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CIRCULAR BUSINESS MODELS FOR THE CLOTHING SECOND LIFE: RESULTS OF QUALITATIVE EMPIRICAL RESEARCH

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ABSTRACT: A critical need to transform huge amounts of post-consumer textile waste (PCTW) into valuable circular resources prompted the authors to examine the strategies which may be adopted to enhance the practice of circular textile economy (CTE). This qualitative exploratory study included semi-structured interviews with a representative of the company and secondary data content analysis. By design, the authors operationalised CTE in the form of circular business models (CBM). The research results demonstrate CBMs canvas for slowing-loops reuse (i.e. resale, re-purposing), which may be communicated to other stakeholders in the sector and may be used as a visual tool in education. However, CTE strategies and CBMs are subject to change. The research results are exploratory and offer insights which may be further tested in other contexts. In general, the research may contribute to the theory of circular business models, with a particular relevance to post-consumer textiles (PCT) circularity.

KEYWORDS: circular economy, circular business model, textile waste, post-consumer textile waste

Introduction

Textiles are part of humans' existence, providing them with clothes, footwear, carpets, curtains, furniture for homes, offices, and public utility buildings (EEA, 2019). Nevertheless, overproduction and end-of-life of home textiles, clothes and other clothing items generate a huge amount of waste (Domańska-Sikorzak, 2024; Huynh, 2022; Saccani et al., 2023). Worse yet, although these products owned by individuals and organisations represent an investment in exchange for an expected period of useful and trouble-free use (EEA, 2023), they are often not fully utilised and are thrown away before their actual useful life has elapsed (EEA, 2021a; EEA, 2024a). In addition, one in five items of clothing that go straight to waste is never sold or used (Coscieme et al., 2022). Consequences for the environment result from the amount of waste from discarded clothing at the disposal stage (Teixeira et al., 2023). It is estimated that total post-consumer textile waste may reach up to 148 million tonnes globally by 2030, a 62% increase when compared to 2015 (EEA, 2021a; Farrukh & Sajjad, 2024). The average citizen of Europe generates around 11 kg of textile waste per year (EEA, 2021a). To make matters worse, over 70% of textiles and clothing end up incinerated or landfilled at the end of their life, resulting in a missed opportunity to enable circularity (Coscieme et al., 2022). The above statistics reveal that textile waste (TW) management is suboptimal with respect to the recommended waste management hierarchy (Horn et al., 2023), as landfilling and incineration are still the dominant textile waste treatment methods (Morell-Delgado et al., 2024). This reveals the critical need to implement CE strategies to reduce the amount of TW and its negative (short- and long-term) environmental impact (Teixeira et al., 2023) at both micro- and macroeconomic levels (Sztorc & Savenkovs, 2025). While large manufacturers are already making a transition towards the circular economy (CE) and others are now aspiring to incorporate CE into their business models to enable CE (Susur & Engwall, 2023), a broad and comprehensive transition towards CTE is still in its early stages (Farrukh & Sajjad, 2024; Szpilko & Ejdyś, 2022).

A key role in supporting the transition towards CTE-oriented systems is played not only by textile and fashion producers (Massari & Giannoccaro, 2023), but also by those operating in the textile recycling market and/or in the second-hand clothing market (IMARC Group, 2024; Prozman et al., 2024; VIVE Goup, 2024a; Wójcik-Karpacz, 2023) and environmentally conscious consumers (Reike et al., 2018; Wolski, 2025). Unfortunately, many examples of successful CBMs remain unknown (Walaszczyk & Dingli, 2025), which means that entrepreneurs have limited access to good practices in the field of CTE (i.e., CBMs for slow post-consumer textile resource loops) that they would like to implement. The originality of this paper stems from the fact that it presents a description of CBM components for slowing-loop reuse (i.e., resale, re-purposing), which are missing in the subject-matter literature.

That is why, the aim of the research is to explore circular economy (CE) strategies for post-consumer textile waste (PCTW) at the enterprise's business model level as a unit of analysis. To achieve this aim, the following research questions were formulated:

RQ1: How does VIVE Textile Recycling (VTR) incorporate CE strategies into post-consumer textile waste management?

RQ2: What types of business models does VTR primarily use to manage post-consumer textile waste?

To answer the above research questions and fill the knowledge gap in the existing subject-matter literature, we applied a qualitative single-case study design with multiple data sources. We chose a large industrial enterprise that has been involved for decades in the wholesale and retail sale of sorted and unsorted second-hand clothing imported from Western Europe, as well as raw materials processed into industrial cleaning cloths. VIVE Textile Recycling is the largest company within the VIVE Group (VG) structure, whose mission is to give PCTW a second life and to follow the "3R idea": reuse, reduce, recycle. We operationalised CTE in the form of CBMs. The essence of our argument is based on the assumption that CBMs challenge the linear logic of "take-make-waste" value creation (EC, 2020) and are seen as enablers for the transition towards CE (Bocken et al., 2016; Kanzari et al., 2022). We discussed CBMs and CTE strategies to slow resource loops (reuse of second-hand clothing) as feasible solutions.

An overview of the literature

This part introduces the key concepts for this research: post-consumer textile waste, circular economy (CE) and CE strategies, as well as circular business models (CBM). These concepts are first introduced in a general manner and then used to examine the CE strategies and CBMs aimed at PCTW in the following part.

Types of textile waste. There are post-industrial and post-consumer textile waste. Post-industrial textile waste includes various types of waste generated during production operations, such as fibre and yarn remnants as well as fabric scraps (Niinimäki et al., 2020; Patti et al., 2021). Post-consumer textile waste (PCTW), in turn, includes used home textiles, clothing, and footwear which consumers no longer need (Farrukh & Sajjad, 2024), and these are the subject of the authors' research interest.

Circular economy and CE strategies. To address textile waste, the literature emphasises the role of the circular economy (CE) view. The CE view first appeared when Boulding (1966) proposed a circular economy system which could support sustainable development (cited in: Castro-Lopez et al., 2023). However, the CE concept was introduced later by Pearce and Turner (1990) in the description of the system of mutual interactions between the economy and the natural environment and their implications for the future development of humanity, which is both the producer and recipient of waste (quoted in Vegter et al., 2020). In other words, based on the principle that “*everything is an input to everything else*”, these authors critically examined the traditional linear economic system and developed a new economic model, called “circular economy” (Rizos et al., 2017). In this way, the CE concept was introduced in opposition to the linear economy, which is an example of a resource “take-make-waste” approach (EEA, 2024b; Sztorc & Savenkovs, 2025), which directly transforms natural resources into waste (Castro-Lopez et al., 2023; Vegter et al., 2020). This waste is a potential resource in the sense of CE and should be used in terms of materials, which results in maintaining a higher level of raw material resources on the market and, at the same time, reducing the amount of waste permanently stored (Horn et al., 2023; Schandl et al., 2024). Such a radical change entails a major transformation of current production and consumption patterns, which in turn have a significant impact on the economy, the environment and society (Rizos et al., 2017). Understanding these influences requires a deeper understanding of the concept of CE. Therefore, in the past decade, use of the CE concept by scholars and practitioners has grown steadily (Kirchherr et al., 2023). Since the first formal use of the CE concept by Pearce and Turner (1990), it has been interpreted and implemented in a variety of ways (Rizos et al., 2017; Kirchherr et al., 2023). Kirchherr et al. (2023) conducted the most comprehensive analysis of the definition of CE in scientific discourse, making several important findings. They found, among other things, that the concept has both consolidated and diversified, and that definitional trends are emerging that potentially have more implications for science than for practice. Many authors have presented resource-oriented definitions, emphasising the need to create closed-loop material flows and reduce the consumption of virgin resources and the associated harmful environmental impact (Rizos et al., 2017), and this is the approach we adopted in our study. For instance, CE refers to “*an economic system that uses the reuse of products and materials and the conservation of natural resources as its starting point, in which economic, social and environmental values are important in every part of the system*” (Reike et al., 2018). Also, value retention may be referred to as looping, and CE is sometimes depicted as loops, which include a hierarchical view. The shorter the loop, the more effective a measure is in terms of its value retention, as it requires less intervention, such as energy or resources, from outside the system (Reike et al., 2018). In a similar vein, Sauv e et al. (2016) claim that the circular economy “*refers to the ‘production and consumption of goods through closed loop material flows that internalise environmental externalities linked to virgin resource extraction and the generation of waste (including pollution)’*”. In their view, the primary focus of the CE is the reduction of resource consumption, pollution and waste in each step of the life cycle of the product. Mitchell (2015) goes further and emphasises that “*A circular economy is an alternative to a traditional linear economy (make, use, dispose) in which we keep resources in use for as long as possible, extracting the maximum value from them whilst in use, then recovering and reusing products and materials.*” These may require enterprises to create new business models or processes with take-back systems.

CE also includes a hierarchy of waste management options. Findings in the subject-matter literature indicate that all CE-based approaches are often considered to be inherently beneficial, regardless of how they are operationalised in practice. The actual environmental benefits of CE vary across different alternatives, sometimes offering no benefits at all or entailing major compromises (Horn et al. 2023). For this reason, among others, more detailed waste management rules have been developed in legal acts (EEA, 2023; EEA, 2024b). The original 3 R (i.e. reduce, reuse, and recycle) framework of CE has now been expanded to 9 R (Castro-Lopez et al., 2023; Mishra et al., 2022). For example, Horn et al. (2023) present commonly used the CE (lub R-) strategies in the context of textiles in order of priority, i.e., refuse, rethink, reduce, reuse, repair, refurbish, remanufacture, repurchase, recycle, and recover to achieve a higher degree of circularity, reduce related environmental impacts and increase the efficiency of product manufacturing and/or using (Vegter et al., 2020). However, Horn et al. (2023) explain that the order of priorities of the CE strategies is ambiguous and depends, among other things, on the specific product, as they are not always realistic for every type of garment or for the personal preferences of users.

To conclude, the CE strategies stand in contrast to the traditional open system (Das et al., 2023) and aim to address the challenges of resource scarcity and waste disposal in an approach which is beneficial to the environment, a given organisation, and society (Mostaghela & Chirumalla, 2021).

Circular business models. On an enterprise level, as a first step, the transition towards CE requires an adequate circular business orientation (Jabbour et al., 2020), which is referred to as the CBM in this research (Castro-Lopez et al., 2023), and incorporates the CE principles (Kirchherr et al., 2023). CBM may be defined as the one which operates in closed material loops or the one which combines economic value creation with narrowing, slowing, or closing of resource loops (Bocken et al., 2016; Lewandowski, 2016). CBMs may be seen as a way to achieve the circular economy goals, such as longer use, reuse or recycling; and thus supporting the transition towards CE (EEA, 2021b). Most of the CBM frameworks proposed in the subject-matter literature are consistent with the BM framework by Osterwalder and Pigneur (2010) and suggest adaptations (Hossain et al., 2024; Roci & Rashid, 2023). Typical definitions combine key dimensions of the BM concept with the CE principles (De Angelis et al., 2023; Kanzari et al., 2022; Osterwalder & Pigneur, 2010; Pascucci et al., 2024). This means that enterprises need to rethink value creation by turning waste into wealth in order to move to CBM (Kanzari et al., 2022; Roci & Rashid, 2023). It should be noted that the key elements of BM include value proposition, value creation and delivery, as well as value capture (Bocken et al., 2014; Osterwalder & Pigneur, 2010). A value proposition establishes a solution to a problem or need by describing in detail a given product or service. Value creation and delivery define what needs to be done, how and by whom, including key activities and required resources. Finally, value capture reveals what may be gained from BMs, traditionally, by detailing the cost structure and revenue model.

In short, CBMs provide a framework for formulating sustainable business strategies (Bocken et al., 2016; Geissdoerfer et al., 2018) and may take many forms (Das et al., 2023).

Research design

Methods. The research involved a qualitative single-case study design using multiple data sources (Bocken et al., 2022). The basic research method included semi-structured interviews, and the additional method was the study of materials posted on the VTR websites, content analysis of press interviews with managers of companies belonging to the VIVE Group or their statements presented in social media, in order to enrich the data set.

Semi-structured interviews are a widely used and versatile method of collecting information in performing qualitative research (Chirumalla et al., 2024). Qualitative data may provide important insights into the complex processes of the social phenomenon being studied, which cannot be revealed using quantitative approaches (Hofmann & Knyphausen-Aufseß, 2022). According to Eisenhardt & Graebner (2007), theory-building research using cases tends to answer research questions which address the “how” and “why” of unexplored areas particularly well. Such a research design was adopted because there is limited knowledge about how enterprises incorporate the CE strategies into PCTW management.

The case of VIVE Textile Recycling (VTR) (VTR, 2021a) was chosen because it has many years of experience in commercial transactions, including those in the European market, which, thanks to its legal documents and culture, drives the development of CE (i.e. EEA, 2023; EEA, 2024b), which may facilitate the implementation of CBMs (Reim et al., 2021). Additionally, the company actively works to improve sustainability in all aspects of its business, including its global operations. This company was therefore considered to represent a case that was appropriate for this research.

Data collection. Only one-to-one interviews were conducted (Bocken et al., 2022). Data were collected and organised by one researcher. This researcher collaborated with a second researcher to develop the data analysis and continued data collection to triangulate the scientific evidence. There were 10 semi-structured interviews with the manager of VIVE Textile Recycling. This manager actively works to improve sustainability in virtually all aspects of VTR's operations. He has been an employee of this company for many years and holds a position at the highest management level. During the interviews, the researcher asked open-ended questions. The interviews aimed, among other things, to find out the ways the company creates value as well as provides itself with profits from the value it creates. The starting point for the part of the interview devoted to the issue of creating CBMs was to establish a common understanding of BM. The BM concept proposed by Osterwalder & Pigneur (2010), which facilitated the formulation of descriptions and the conduct of the interview, was adopted. Basing on the interviewee's consent, the interviews were recorded and then all transcribed for further analysis. The researcher collected data from February to October 2024. These data were then triangulated with publicly available information from the company's website. While preparing for the interviews, the information on the company and its circular activities was gathered by reviewing official reports, press interviews with company's representatives, websites and social media profiles. The researcher conducting the interviews was also making consultations with the interviewee, which facilitated the triangulation of the subject-matter literature results and provided more details about the circular activities implemented in VTR.

Results of the research

In this part, we made attempts to establish the types of CBMs implemented in VTR based on the CE strategies, which slow down resource flow. We chose the Business Model Canvas (BMC) introduced by Osterwalder and Pigneur (2010) to describe the BM components because it is the most common among practitioners (Salum et al., 2019; Pascucci et al., 2024). In this empirical research, CBM combines the main elements of the BM concept with the principles of CE (De Angelis et al., 2023). To avoid duplicating descriptions of common elements of the identified CBMs for slowing resource loops, we made some appropriate references to them in subsequent fragments of the text. These common elements of CBMs include: key partners, key resources, key activities (except for those dedicated to resale/re-purposing), cost structure (except for those directly related to resale/re-purposing) (see Table 1, 2).

The analysed company undertakes various CE activities in managing PCTW. Below, we present only those related to reuse (i.e. resale, re-purposing) which the company prioritises over others it uses.

CBM Canvas for Resale Strategy. The first CE strategy identified in VTR, focused on reuse, is resale. Giving second life to end-of-life or discarded home textiles as well as used or unwanted clothing is part of VTR's mission: *"Our circular activity is that we give a second life to clothes, and this is the main process to which 350 million pieces of clothing per year, which pass through our company, are subjected."* Resale of used or unwanted clothing and other items of clothing by previous users is one of the key CE practices used by VTR (corresponds to reuse strategy): *"Our company's core business is to sort out used clothing for resale to consumers."* This circular activity enables the reuse of an intact product by (an)other consumer(s): *"The same function, but the entity is changed many times."* This means that VTR maximises the availability of such goods on the second-hand clothing market (VP, 2025) and makes more end users use fewer products in total.

In this option, VTR creates value by using used textiles and clothing as goods for resale. This second-life activity allows a second user to purchase a garment after the first user has thrown it in the trash, and the process can repeat itself until the garment no longer serves the function for which it was designed. VTR avoids using second-hand clothing and textiles as secondary raw material for

recycling when things are still reusable: *“Why should we do it [sort the used clothing and textiles according to the needs of the type of recycling technology] today when someone else can use this clothing again.”*

Resale is an activity which allows used clothes to be reused without processing them into other products or materials. This means that they retain their function (use value) and trade value, although this may sometimes be perceived by customers as lower than the original one. Some elements of the goods offered may be slightly worn: *“In the case of clothes, however, there is a process of wear and tear.”* The loss of commercial value of second-hand goods shortens their potential life cycle.

The foundation for the scalability of CBMs for all “R-activities” are mechanisms ensuring the smooth flow of resources: *“Our advantage and our disadvantage are quantities. We need a continuous solution.”* The problem of the size of PCTW streams and shaping the supply of second-hand clothing and recycled products is solved by cooperation with key suppliers of used clothing. VTR cooperates with large enterprises or other organisations collecting waste, which creates the flow of used textiles and clothing expected by VTR. This, in turn, is of a key importance for re-selling of the used clothing and other wardrobe items.

Cooperation with suppliers is necessary to systematise access to PCTW on a Western European scale (VIVE GROUP, 2024c): *“Our key partners are organisations collecting textile waste. In the first group, there are enterprises which have their own containers to collect waste from households. In the second one, there are foundations and associations which collect this type of clothing, and they very often cooperate with the first group. Our partners know how to segregate waste, how to collect it, how to deliver it to us, and which regime to choose to do it. This is extremely important.”* Cooperation with these organisations allows VTR to have access to PCTW in the appropriate quantity and time, as well as to meet specific requirements related to waste delivery. This, in turn, allows for optimising this type of CBM.

Additional cooperation with VIVE Logistic Services (VLS) ensures logistics excellence and cost-effective solutions which meet the needs of VTR in terms of transportation time, flexibility, and innovation (VLS, 2025; VTR, 2018). VLS is *“a logistics company that co-manages the logistics centre and our logistics, because we deal with a lot of logistics.”* This logistics operator is one of the key partners in all CBMs used. The cooperation between VTR and VLS aims to ensure deliveries at the moment they are needed because VTR does not store items which cannot undergo a sorting process.

In order to give a better idea of the value creation logic, the infrastructure management involving the main resources and key activities is presented. The key activity common to all CBMs is a multi-stage sorting process associated with the key resources appropriate to this process. The interviewee stated that *“highly developed sorting processes and mechanisms”* play an important role, as VTR has a production line equipped with modern technologies (see: VTR, 2018; VTR, 2021b; VTR, 2021c; VTR, 2025). Automated sorting technology at VTR’s plants provides great opportunities for business scaling: *“Scaling is part of our company’s development plan. We are talking about thousands of tons or even tens of thousands of tons, which we want to manage, not just single tons.”*

To better reflect the logic of this company’s operation in the field of value delivery, the first customer segments and then interface with clients, i.e. distribution channels and relationships, are presented. Within this CBM, the company has defined two customer segments. In the B2C segment, customers are individuals (this market segment is presented later in this part), while organisations are customers in the B2B segment: *“On the sales side in our B2B market, our key partners are all these second-hand stores, and there are plenty of them. We are talking about hundreds of entities we trade with and this is a whole large distribution network. Behind it, there are various wholesalers and semi-wholesalers specifically dedicated to this segment.”* The company uses a wide range of distribution channels, from wholesale to retail ones.

This CBM is created with the second-hand clothing market in mind. The company delivers its value proposition to customers through its own and partners’ channels. Using partners’ (indirect) channels leads to lower margins, but creates the opportunity to expand the scope of VTR’s activities. The products are delivered to over 70 countries around the world (VTR, 2021a). In the B2B market, close relationships exist between VTR and its clients. VTR receives purchase orders and delivers products to clients in the B2B market: *“We fulfil orders from our business partners. We operate on a global scale by supplying stores and entire chains of second-hand stores in the countries of Africa, Asia and South America. And the biggest challenge here is the scale on which we have to operate.”*

Moreover, franchise stores as part of the VIVE Group ecosystem are another way to develop market space (VTR, 2022). Although they generate higher costs (maintenance and operation of classic distribution channels) (VP, 2023), they also generate higher margins. VTR develops its VIVE Profit retail chain with economies of scale in mind. In the traditional distribution channel, i.e. the VIVE Profit franchise chain located throughout Poland, such used products as clothing, shoes, handbags and others are “available immediately”. At the moment of sale, these products start a new life as part of someone’s wardrobe. The VIVE Profit brand belongs to VIVE Textile Recycling (Wojniak-Żyłowska, 2021; VP, 2023).

The VIVE Profit retail chain’s offer is preceded and shaped by our own market research: *We supply our own stores where we sell B2C. We provide our own stores with assortments according to the demand we diagnose and verify ourselves.*” In the B2C market, the company maintains close relationships with franchisees, while generally transactional relationships are kept with individual customers. Currently, VTR focuses on commercial activities conducted mainly in large-scale stores, although the company also has smaller formats (VTR, 2022). In these professionally designed large-scale franchise stores, VIVE Profit goods await their new second or subsequent life. These are places where contacts between a company and individual customers occur, and which influence his or her final impression (Gryn, 2021). The ability to scale this distribution channel, which means development for the VIVE Profit network, is one way to deliver value embedded in second-hand clothing.

In addition to traditional distribution channels, i.e. franchise store networks, e-commerce is becoming increasingly important in VTR, which is a response to the increased digitalisation of trade. The company not only recognises this channel as important, but has also developed separate platforms for building relationships and selling with wholesale (CLVG, 2025; VTR, 2025) and individual customers (B2C) (both in its own solutions) (VP, 2023). This next scalable solution is designed to keep up with the changing trends in e-commerce. It uses popular sales platforms, as well. In terms of creating e-commerce solutions, the interviewee said that: *“We are really testing the e-commerce model, that is, we introduce some assortments to the network in such direct communication with consumers, from our own application, in our own approach, and this is something different from the e-commerce sales channel. It is a slightly different formula as our internal customer is the e-commerce department, which orders special types of assortments.”* This indicates that the B2C segment has completely different recipients than the B2B segment. In the B2C segment, private individuals are customers. The B2C system serves individual customers via online store and e-commerce platforms for second-hand clothing. Ultimately, B2C market customers are expected to become active participants in the future exchange: *“Trading with them [customers] as if they were active participants in the model.”* Therefore, the role of customers classified as B2C is clearly changing in this channel of communication and distribution (sale and delivery) of used clothing. This process has a direct impact on customer’s satisfaction, thus establishing the right distribution strategy is crucial. Currently, the circular activity of feasibility, purposefulness and profitability of the previously mentioned e-platform for selling used clothing is being tested: *“The consumers no longer even have to go to the store. They can just see our products for sale in the application. They can immediately buy products from us, directly communicate with us, and send these products back. The entire mechanism of trading with consumers will be introduced there [e-sales platform]. We want consumers to sell their belongings there. There are a number of things which we will be testing, including all the logistics and the way of transferring these clothes.”* It is a complicated and demanding logistical process.

This means that another key resource in this CBM is the above-mentioned platform, and subsequent key activities focus on improving the functioning of this platform. The platform function is performed both by its own solutions and by cooperation with other e-commerce market participants. To implement this CBM, the company must continuously develop and maintain its platform, i.e. the entire highly specialised IT structure (sales platform) and AI solutions (automation of describing the assortments offered to consumers) in this case. This model requires taking action on the e-commerce platform to further automate it and generate content which best reflects the features of clothing being sold so as to make it as easy as possible for consumers to make a choice.

It was established that VTR is permanently developing new, circular and more direct sales channels for “B2C” via its mobile application. The company wants not only to maintain many channels, but also to expand them so that the customer can interact with VTR in a variety of ways. The digitalisation of trade in VTR is an irreversible direction of business development, and, thanks to it, it would also be

possible to centralise the management of the entire sales network. In this circular business strategy: *“In terms of revenue structure, the share of our [VTR] own stores and e-commerce is increasing [compared to] the classic, original, first model, that is B2B.”*

Our research also focused on identifying VTR activities towards the possibility of returning products by end-users after their use. In this company, the slowing-loop CBM for reuse (i.e. resale) relies on the return of textile waste and used clothing via a take-back system. It involves customers voluntarily returning unnecessary clothing directly to one of nearly one hundred of VTR's stores located in Poland. Despite this, managers' attention is strongly focused on combining stationary solutions with newly created e-commerce solutions: *“We want to shorten these collection chains very much so that this customer is very close to us. This significantly accelerates the turnover of these goods and motivates customers to return them. This is what our e-commerce model is all about.”*

Thus, managers take steps to develop an appropriate structure of distribution channel types to enable customers to purchase products and provide them with more convenient options for returning products at the end of their use. Therefore, understanding post-consumer textile (PCT) management is crucial to identifying potential areas for improvement. A major role in the process of changes is played by: *“The employees, definitely. But, they must be focused on development, not on routine.”*

In this company, slowing-loop CBM for reuse (i.e. resale) is very complex. Firstly, VTR provides customers with access to the offer both in a traditional form, enabling them to make purchases in the VIVE Profit network of stationary stores, and in the virtual one, enabling them to use on-line stores and mobile applications. Secondly, customers not only create demand, but also have an impact on supply (VTR, 2022; VIVE GROUP, 2024c) as they can return unwanted clothes and therefore re-enter the resource loop. That is why, the roles played by customers are the factors which make the CBM complex in fashion retail value chains.

VIVE Group, including VTR, strives to make clothing last longer. Therefore, the reverse flow of used clothing aims to recover reusable goods first through resale, then through re-purposing or recycling [VTR – sorts PCTW for recycling technology, VIVE Innovation (VIN) – commercialises textile recycling technology, both industrial enterprises belong to the VIVE Group], and finally processing the non-reusable content through recovery to energy: *“But when it [used clothing] reaches us, it will also circulate in this circular cycle until it disintegrates at the atomic level.”* If so, then the extended life cycles of second-hand clothing, i.e. PCTW, treated as resources, are a fundamental aspect of the supply chain included in this CBM. It is also very important to identify the elements and relationships which describe VTR's logic of profiting from the value created. It turns out that customers' willingness to pay for a second life for clothing is much lower than in the case of new clothing. Therefore, second-life clothing can be sold if it is significantly cheaper than the new one.

Goods in the VIVE Profit chain stores are offered at more affordable prices than brand new items: *“The price of second-hand clothing is definitely lower than the current alternatives [new products]. Definitely yes.”*, but higher than those offered by traditional second-hand stores: *“The average price of goods in our stores is higher than the same goods in old-style second-hand stores”* because customers pay: *“not only for a product, but also for the way, for the place where he or she is. That is how it all works. Our customers in this B2C segment want this option. They want to feel as if they were shopping in a normal store.”* This shows that the second-hand market is developing and, at the same time, changing its character. Chains of large-scale stores and e-platforms selling second-hand clothing are emerging, replacing small second-hand shops. The price of second-hand clothing depends on the sales volume and the characteristics of the customer segment and results from the desire to appropriately control demand (VTR, 2022; VTR, 2025).

This CBM takes into account two different types of revenue streams, i.e.: transactional revenue resulting from payments made by one-time customers and revenue resulting from repeat purchases by regular customers. The company is increasingly benefiting from the increase in sales volume of used clothing and footwear. In this company, costs play a significant role because supplying the B2C market, and especially the B2B market, with used clothing, sorted every day in the amount of hundreds of tons, generates high labour, transport, and logistics costs. They are cost drivers for all CBMs. If VTR decides to reduce labour costs: *“The only way to reduce [human labour costs] is through robotic automation processes, the level of difficulty of which is unimaginably high in our industry.”* Robotic automation of business processes, especially sorting and related ones, are challenges which require VTR to rethink the way it does business.

In line with the findings, CBM canvas for slowing-loop reuse (i.e. resale) has long been in the maturity phase and has already reached the commercial stage. By investigating second life apparel and textile as well as end-of-use by reuse, it was determined that full-scale reuse CBM exists in VTR. Table 1 shows the CBM canvas for slowing-loop reuse (i.e. resale).

Table 1. CBM Canvas for Slowing-Loop Resale Strategy

	(Slowing-Loop) Resale
Value Proposition	one or more extending product's life, personalisation of commercial offers for specific customers, price lower than the new product
Customer Segments	environmentally conscious B2B and B2C customers, clients seeking to reduce their impact on the environment, price sensitive customers, second-hand clothing market
Customer Relationship	close relationship with key recipients, transactional relationships (if second-hand clothes is sold to individual clients)
Key Partners	companies and other organisations which collect used clothing, clothing manufacturers/retailers, transport and logistics company
Key Resources	management staff, ability to create and implement processes (sorting and distribution) and technologies, sorting facility, warehouse halls, financial capital
Key Activities	coordination of transport and delivery logistics, transport and logistics (outsourced), unloading process, sorting process, monitoring, packing process, sales network design, technology development (i.e. e-shop), design for sorting second-hand clothes, customer services
Distribution Channels	a network of company (classic) stores, external wholesalers, social media, e-commerce
Take-Back System	potentially and voluntary direct return to own chain of stores in Poland or voluntary return via third-party collection of second-hand clothes
Costs	transportation and logistics costs, sorting costs, maintenance and service of retail stores
Revenue Flows	transactional/multiple repeated sales of second-hand clothes, transactional/multiple repeated sales of other used products (i.e. blankets, carpets, toys, handbags, bedding sets, sheets, bathrobes)

CBM Canvas for Re-purposing Strategy. The elements common to both presented CBMs for slowing resource loops were presented in the previous parts. Therefore, the authors' attention in this part was focused on the remaining elements characterising the CBM Canvas for Slowing-Loop Re-purposing.

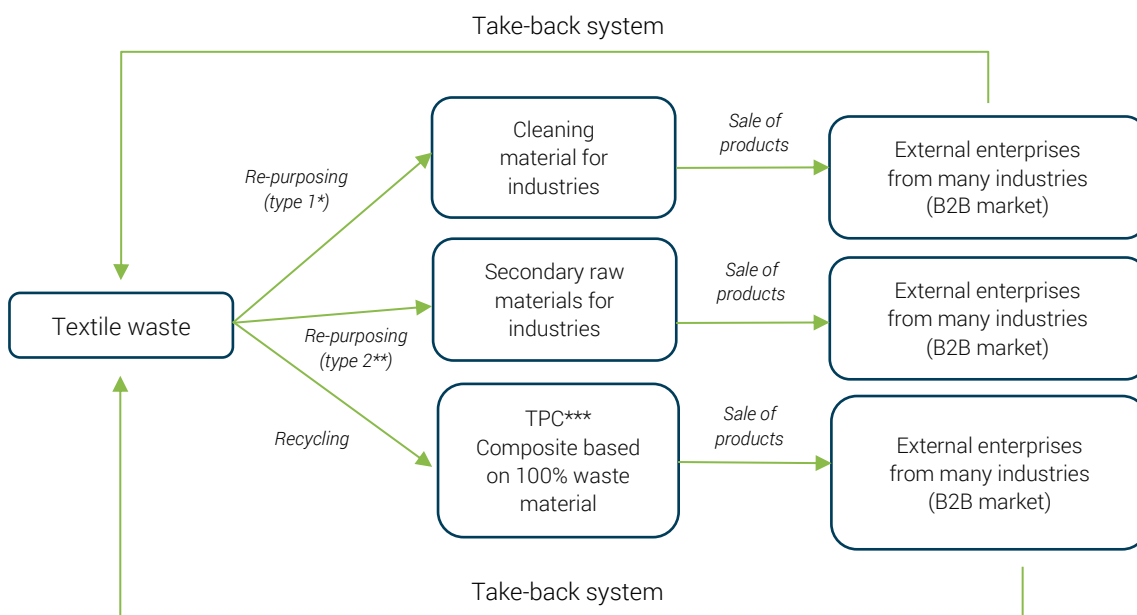
When clothing and other textiles are worn to the point where they no longer meet the requirements of the second-hand clothing market, VTR selects further reuse options in accordance with the sequence of so-called CE strategies to extend the life of these products: *"Our goal is to sort clothing so that it goes to the method of management which involves the least energy expenditure and gives the greatest potential for reuse, let us say downcycle, and the most energy-intensive process, that is recycle, takes places at the end [VTR is a key supplier of secondary raw materials for VIN – the manufacturer of the innovative VIVE Texcellence textile composite]."*

As a result, during the multi-stage sorting process (VTR, 2021c), the raw material which does not meet the specified requirements is partly allocated to industrial cleaning materials (corresponds to re-purpose strategy from Figure 1). This group of waste textiles includes, among others, cloths, towels, i.e. materials that can be used to wipe oils, grease and other liquids (VTR, 2024). This is an industrial cleaning cloth for potentially repeated use, having appropriate absorbency and durability. The interviewee claims that currently: *"Cleaning cloth made from used textiles is becoming an increasingly important alternative to new cleaning cloth."* The end-users are organisations in a Business-to-Business market, i.e. domestic and foreign enterprises representing construction and automotive industries, mainly (VIVE GROUP, 2024c). Textiles intended for industrial cleaning materials are delivered to wholesalers and semi-wholesalers by road and/or sea transport.

Another important element of the analysed CBM is a take-back system, which includes potentially voluntary indirect return via external organisations dealing with the collection of textile waste or transfer of recycling responsibility to the end users of textile cleaning materials. This results from

an active search for a course of action: *We are strongly committed to providing our customers with the opportunity to return/sell to us used clothing that they no longer need. We undertake such initiatives either directly in our stores or through cooperation with such entities as Game4Planet or various foundations and organisations.*” The interviewee further explains that *“Our idea of CE is to provide consumers with the opportunity to buy used clothing from us, use it, and when they no longer need it, to sell it back to us. We [VTR] will be providing it with another life until it is safely recycled [VIN is responsible for recycling within VG.]”* As a result, worn-out mohair sweaters are used to produce carpets, and denim offcuts are turned into book covers by specialist factories located in India, which constitute another group of customers in the B2B market. This B2B segment is constituted by re-purposing partners (specialised companies processing sorted and used clothing into other products, including textile products for a different purpose than they were designed for). VTR contacts these customers through indirect channels, i.e. wholesale/semi-wholesale distributors, and direct channels, i.e. e-commerce channel for wholesalers or traditional sales.

In the context of the CE approach, VTR employs cascading strategies to utilise post-consumer textile waste. CBMs and CTE strategies to slow resource loops are linked to the CE strategies, which close material flows, such as recycling. The interviewee explains: *“Recycling requires a higher level of resource involvement and higher energy expenditure to manage waste and return it to the economy. At the same time, it provides the possibility of handling waste that is not suitable for the re-purposing process. VIN has already developed a technology for the complete recycling of used consumer clothing, which, due to, for example, the level of wear and tear, cannot find buyers in the reuse model [VTR].”* The above illustrates, if not complete, then certainly a very advanced implementation of CE strategies and the construction of CBMs based on them. Fig. 1 summarises the main re-purposing set-ups from VTR’s perspective.



Note(s): *type 1 – processing (the process of cutting or shredding textile waste takes place in VTR) of appropriately sorted (according to specific features: i.e.: colour, type) secondary raw materials into industrial cleaning materials; **type 2 – sale of sorted used wool or cotton clothing to specialist external organisations for further processing into other products (i.e. mohair sweaters are turned into carpets); *** textile plastic composite (TPC)

Figure 1. Observed re-purposing set-up alternatives

CBM in the re-purposing area includes revenues from the sale of textile cleaning materials and secondary raw materials. The price depends on the volume of goods purchased and the requirements of a given customer segment. Within this CBM, key costs include: road and/or sea transport and logistics, processes for sorting, cutting or tearing used clothing (human labour, energy). The interviewee explains: *“A significant limitation of our re-purposing approach is, on the one hand, its limitation only to selected types of waste, and on the other hand, the great difficulty in automating the pro-*

cesses and, thus, the difficulty in scaling this approach.” Therefore, in the context of CE, recycling technology allows for closing this business model (see Fig. 1). The interviewee says: “Recycling, especially one as advanced as creating a new class of materials [TPC] from waste, perfectly closes the loop, allowing us [VTR] to utilise virtually the entire stream being unused in other processes.”

In summary, the result of activities within both CE “slow-loop” strategies is the improvement of the efficiency of utilising used clothing or its parts so that the company achieves ecological and social benefits while simultaneously achieving financial goals. To achieve this, VTR increases the recovery rate from the textile and used clothing stream, reduces waste, optimises raw material and energy consumption rates, and adheres to the principles of sustainable development (VIVE GROUP, 2024b), ultimately building profitable CBMs with enormous scalability potential. Scaling local franchisees’ operations is a key factor in the success of their businesses and, consequently, the success of VTR as the operator of the VIVE Profit network (Ferreira, 2022). In line with the assumptions of the VIVE Textile Recycling program “Together We Care for the Environment,” VTR has developed a solution that already recycles 97% of the raw material entering the company. The VIVE Group, including VTR, is constantly seeking other opportunities to recycle 100% of the raw material (Ferreira, 2022).

Re-purposing gives a better environmental outcome than chemical recycling or recovery to energy, in line with the textile waste management hierarchy. Re-purposing is still used mainly due to the presence of heavily used clothes which have not been sorted out yet, i.e. “the pile of used clothes before sorting” as well as the great interest of customers in “industrial cleaning materials” and recycled/secondary raw materials.

The take-back system is another element of CBM. A consequence of reverse logistics is the ability to recycle products returned by customers. The interviewee explains: “We have always believed that the CE model requires us [VTR] to be able to take back used clothing from our customers and, at the same time, have a solution for the problem of its further processing, if it is no longer suitable for resale. Composite technology gives us [VTR] the comfort that VIN will transform everything [secondary raw material] that comes from us [VTR] into new products [textile composite products].”

This indicates that VTR prioritises R-activities, which are more beneficial to the environment. Table 2 shows the CBM canvas for slowing-loop reuse (i.e. re-purposing).

Table 2. CBM Canvas for Slowing – Loop Re-Purposing

	(Slowing-Loop) Re-Purposing
Value Proposition	finished products in the form of textile industrial cleaning cloth for potentially repeated use with appropriate absorbency and durability, textile cleaning cloth dedicated to a specific user, finished products in the form of sorted used wool and cotton clothing which is a potential secondary raw material for the production of other textile products
Customer Segments	environmentally conscious B2B customers, re-purposing companies (enterprises converting textiles into other products)
Customer Relationship	close relationship/transactional relationships/recursive relations
Key Partners	companies and other organisations which collect used clothing, clothing manufacturers/retailers, transport and logistics company
Key resources,	management staff, ability to create and implement processes (sorting and distribution) and technologies, sorting facility, storage facility, financial capital
Key Activities	coordination of transport and delivery logistics, transport and logistics (outsourced), unloading process, sorting process, process of cutting or tearing textile waste, monitoring, packing process
Distribution Channels	external wholesalers/semi-wholesalers located in Poland and abroad, websites
Take-Back System	transfer of recycling responsibility to users of textile cleaning materials or potential and voluntary indirect return via external organisations dealing with the collection of textile waste
Costs	transportation and logistics costs, sorting costs, cutting and tearing processes costs
Revenue Flows	sale of textile cleaning materials, sale of secondary raw materials

Discussion and Conclusions

Our research confirms that CE combines different CE strategies (resale strategy, repurposing strategy) to slow down material cycles by extending the useful life of clothing and textiles, and this reflects the views of authors such as Sztorc & Savenkovs (2025). Furthermore, it suggests that different practices, termed CE strategies, can be used sequentially and in combination. According to Mölsä et al. (2022) and Wolski (2025), in this case, they can generate cumulative environmental benefits and thus further reduce the environmental impact of PCTW.

At VTR, resale plays a primary role in PCTW management, with other options, such as repurposing, upcycling, or preparing secondary raw materials for recycling within another industrial enterprise, considered only as a next step to close the material cycle. These findings align with the conclusions of Prosman et al. (2024), who argue that some R-activities can be performed externally.

According to Horn et al. (2023), resale can shift the consumption of home textiles, clothing, footwear and other wardrobe items to more sustainable levels by extending their life cycles; since these products have already been produced and decommissioned at least once by individuals or organisations and treated as waste. And VTR is taking action to put them back into circulation and keep them there for as long as possible.

Based on these research results, the above-mentioned wholesale and retail sale of second-hand clothing is evolving, among others, as a result of the digitalisation of trade, which is expressed by e-platforms (B2B on-line store, B2B wholesale platform) and a platform enabling the activation and collection of textile waste in the C2B model. We want to emphasise that the company uses B2B distributors and intermediaries, and at the same time develops B2C and C2B relations. The latter dimension means that the company, developing its brand, i.e. VIVE Profit, by establishing relationships with consumers, simultaneously promotes the benefits of buying second-hand clothing (VP, 2025). This is as suggested by Pascucci et al. (2024), who argued in their research that business models such as “B2C” require a completely new approach to sales and distribution, as well as to communication and branding activities, in order to support the value proposition and brand awareness. Pascucci et al. (2024) include such activities as, for example, the “direct” channel with consumers via social media and websites (static and e-commerce sites), which is already the case when it comes to VTR.

The research results indicate yet other methods of action, which include improving second-hand shopping habits among consumers, i.e. the VIVE Profit chain of stores located in Poland, offering second-hand clothing. These issues are important because people take pro-environmental actions if there is a convenient way to do so (Martikkala et al., 2023). This circular activity requires the company to simultaneously invest not only in expanding its store network, but also in better sorting of PCTW. In some enterprises, this is a serious limitation in creating a local textile reuse sector (Morell-Delgado et al., 2024).

Resale as part of a CE strategy can generate greater environmental benefits compared to other CE approaches, which VTR offers. Resale models reduce the environmental and social impact of the fashion and textile industry by increasing the number of users per garment and extending its life cycle, which, in turn, may contribute to reducing the total amount of textiles produced (Hellström & Olsson, 2024). Similar conclusions were made by other researchers. Vegter et al. (2020) argue that the longer the final product is available for use, the fewer resources are used to produce a new product. Chand et al. (2023) add that due to the environmental and economic benefits, reusing textile and clothing waste is an action that protects against many polluting and energy-intensive textile production processes.

The arguments made by Das et al. (2023), who argue that circular practices may, but do not necessarily have to, contribute to reducing the production of new clothing and be beneficial to the environment, are also taken into account. For example, customers might mistreat a product (i.e. ski and snowboard clothing, wedding and evening dresses, themed outfits) that is for rent because they perceive a lack of ownership and lower responsibility towards the product, leading to higher repair, refurbishment or ultimately replacement with a new one rates. The rebound effect also occurs in the second-hand clothing market. Empirical research shows a higher than 1:1 ratio of replacing new clothes with used ones (Ciechelska et al., 2024). Moreover, perceived savings resulting from circularity may sometimes lead to rebound effects by increasing the consumption of other resources (Das et

al., 2023). For example, second-hand clothing consumption saves money, which consumers can then spend on other goods or services. This means that well-thought-out and sustainable offerings can lead to unintended negative rebound effects through increased consumption. The rebound effects are the difference between the expected and actual environmental savings from efficiency improvements, once larger economic considerations have been accounted for (Das et al., 2023).

Enterprises wishing to develop reuse-based BMs typically incur significant collection and sorting costs, and resale brings relatively low revenues (Coscieme et al., 2022). In relation to VTR, these issues relate in particular to the sorting stage, although in this field, too, innovations introduced involving automatic sorting may reduce logistics costs and lead to faster and more efficient selection of clothing for reuse. However, extensive logistics (Horn et al., 2023) and long transportation distances (Hossain et al., 2024) may reduce the overall benefits of CE strategies, such as reuse and the subsequent ones proposed in the textile waste management hierarchy. Therefore, the priority order of the CE strategies applied by the company depends on the quality of the received PCTW types, which is initially determined at the sorting stage. Ultimately, the choice is based on an analytical framework which provides greater insight into the potential benefits of each option under consideration for a specific batch of “second-hand” (i.e. second use) materials. The authors believe this is the right move and is in line with the suggestion by Reim et al. (2021), who argue that a dynamic perspective should be taken to recognise the conditions under which some types of CBMs are more applicable than others. This means that the R-strategies identified in the subject-matter literature are not always feasible for every type of garment. The actual feasibility of options also depends on the personal preferences of enterprises, and regulations (Wolski, 2025) establish a framework for managing PCTW.

However, the resale model as one of the types of CBMs will require, among others, effective policies and changes in consumers' behaviour (Coscieme et al., 2022; Gidaković et al., 2024), who must become part of the life cycle of products, actively participating in the reuse of clothing (Ciechelska et al., 2024). The findings from this study indicate the need to consider consumers in planning corporate R-strategies, which is consistent with the suggestions of Bentkowska and Nowicka (2024). According to our study and the literature (Walaszczyk & Dingli, 2025), enterprises implement circular activities and attract socially responsible customers to gain a competitive advantage and ensure long-term profitability. Therefore, we believe, like Wolski (2025), that shaping consumers' environmental awareness is important because it fosters behaviours that support proper waste management (selective collection of textile waste, including clothing, footwear, and other textile products; use of return systems for used clothing in stores). While the growing awareness of resale models by retailers and consumers is encouraging, this is only the first step towards a transition towards circular fashion retailing, as traditional linear models still dominate the fashion market (Hellström & Olsson, 2024).

The so-called CE strategies which have been identified in business practice cannot be implemented in isolation. The research results are in line with recent evidence provided by Pascucci et al. (2024), who argue that close collaboration with stakeholders, including new ones from the external environment, and the use of information technology are crucial to create circular flows of products, packaging, information, finance, and knowledge.

In sum, CBMs can be of many types because the markets and products offered differ greatly, and there is no one-size-fits-all CBM for them all. In the case of VTR, value is being created from PCTW, which proves that it is an important resource in terms of CE strategies. The company adopted circular strategies aimed at slowing down material loops several years ago and switched to CBMs. This paper presents two CBMs and CE strategies which incorporate the concepts of resource slowing loops.

These models were operationalised according to the business model canvas of Osterwalder and Pigneur (2010) with one additional element, namely take-back systems. The research findings indicate that VTR is focused on higher circularity strategies, including local and global closed-loop reuse, which is an expression of more circular post-consumer textile (PCT) management.

Implications, Limitations and Directions for Future Research

The results of this research provide new information and insights into the implemented CBMs canvas for slowing-loops reuse (i.e. resale, re-purposing), which can be communicated to other stakeholders in the sector and can be used as a visual tool in education. This study can help understand current best practices regarding the possibility of extending the life of clothing, such as the use of second-hand clothing consumption and the production of industrial cleaning materials used by enterprises in many industries.

This research has some limitations which should be taken into account when interpreting the results. Therefore, these limitations constitute a starting point for any future research. Firstly, by choosing the case of a company that, in its transition to CE, is actively working on developing its circular business orientation, also referred to as CBM in the subject-matter literature, the insights were obtained only from its many years of experience. However, these observations are limited to a large company that manages and disposes of PCTW on a global scale. Therefore, cross-case analysis would enable extending this research to other cases. Secondly, the research results are exploratory in nature and should be treated as conceptual models which provide reasonable expectations for similar results in other cases of PCT management and disposal companies, and which can be confirmed or falsified in future quantitative research.

The contribution of the authors

Conceptualisation, A.W.-K. and P.B.; literature review, A.W.-K. and P.B.; methodology, A.W.-K. and P.B.; collection of primary data, A.W.-K.; collection of secondary data, A.W.-K. and P.B.; formal analysis, A.W.-K. and P.B.; writing, A.W.-K. and P.B.; discussion, conclusions, implications, limitations and direction for future studies, A.W.-K. and P.B.

The authors have read and agreed to the published version of the manuscript.

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CYRKULARNE MODELE BIZNESOWE DLA DRUGIEGO ŻYCIA ODZIEŻY: REZULTATY JAKOŚCIOWYCH BADAŃ EMPIRYCZNYCH

STRESZCZENIE: Krytyczna potrzeba przekształcania olbrzymich ilości pokonsumenckich odpadów tekstylnych (POT) w cenne cyrkularne zasoby skłoniła autorów do zbadania strategii, które można przyjąć w celu poprawy praktyki gospodarki tekstyliami o obiegu zamkniętym (GTOZ). To jakościowe badanie eksploracyjne obejmowało częściowo ustrukturyzowane wywiady z przedstawicielem firmy i analizę treści danych wtórnych. Z założenia autorzy zoperacjonalizowali GTOZ w formie cyrkularnych modeli biznesowych (CMB). Wyniki pokazują CMB dla pętli spowalniających obieg POT (np. odsprzedaż/zmiana przeznaczenia), które można komunikować innym zainteresowanym podmiotom w sektorze, jak i mogą być stosowane jako narzędzie wizualne w edukacji. Jednakże GTOZ strategię i CMB mogą ulec zmianie. Wyniki badania mają charakter eksploracyjny i oferują spostrzeżenia, które można dalej przetestować w innych kontekstach. Badania te przyczyniają się do ogólnej teorii cyrkularnych modeli biznesowych, ze szczególnym uwzględnieniem obiegu zamkniętego tekstyliów pokonsumenckich (TP).

SŁOWA KLUCZOWE: gospodarka o obiegu zamkniętym, cyrkularny model biznesowy, odpady tekstylne, pokonsumenckie odpady tekstylne