteristics currently existing in the used clothing network. This was followed by a set of semi-structured discussions (in the form of interviews) conducted with various identified actors operating in Sweden, viz. branded retailers (Boomerang, Kappahl, Nudie), second-hand retailers (Myrorna), charities (Redcross), clothing library (Klädoteket), Laundry (Alingsås Tvätteriet), sorting company (I:Collect) among others. The choice of these critical company cases were very much based upon the purpose of the study. These discussions were led by student groups under the supervision of author aimed at obtaining a clearer picture of the business- and EPR- models in practice. Subsequent analysis made use, as far as possible, of data gathered from businesses/organizations engaged in each model, supplemented with qualified assumptions where necessary.

3. RESULTS

14 different business models can be located in the used clothing network as summarized in Table 1. These are described briefly below:

1. Collection+Sorting – In this business model, predominantly fashion retailers organize a take-back scheme in-shop. Clothing owners typically come and deposit their old clothes in exchange of a discount coupon valid on their next purchase at the retailer's outlet. This offers the customers with "shwopping" of their old clothes for discounted purchase of new one. The next step of pick-up, sorting and grading of the collected garment is mainly conducted by a partner as they are transhipped to a central sorting facility. The terms of the sorting companies are in terms of payment for the collected used textiles. Seldom have the fashion retailers done the sorting by themselves unless they sell them in their own store (a different business model). In connection, the business model pattern recognized for the fashion retailer is of service-based "shwopping" (with or without partner) fitting well with the product take-back scheme EPR. Such EPRs are voluntary in nature and originates after the end of the 1st lifetime of the product. However, the economic gain of such model is 'low' for the collectors unless we consider the economic gains made from sales of new clothes due to the discount coupons.
2. Direct Reselling – In this kind of business model, the garments brought back by customers are divided into three categories, viz. recycle, resale and restyle. The brands normally resale the highest quality garments in their own stores, as was seen in case of the Swedish brands Boomerang and Filippa K. While Boomerang has seven stores that sell its own brands, Filippa K has a separate resell store for this. These garments are of higher quality/value hence is not considered to compete with the charities. Key activities organized by the brands are picking & packing, laundering, receiving & storing, and finally restyling if necessary. Recycling and restyling, here, are classified into different business models due to their variant business logic. Old owners on an average receive a discount of 10% on their next purchase, which can be utilized for purchase of both new and second-hand garments. This business model format is represented in already existing EPR category as "re-sell of used own brand". In terms of value creation potential, the environmental gain achieved through reselling is 'medium' considering as the positive environmental gains from lesser usage of virgin materials, however this is countered by the offering of rebate coupons which can be used for the purchase of new items as well. The economic gain is 'medium' considering the average sales value of EUR 17 as identified by Watson et al. [4].
3. B2B reselling – Similar to collection+sorting, this business model format also favours shwopping activities as it provides old owners a rebate on new purchases. This displacement effect makes its environmental gain lesser than the direct selling model where the vouchers could be used to purchase other used clothes as well. However, on the other hand, clothes those are sent for recycling enters the material loop again hence benefiting in terms of lesser impact on virgin raw material consumption. It is hard to equate the right environmental benefits without further research. The brands are engaged in key activities similar to that for direct selling. The economic gain for the brands are however lower as the clothes are particularly of lower quality which cannot be sold in their own stores, instead sold to charities or even sent for recycling. On an average, 20% of the collected clothing is reused (after restyling or repairing) while the rest 70% is still landfilled or incinerated, while the rest 10% is recycled.
4. Charity – The charities and other non-profit organizations have over the years started following social business model formats which supplements monetary profits with social profit maximization [10]. Such business models in the used clothing network are based upon offering second-hand clothing at a low price apart from just philanthropic donations. Charities organize most of their activities themselves,

starting with collection and followed by sorting, distribution and reselling either via own stores or to third parties. The monetary gain from such reselling is modest. However, charities also partner with fashion brands, as for example, Stadmissionen Stockholm's partnership with Filippa K to receive its lower quality clothes that Filippa K do not want to sell in its own stores. Different ways of monetization can also be noticed in charities outside Sweden. However, there lacks a clear indication on how such socially profitable business models can be categorized under existing EPR schemes or models, perhaps as a reseller of old clothes. In terms of value creation, such businesses render 'high' environmental gains as they do not support purchase of new clothes instead have considerable displacement effect against its purchase. But considering the not quite high mark-up these businesses can fetch due to lower quality and also because of their social model, the economic gain is lower.

5. Second-hand luxury – Such businesses are offering second-hand luxury clothes at an affordable price and are increasing becoming popular. By offering its customers a selected consignment in terms of the styles and brands they accept to display these shops engage in sourcing of consignment from either wholesalers or individuals, selection and finally displaying them in a retail format. But to the comparatively higher price of the luxury second-hand clothing the economic gain from such models is 'high'/'medium' except from the fact that these organizations/shops have to pay a VAT on their sales unlike the charities, but cannot claim an input VAT since they are "buying" from ordinary people rather than businesses most of the times. Generally, for such "buying" from individuals the product ownership is still retained by the individual/old owner while the profit is split, commonly into 50-50, upon its sale. This can be hence classified by an open service-based model as (others') product is offered retail service by the second-hand luxury business. The environmental benefits rendered are also 'high' considering high displacement effect on purchase of new clothing.
6. Second-hand retailer – Similar to second-hand luxury with the exception that consignment is not so selective and of high price range. In fact any second-hand clothes can be sold by these retailers; hence the consignment is not so selective. Further, the consignment is owned by the retailer and seldom is the profit shared with the old owner. This classifies such a business as a multi-brand second-hand retailer (where the collection is mostly based upon donation) rather than being service-based. The environmental benefits are similar to that of second-hand luxury businesses; however, the economic gain is lower due to lower average mark-up on its consignment.
7. Leasing/Renting – Such business models favour collaborative consumption with a product have several users in its first life. Such lending or renting models have become common in case occasional wear items having less frequent usage, e.g. wedding gown or formal evening or party wears. In these cases the company purchase or produces and owns the product, hence possesses the responsibility of the brand, meaning that the fabrics can be reused/recycled at the end-of-life stage or repaired. There can be various types of monetization formats under this business model type, viz. long-term subscription-based agreement or one-off loans (rents) or customer paying a small amount at start followed by payment of a leasing fee over a set period of time, etc. Typically the business model pattern in such case falls into a service-based model with retained brand/product ownership. Such a business model also calls for enhancing the design for durability and reusability of the product to prolong the products' quality life-time. Related EPR model can be clearly identified as "Hiring, leasing and borrowing" with characteristic of being voluntary, individually run by the brand owner. This aims at either extending or enhancing quality life-time of the

product through “design for durability” and subsequent multi-usage. The environmental benefits are high due to high displacement effect provided the “usage time” [4] is low. Even though no data is available on the “usage time” it can be assumed that this is particularly low for baby and children’s clothes where the user grows fast. The economic benefits, on the other hand, are still low-medium as the activities are resource-demanding while the returns (in terms of fees) are limited. However, future crowd-funding models might emerge in near future.

8. Laundry – Laundries, similar to other renting/leasing services, are also offering its customers opportunity to rent clothes owned by them. Customers are mainly public institutions like hospitals and businesses (e.g. hotels, etc.). This service-based business model offers its customers services that include cleaning and mending of the clothes as well. It falls under the EPR category of “Hiring, leasing and borrowing” with characteristics as identified in case of other leasing and renting services. With the advantage of having the full ownership the laundries also take the responsibility to enhance the longevity of the clothes by engaging in various ‘design for reusability’ activities. The displacement effect on purchase of new clothes is high in this regard provided the customers tie with the same laundry for a long time-period. However the economic viability of such a model is challenged by the low fee-based revenue structure inherent to this business model type.
9. Online Marketplace – Internet platforms like online marketplaces increasingly provide opportunities for customer-to-customer (C2C) transactions and collaborative consumption of clothes. Such platforms render open services, in the sense; they do not possess the ownership of the clothes but offers e-tail services to the old owners who want to sell their clothes. Such businesses hence provide the users a platform to sell their clothes themselves. Typically, the monetization for businesses is either through membership or subscription fees from the users who want to engage in C2C transactions; apart from that they also make revenue by offering space to advertisers on a rental basis. However, in connection to their effort to increase business responsibility the closest fit is with “reuse and resell” under EPR models. The environmental benefits of such models are in due to displacement of sales of new clothes while the economic benefits are in terms of fees generated by the platform service. However, such online marketplaces are increasingly growing, e.g. e-bay – world’s largest online marketplace having more than 2 million garments registered for sale (including new clothes); Danish EPA on the other hand estimates the growth rate of such businesses to be around 20% per month.
10. Swapping Platform – As discussed above under online marketplaces, these platforms can also organize online swapping events where users exchange their used clothes instead of buying one. Such swapping platforms are also organized as physical meeting places to exchange clothes. Many brands, particularly those renting or leasing their clothes also organize such swapping events for users so that they can exchange the clothes themselves (paying a fee to the organizer/brand) instead of increasing the logistics the garments. However, such swapping events could also be run free without a business perspective, mainly by unions. These platforms are also open service-based business models having ‘high’ displacement potential, hence environmental benefits, but ‘low’ economic gains.
11. Clothing Library – Similar to online marketplaces and swapping platforms mentioned above, the clothing libraries also offer C2C transactions thus unifying fashion interests of multiple users for collaborative consumption [11]. Such libraries can be

either physical or online. The clothes are typically donated by producers, designers, members or organizations and are the property of the library. However, models could also operate where the original owner retains the ownership. This classifies such clothing libraries to be either open-service or closed-service based depending upon who has the ownership of the clothes. In case of libraries possessing the ownership, the borrowers pay a subscription or membership fee to enter into the borrowing process; fines can be charged for late returns. While in cases where the original lender still retains the clothes the borrower either borrows for free or in return for a fee. Clothes exchanges in such cases are organized mutually by the lender and borrower. This business model offers users the opportunity to rapidly renew their wardrobe without the need to purchase new textiles thus having 'high' displacement effect; found to be around 28% in a recent UK study. Further, the economic benefits of these business models not very clear, but is estimated to be low. This is because of the revenue generation is based upon membership or late fees only, whereas the costs could be high due to maintenance of internet site plus marketing (for virtual libraries) or running premises (physical libraries). However, these libraries sometime receive financial support from state/municipalities. Further, it is assumed that their economic benefits could be higher than that of rental services as they are not required to deliver or launder clothing.

12. Redesign – Such business models have the potential to offer high value-added used clothing through high degrees of redesign and reconstruction of the old clothes. Used garments can be turned into new (and hip) items which can be used as 'new' clothes. Such businesses can either be just redesign service-based, offering open redesign, in return of redesign fees. This means that the original owners retain the ownership and 'pimps' his/her clothes to a new one through this service. While, on the other hand, it can be that these redesign factories create their own redesigned collection for sale on clothes being donated by both customers and producers. Producers can also offer such services to owners of its brands along with idea workshops on how customers can redesign and upgrade their own clothes which they no longer use (as a product-service system offering). Typically, such business models extends the responsibility of the associated actors through their role in extending the product durability and hence lifetime. The environmental gain is dependent upon the increase in the usage time however the economic gains are high primarily due to major value-added redesign activities.
13. Repair/Fitting – Such business models have started to re-emerge in the Nordic countries once again, and are offered by the clothing brands (Nudie) and other actors (like tailors). The value proposition offered to customers is in terms of extended life and durability of a specific garment, either through repairing or altering it to a different size. Allied activities can also include cleaning services to be more cost-effective. These services can be add-ons to the purchase of high-quality relatively expensive clothes (shifting the focus from product to product-service). Along with training workshops can also be organized by brands on basics of mending and repairing activities. On the other hand, such services can also be offered to original users in return of service charges as offered by tailors (open service innovation). Such business models extends the responsibility of the associated actors through their role in extending the product durability and hence lifetime. In this model, the environmental gain is dependent upon the increase in the usage time resulting from the repair and has been assumed to be significant in prior studies. However, the economic gains are still low, primarily due to low demand (due to challenges from cheap high-street fashion) and high labour costs resulting in ~10 years of payback time.

14. Reclaim-First hand – Even though this business model does not deal with used clothing, but the benefits of it are similar to that of used clothing in terms of its displacement effect for decreasing newer production. In Scandinavia on an average 0,03 kg per capita is yearly donated to charities from fashion retailers. These are leftovers with or without any quality issues, i.e. either surplus stock or cut-offs from production phase. These are first-hand clothes and can be sold with minor repair/redesign which can enhance the product lifetime. Such products can first be de-branded followed by either donation or selling at own store (factory outlets). Such additional sales are profit generating and can also displace production of newer garments. Environmental gains from such business model can be ‘high’ considering not favouring of sales of new garments, while economic benefits can be ‘high’ as well.

Table 1. Mapping and connecting Business- and EPR- models along their characteristics for value creation

Business Model and its core drivers				Business Model Pattern	Connecting EPR model	EPR characteristics*	Value Creation [#]
Type	Customer Value Proposition	Key activities	Profit Formula				
Collection-Sorting (e.g. H&M+I:Co; Jack & Jones+I:Co)	Shwopping	Collection, grading, sorting	Collector (mostly the brand): Offering discount to shoppers on new purchases Sorter (partner): Value-added grading	Service-based Shwopping scheme (with or w/o partner)	Product take- back schemes (with or without partner)	Voluntary/Individu al or Collective/Post 1 st Life	Low/Medium for sorter, Low for collector
Direct Reselling (e.g. Boomerang, Filippa K)	Second hand clothing at low price; Shwopping	Collection of own brand w/o partner; Laundry, Reselling via own stores	Resell: offering discount on new garment or commission to old owner	Resell (own second-hand) with discount offer to old owner	Re-sell of used own brand (in- store)	Voluntary/Individu al/Post 1 st Life	Medium/Medium
B2B reselling (e.g. Filippa K+Stadsmissionen)	Shwopping	Collection (of mainly own brand); Reselling	Resell to others: offering discount on new garment or commission to old owner	B2B Resell (own second-hand) with discount offer to old owner	Re-sell of used own brand (through other organization)	Voluntary/Collecti ve/Post 1 st Life	Low or Medium/Low
Charity (e.g. RedCross, Stadsmissionen)	Second hand clothing at low price/donation	Collection, sorting/grading and distribution, reselling via own stores or to third parties	Resell; Commission from partners	Resell+Social	Not explicit. [can fall under: Reuse and resell]	Voluntary/Individu al or Collective/Post 1 st Life	High/Low or Medium
Second-hand luxury (e.g. BeyondRetro)	Access to luxury brands at lower price (Affordable luxury)	Selection of consignment, Sourcing from 2 nd hand wholesalers	Resell; Sharing profit with old owner-VAT	Open Service- based Luxury resell	Platform for resell	Voluntary/Individu al/Post 1 st Life	High/High- Medium
Second-hand retailer (e.g. Myrorna, Emmaus)	Second hand clothing at affordable price	Selection of consignment, Sourcing from 2 nd hand wholesalers or directly from donator	Resell value- VAT	Multi-brand second-hand retailing (w/o partner)	Resell	Voluntary/Individu al/Post 1 st Life	High/Medium

Leasing/Renting (e.g. <i>Houdini, Rent-a-plagg</i>)	Collaborative consumption of expensive occasional clothing	Leasing/Renting service	Leasing fee or Rent: Long-term subscription-based or one-off loan	Rental Service-based brand ownership	Hire, leasing and borrowing + Design for durability	Voluntary/Individual/Pre- and During 1 st Life	High/Low or Medium
Laundry (e.g. <i>Alingsås Tvätteriet</i>)	The services of renting, cleaning & mending as offerings	Renting, cleaning & mending services	Rent from businesses and public institutions	Service-based	Hire, leasing and borrowing	Voluntary/Individual/During 1 st Lifetime	High/Low
Online Marketplace (e.g. <i>Blocket, Tradera</i>)	C2C transactions, Collaborative consumption, Access to a variety of clothes at low cost, Unification of fashion interest	Provide product or service information; E-commerce	Membership fees; Subscription fees; Ads	Open Service-based e-platform - B2C or C2C	Platform for resell	Voluntary/Individual/Post 1 st Life	High/Medium
Swapping Platform (e.g. <i>Swappis</i>)		Organize Swapping event	Membership fees; Ads; Free	Open Service-based platform for sharing	Platform for resell; Hire, leasing and borrowing	Voluntary/Individual/During or Post 1 st Life	High/Low
Clothing Library (e.g. <i>Klädoteket, Lånegarderoben</i>)		Renting through subscription; Running physical or virtual library	Subscription fees from members [can be free as well]	Service-based Platform for sharing (open or closed)	Hire, leasing and borrowing	Voluntary/Individual/Post 1 st Life	High/Low
Redesign (e.g. <i>RedCross, Dreamandawake</i>)	Value-added redesign on idle clothes	Upcycled redesigning (Recoupling or Reconstruction)	Redesign charges; Higher resell price	Design Service-based platform (open or closed)	Extending lifetimes + Redesign	Voluntary/Individual/During or Post 1 st Life	High/Medium or High
Repair/Fitting (e.g. <i>Nudie Repair</i>)	Design for durability, Reduced emphasis on changing collection	Repairing, tailoring and fitting services; workshops	Service charges	Mending Service-based (open or closed)	Extending lifetimes + Redesign	Voluntary/Individual/ During 1 st Life	High/Low
Reclaim-First hand (e.g. <i>Branting</i>)	First-hand clothes	De-branding, donating+selling, selling in own store	Non-markdown Sales; Additional Sales	First-hand Retailing with or w/o partner	Extending lifetimes + Redesign	Voluntary/Individual or Collective/Pre 1 st Life	High/Medium or High
<p>* Voluntary or Mandatory/Individual or Collective/ Pre-, During- or Post 1st Life stage # Value creation is represented in terms of Environmental gain/Economic gain. Environmental gain: is in terms of the displacement potential (how much is the purchase of new clothes being replaced by the sales of old clothes) – Low: only favouring purchase of new clothes, Medium: favouring purchase of both old and new clothes, High: favouring purchase of old clothes only; while Economic gain: is in terms of sales of old clothes only (determined by the sales mark-up).</p>							

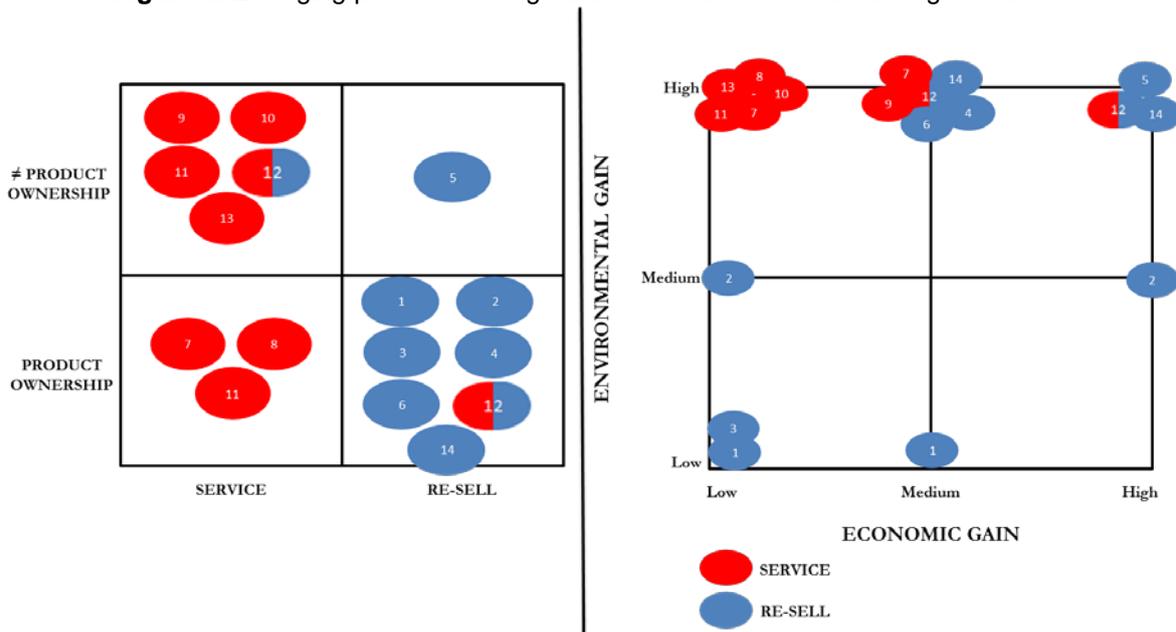
4. DISCUSSION

Several key patterns are emergent through the mapping of the operating business models in the used clothing network in Sweden. These business models are not only limited for producers but are also evident among other actors in the network.

In terms of business model patterns, we see that there are 8 business model types those are service-oriented, out of which 5 types do not involve ownership of the product (cf. Figure 1). These can be categorized as open service-based business models, and are either service platforms (like online marketplaces, swapping platforms), clothing libraries or redesign-oriented. All these business models render high environmental benefits or gains considering their high effect towards displacement of new clothing production (cf. Figure 1). Out of these business models the redesign service-based models typically gain higher profits while, so far, the C2C platforms and libraries based upon membership or subscription fees, or even sometime totally free, are less economically beneficial. Clothing libraries can be both with or without product ownership [11].

The other emergent business model pattern is in terms of reselling of used clothes; most of these possessing product ownership either due to donation or collection from businesses and individuals. 7 out of these 8 resell-based business models possess product ownership, except second-hand luxury shops which monetizes on the basis of commission gained through sales where the original owner still retains the product ownership [4]. Such second-hand luxury shops are high in rendering environmental benefits due to high displacement potential. The other resell business models are mainly either B2B or B2C selling where the businesses possess the product ownership. Sales can take place through own stores or via online platform. Typically some of these business models which render original clothes owners with discount coupons for next purchases in exchange of old clothes are not so environmentally beneficial due to their low displacement effects; while the ones which focusses on either second-hand clothes only or on redesigning are more environmentally gaining as they do not stimulate buying of new clothes.

Figure 1. Emerging patterns among business models in used clothing network



Hence, trade-offs exist in the patterns underlying these business models in terms of being open or closed, individual or collective, and upstream or downstream in terms of participation of various actors in the network [6]. These are essential to connect the business models to the existing EPR systems. However, it was evident that some of the business model types could not be related very clearly to an existing EPR model.

5. CONCLUSIONS

The contributions of this paper are manifold. First, it makes a contribution towards developing structured understanding and mapping of the various operating business types in the used clothing value network. This helps to identify the various core drivers of each business model along their key constituents.

Second, the paper identifies differentiating patterns among these business models and in connection also identifies and classifies their degrees of value creation. This way the paper creates an understanding of the environmental and economic gains of each business model - the key to responsible business models.

Finally, the paper attempts to connect each business model to the existing list of EPRs; however it is realized that the terminologies used to classify the existing EPR system are very overlapping with business model types.

In this context, further research is required to identify the extended responsibilities along five responsibility types specified by Lindhqvist [12] to explore the explicit connection between business models and activities to extended responsibilities (ER) of various actors in the used clothing network. Further research is also needed to explore how these business models with their ERs explicitly relate to value creation and to what degrees.

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Corresponding author:

Rudrajeet PAL

Department of Business Administration and Textile Management; University of Borås

Skaraborgsvägen 3

501 90, Borås

Phone: +46-33-435-45 30

Fax: +46-33-435-40 09

E-mail: rudrajeet.pal@hb.se