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**The Implementation of Circular Economy in
Indonesia's Fashion Industry**

Master Thesis Business Administration
Innovation and Entrepreneurship
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Abstract

Asia-Pacific countries that experience enormous economic growth alongside significant externalities in the fashion industry are the epitome of the neoclassical economy. The emergence of the circular economy concept through its regenerative and restorative design presents a potential solution to alter our current paradigm radically. By this notion, this research solicited the following questions: How is a circular economy approach applied in Indonesia's fashion industry? The study utilized Product Design and Business Model Strategies for a Circular Economy model. Through in-depth interviews and purposive sampling, case study analysis was conducted to gather the primary data. The results conclude that: (1) design for desirability and durability ensure long-life products. (2) resource efficiency through zero waste pattern design poses a solution to the industry's problem, albeit there is a possibility that a rebound effect could emerge. (3) Downcycling and deconstructing to upcycle are the most viable and feasible avenues to close the resource loops in the fashion industry. Furthermore, a more progressive stakeholders' mindset; limit consumption growth, and the social dimension are vital to support the circular economy implementation. This study contributes to the existing literature by providing an understanding of system thinking, particularly the design of the alternative solution and its impact throughout the production process.

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Chapter 1. Introduction

In September 2015, the heads of government of 193 United Nations Member States united approved the 2030 agenda for sustainable development (Ministry of Foreign Affairs, 2020). This agenda was a universal call to action to all stakeholders at the planetary level to end poverty and protect the planet. It ensured that humanity could reach peace and prosperity by 2030 (Ki-Moon, 2014). It produced a shared blueprint that putting people and the planet at the center of all interests, namely the 17 Sustainable Development Goals (SDGs) (Ki-Moon, 2014). SDGs put up a framework consisting of 169 targets that accompany the 17 goals and laid out quantitative and qualitative objectives applicable for universal implementation (Ki-Moon, 2014).

One of the goals, specifically the twelfth, is titled Responsible Consumption and Production (UN News, 2015). In other words, all facilitators are obliged to ensure sustainable consumption and production patterns in multi-level economic activities. Over the last century, the economic and social progress is leaving negative environmental externalities that endangering the planet (Park & Chertow, 2014). Moreover, the detrimental effect of a neo-classical economy threatens the stability of the economy and natural ecosystem essential for humankind (European Commission, 2014; Park & Chertow, 2014; West et al. 2013). For instance, statistical data shows that, by 2050, humanity will require the equivalent of three planets to fulfill its lifestyle (United Nations, 2019), an estimated 33% of all food produced in the world is wasted every year (Gustavsson et al. 2011), etc.

The limits of the neo-classical economy (take-make-dispose) are well illustrated in the fashion industry (Koszewska, 2018). In terms of production, with sales of over \$450 billion globally, the fashion industry is the second-largest water polluter in the world (Charpail, 2017) due to the waste during the dyeing process, which is dumped mainly into ditches, streams, and rivers (Johnsen, 2020). It is responsible for 10 percent of humanity's carbon emissions and it is the second-largest consumer of the world's water supply (Johnsen, 2020). According to Ellen Macarthur Foundation (2017), the industry accounts for less than 1 percent of total material input during the production is being recycled into new clothing. Therefore, its environmental footprints, which mostly consist of energy, water, chemicals, direct CO₂ emissions, and solid waste (Resta et al. 2016), are the epitome of how unsustainable the industry is.

These significant ecological concerns are consequences of surging consumption accompanied by the fast-fashion business model (Koszewska, 2011). The business model enabled consumers to acquire more affordable clothes than traditional clothing retailer through

shorter production lead times (Koszewska, 2018) and an efficient supply chain (Remy et al. 2016). Fast-fashion retail companies such as Zara and H&M offer up to 24 new clothing collection each year (Remy et al. 2016; Johnsen, 2020). Consequently, consumers responded to affordable prices and a variety of clothing lines by acquiring more clothes than ever before (Remy et al. 2016). In the last 15 years, the fashion industry has doubled its production. Meanwhile, there has been a significant decrease, about 40 percent, in clothing utilization (Gueye, 2019). Some garments were predicted to be discarded after only seven to ten wears (Morgan & Birtwistle, 2009). This consumerism consumption pattern has led to many environmental pressures. For example, 35 percent of all microplastics in the ocean came from laundering synthetic textiles. An equivalent of one garbage truck full of clothes is burned or ends up in landfills every second (Johnsen, 2020).

These noteworthy environmental pressures largely occurred in emerging countries. Fashion companies that performed best in terms of economic profit in 2018 tended to focus on the Asia-Pacific market (Balchandani et al. 2020). This was mainly due to more and more people entering the middle-class economy (Remy et al. 2016). On the other hand, Asia-Pacific countries also were dominantly accounted for the leading clothing exporters in 2019 (Statista, 2020). They were China (30.8%), Bangladesh (6.8%), Vietnam (6.2%), India (3.5%), Turkey (3.2%), Indonesia (1.7%), and Cambodia (1.7%) (Statista, 2020). Overall, Asia-Pacific countries have been significantly engaging in not only consumption but also production in the fashion industry.

The case of Indonesia is quite suffocating. Based on a documentary film conducted by Deutsche Welle, the Citarum River in West Java was the most polluted river in the world (DW Documentary, 2020). The sole cause of this catastrophic phenomenon was that over 500 textile factories that produce global fast-fashion brands' collections such as H&M and Uniqlo, (DW Documentary, 2020) dumped their toxic waste into the river on everyday basis (Flesch, 2020). In addition, the disaster did not cease there. According to Daily Mail, the Citarum River is the source of irrigation and drinking water for over 35 million people (Tarahita & Rakhmat, 2018). The high concentration of polluted water has led to several societal issues, especially for children, such as increasing cancer rates, skin diseases, slow development of children (Flesch, 2020), and mortality rate (DW Documentary, 2020). Therefore, in Indonesia's context, it is not only putting pressure on environmental devastation but also costing to the health and well-being of local communities (LaRose, 2017).

These facts validate the necessity to unify and work on the agenda. A sustainable model that redesigns the current linear production and consumption is imperative (O'rouke, 2014).

Despite its emergence dates back to the 1970s, the concept of circular economy (CE) has gained momentum worldwide among practitioners and scholars (Lieder & Rashid, 2016; Ghisellini et al, 2016; Ness, 2008).

This model implies a restorative and regenerative design. While it aims to keep the product, component, and material value at its highest utility at all times, it distinguishes between technical and biological cycles (MacArthur, 2013). Moreover, CE works alongside social inclusion and it offers a new ethical norm on business activities to reach an equilibrium between profit and social responsibility (Kemkhadze, 2019). At the moment, the practitioners have not concluded the agreed definition of CE since the concept is applied by a diverse group of researchers and professionals in different industries (Kirchherr et al., 2017). According to Korhonen et al. (2018), CE can be seen as a system change that empathizes three elements: closed cycles, renewable energy, and system thinking. Other researchers have also included social inclusiveness as a significant aspect within CE (Korhonen et al. 2018). Ellen MacArthur Foundation (2017) views CE as an initiative to decoupling economic activity from current linear process to three essential principles: design out waste and pollution, keep products and materials in use and regenerate natural systems.

CE is an epitome of a new business model that has been predicted to drive sustainable development and harmonious society in the future (Zhiyun & Nailing, 2007; Bleriot & Butterworth, 2014). However, due to the complexity of the sustainable development vision, the implementation of CE requires a broad range of aspects, such as actors, interactions, etc. (Ghisellini et al. 2014). It depends upon a balance and simultaneous consideration of the economic, environmental, technological, social aspects of an evaluated multi-level economic activities as well as the interactions among them (Hardaker, 1997). Furthermore, it requires an inclusive look at the design of the alternative solutions, the life cycle of production-consumption, the relationship between the economy, the environment, and the process in which it is embedded (Geng et al., 2014). Moreover, the engagement from innovative designers towards appropriate radical changes in practices, policies, and decision-making tools is significant on successful CE implementation (Golinska et al., 2015).

Collectively, CE changes the current neo-classical economy, epitomized by taking, making, and disposing of resources into circular regeneration of resources (Stahel, 2016), which improves the entire living and economic model (Ghisellini et al. 2014). Because of the advantages it offers, the measures for global CE have been part of the United Nation's Sustainable Development Goals (SDGs) (Pesce et al. 2020). More efficient use of resources

(target 12.2) and reduce waste generation through prevention, reduction, recycling, and reuse (target 12.5) are urgent universal agendas for 2030 (Ki-Moon, 2014).

According to the Head of Public Affairs at the Ellen MacArthur Foundation, Joss Blériot, the EU Commission has taken the lead in driving the member states to develop with CE's national roadmap (Iles, 2018). The impetus from the Commission resulted in an increasing momentum of CE implementation in developed countries (Ibid). Hence, the EU countries have been moving ahead significantly. Furthermore, the European Technology Platform for the Future of Textiles and Clothing has pinpointed the theme "Circular Economy & Resource Efficiency" as was one of the four strategic innovation areas that need to be addressed to further develop the European textile and clothing industry (Koszevska, 2018).

In contrast, Asia-Pacific countries, account for 60 percent of the global population with rapid growth economy, urbanization, and industrialization alongside detrimental environmental impacts (Population Reference Bureau, 2001), wherein arguably the most important implementation of CE, there has been little activities to date (Thompson, 2020).

To tackle the negative consequences of economic growth, the Indonesia's Government has started to adopt various policies, plans, and strategies to pursue a sustainable development track (Kemkhadze, 2019). The government has issued the Presidential Decree No. 59/2017 on SDGs implementation (Ibid). Furthermore, Indonesia has adopted the CE concept into Vision Indonesia 2045 and incorporated it in the National Medium-Term Development Plan (RPJMN) 2020-2024 (Rudiyanto, 2018). Within waste handling regulation, the Presidential Decree 83/2018 on Marine Debris Management, the Presidential Regulation 18/2016 on Waste-based Power Plant Acceleration, and the Law 18/2008 on Solid Waste Management based on 3R principles are a kickoff to pursue sustainable development (Kemkhadze, 2019). As a result, some small and medium enterprises such as Bank BRI, Magalarva, Asani, etc., have started adopting circularity concept into their product lifecycle (Thompson, 2020).

United Nations Development Program Initiation Plan for Indonesia (2019) listed five core economic sectors for the circular economy strategy. The selection of these sectors was based on economic growth potentiality, environmental impact, ease of transformation to circularity, and comparative international examples (Kemkhadze, 2019). The fashion industry is one of them. Based on the report, these are the circular economy implementation opportunities within the fashion industry in Indonesia (Ibid):

- Gradually eliminating toxic substances and microfiber release.

- Altering the fashion industry's approach in respect to design, marketing, and business models.
- Improving the recycling process and supporting the creation of reverse logistics chains.
- Using renewable inputs and efficiently managing the use of resources.

The economic and social progress during the neo-classical economy era is leaving enormous pressure on the natural ecosystem. Economic growth in the fashion industry alongside its detrimental impacts on the ecosystem, is an epitome of how our current paradigm is destructive yet desired, . The emergence of the circular economy concept with its restorative and regenerative principles throughout the production and consumption life cycle, present a glimpse of a direction to change how the linear economy operates. The adoption of CE within the fashion industry is seen as an imperative alteration that needs to be done for further sustainable development. Since Asia-Pacific countries are instrumental in the production and consumption of fashion industry while leaving devastating imprints on environmental and social wellbeing, there is an urgency to tackle this particular problem.

Furthermore, since the circular economy practice, including circular product design and circular business model, is still perceived as a new act (Lewandowski, 2016), there is a call for the development of case studies to explore the influence of this concept (Bocken et al. 2015). In addition, to date, 14 March 2021, there are utterly few studies conducted in relation to the implementation of CE in Indonesia. Therefore, conducting this research is crucial to enrich the existing literature in the realm of the circular economy in fashion industry, particularly in Indonesia.

Based on the aforementioned societal and scientific gap, this study seeks to find the relevant avenues for designers and business decision-makers to adopt the circular economy concept in Indonesia's fashion industry. The findings of this research are expected to fill the voids during the transition towards circularity of resources in order to help designers, innovators, and business decision-makers in Indonesia's fashion industry (Bocken et al. 2016). In addition, academic contributions are achieved through the contextual nature of the study. The case study method in Indonesia's fashion industry extrapolates and clarifies the prevalent framework of circular economy adoption. The study's findings contribute to a better overview of the implementation of the circular economy, especially at the micro-level, from the design process to the manufacturing operation.

1.1 Research Questions

This study aims to find the relevant avenues for designers and business decision-makers to adopt the circular economy concept in Indonesia's fashion industry. Therefore, the research question is: *How does the circular economy implement in Indonesia's fashion industry?*

In order to answer the core research question, specific sub-research questions are addressed: (1) What are the practices toward the circular economy concept in the Indonesia's fashion industry? (2) How are designers and business decision-makers implementing these practices? (3) What are the challenges during the implementation of these practices?

1.2 Research Design

The research outline consists of five sections: introduction, literature review, methodology, result and discussion, and conclusion and recommendation. The introduction describes the societal and scientific relevance of the study. Herein, the researcher builds up the study's contextual nature, which served as the foundation for the subsequent sections. The literature review provides relevant theories and frameworks pertaining to the circular economy. Herein, the researcher explicates the framework of the study to answer the research question. The methodology section illustrates how the researcher intends to answer the research questions. It contains data collection process, data processing, and norms during the research process. Afterward, the result & discussion section identifies and describes the appropriate circular approach in Indonesia's fashion industry. Within these approaches, possible challenges during the implementation are delineated. Lastly, the conclusion & recommendation propose an updated circular economy framework for the fashion industry, especially in Indonesia. It provides a better overview to facilitate actors to move towards the circular economy in fashion Industry.

Chapter 2. Literature review

This chapter serves as the fundamentals of the whole study. It corroborates relevant theories about the circular economy in different aspects. Specifically, the theory in context acts as the study's conceptual framework, which is utilized as a guideline while collecting and analyzing the data. Ultimately, the research questions of the study are clearly answered and explained.

2.1 The Definitions Circular Economy (CE)

The concept of circular economy was derived from different philosophies (Mas-Tur et al. 2019). Environmental economists, Pearce and Turner (1989) introduced the CE concept based on Boulding's (1966) notion of economy as a circular system. According to some studies (Chiaroni et al. 2014; Lung & Levrat, 2014), CE existence is based on Boulding's ecological economists in which Pearce and Turned extended the concept of ecological industry and industrial metabolism into the entire economic system in order to propose a new model of economic development, production, distribution, and product recovery. Peace and Turner (1989) argued that the three economic functions of environment, which consist of provision of resources, life support system, and sink for waste and emissions, should have a price. However, in practice, such environmental goods do not possess value among societies (Ghisellini et al. 2015).

According to Ghisellini et al. (2015), the circular economy concept was also traced back to General Systems Theory (Von Bertalanffy, 1950; 1968) and Industrial Ecology (Preston, 2012). General Systems Theory (GST) proposed that holism, system thinking, organizational learning, and human resources development are essential characteristics of CE (Capra, 1995; Jackson, 2016; Odum, 1996; Senge et al. 2010; Swanson, 2001). It conceived that the relationships between organizations and their environments are interdependence and the wholeness of these interactions could become a determinant in each actor's behavior (Capra, 1995). Thus, it is imperative to investigate an agent's behavior in economic relationships compared to other agents in the economy (Gatti et al., 2010).

Industrial ecology (IE) offered a narrower perspective. It emphasized the utilization of residual waste materials, including energy, water, different by-products, and information (Jacobsen, 2006). Industrial symbiosis, a prevalent practice within the industrial ecology concept, provided a collective benefit through economic and environmental aspects (Su et al. 2013). With respect to economic advantages, a cluster of firms could exploit common

production factors such as labor, capital, and energy (Anderson, 1994) and technology spill-over more easily (Coe et al. 2004), which might increase productivity. Furthermore, industrial symbiosis could achieve environmental advantages by minimizing waste and decreasing the exploitation of virgin materials (Andersen, 2007). Hence, waste management and its integration within the industrial production network played a significant role in preserving raw materials (Frosch, 1992). By this idea, IE promoted the closed cycle of materials and energy that led to efficient industrial processes (Frosch, 1992; Erkman, 1997).

According to Ellen MacArthur Foundation (2013), circular economy was characterized by a restorative and regenerative industrial system in which it altered the “end-of-life” concept into a shift towards the use of renewable energy, the elimination of toxic chemicals, and the elimination of waste through an intentional design of materials, products, systems, and business model.

2.2 The Principles of Circular Economy

Ellen MacArthur Foundation’s research community has the most professional publications on the circular economy in Europe (Fogarassy & Finger, 2020) This research defines CE based on Ellen MacArthur Foundation’s interpretation (2013) of imperative principles to achieve optimal design for circular economic systems. These principles are as follows:

Design out waste by intentionally designing the biological and technical components of a product to fit within their materials cycle. In other words, through a design for remanufacturing, refurbishing, and recycling, the nutrients of a product would circulate in the economic system, which it prevents them from becoming waste in the future (MacArthur, 2013). The biological components are designed with the intention to be consumed or metabolized by the economy in a new cycle. A common practice would be exploiting their added value for a new application. The technical wastes, such as polymers, alloys, and other man-made materials, use a tighter inner loop throughout their lifecycles. It implies the technical components are designed to be preserved and maintained rather than recycled as much as possible. Consequently, product life can be extended, thereby the product utilization is increased (Ellen MacArthur Foundation, 2015).

Build resilience through diversity. The industrial revolution and globalization epitomized by building a system of uniformity to achieve greater efficiency, are not relevant for future development. To tackle this issue, diverse systems with many connections and scales

such as modularity, versatility, and adaptivity need to be prioritized in order to stay relevant in an uncertain world (MacArthur, 2013).

Rely on energy from renewable resources. A circular system should utilize renewable energy in the production process whenever possible (MacArthur, 2013). In addition, A circular design shall decide wisely regarding particular technology and process when utilizing virgin material in order to preserve natural capital as much as possible (Ellen MacArthur Foundation, 2015).

Think in “systems”. It implies the ability to understand how an agent influences other elements within the environment, and the relationship of the environment to the agent. In other words, system thinking proposes the notion of understanding an agent’s impacts on its infrastructure, environment, and social context. Furthermore, system thinking also embodies regenerative conditions, meaning the flow and connection of feedback over times (MacArthur, 2013). For instance, a circular economy allows natural capitals to flow their nutrients within the system. Thus, it creates the condition for them to regenerate within the system (Ellen MacArthur Foundation, 2015).

Foster system effectiveness by revealing and designing out externalities. Reducing detrimental impacts on the system, including areas such as food, mobility, shelter, education, health, and entertainment and controlling negative externalities, (e.g., land use, air, water, noise pollution, and the release of toxic substances) will foster the whole ecosystem (Ellen MacArthur Foundation, 2015).

2.3 Product Design and Business Model Strategies for Circular Economy Adoption

According to Bocken et al. (2016), the circular economy paradigm required alteration at the product design level and strategic level of business innovation to help designers and strategic decision-makers move toward circular model businesses. Based on this idea, Bocken et al. (2016) developed a framework of strategies to guide them in the path.

The framework categorized the design and business model strategies based on the resource flow mechanism by Stahel (2010), McDonough & Braungart (2002), and Braungart et al. (2008). According Bocken et al.’s (2016) framework, there were two main fundamental strategies concerning circular resources flow in a system.

1. Slowing resource loops: to slow down the cycle of the resources, designing the product based on the concept of long-life goods and product-life extension will prolong the utilization period of a product. This prolongation can be achieved

through several ways, such as repairing and remanufacturing (Stahel, 1994, 2010; Braungart et al. 2008).

2. Closing resource loops: to make the cycle of the resource circular, recycling the product between the post-use and the production phase is imperative in reaching the possibility of reusing the materials (Stahel, 1994, 2010; Braungart et al. 2008).

The third approach, entitled narrowing resource loops, emphasizes a different matter than the aforementioned approaches. Bocken et al. (2016) explained that narrowing resource loops implies reducing resource flows, prioritizing efficiency throughout the production process. Bocken et al. (2015) contended that narrowing resource loops does not influence the speed of the flow of products and does not involve any service loops, and therefore does not address the cycling of goods. For that reason, this strategy is not fit within the circularity approach. Its ability to speed up the linear resource flows is one of many critiques of why this approach is irrelevant to the circular economy (Bocken et al. 2015).

Therefore, this study utilized the perspective of slowing and closing resource loops. However, due to the nature of the methodology, explorative research, it does not rule out the possibility that a new approach like narrowing resource loops will emerge in accordance with the interviews' results.

2.3.1 Design Strategies for Circular Economy Adoption

Implementing the CE concept into product design strategies requires concerns at the earliest stage of the design process. The consequence of circumstances wherein any resources have been committed to a particular design is that it is difficult to make significant alterations (Short et al. 2014). The following sections will explicate the product design strategies at the early stage relevant to slowing and closing the resources loops.

2.3.1.1 Product Design Strategies for Slowing Resource Loops

Designing a product to prolong its utilization period is a highly effective strategy to reduce resources. There are two typical design strategies to slow down the flow of resources, they are creating long-life products (Chapman, 2005) and extending used-product's life (Bakker et al. 2014). Designing for attachment and trust (Chapman, 2005) and designing for reliability and durability (Moss, 1985) can achieve long-life products. In addition, used-product life extension can be facilitated through design for maintenance and repair, upgradability and

adaptability, standardization and compatibility, and dis- and reassembly (Linton & Jayaraman, 2005).

Design strategies to slow loops	
<i>Designing for long-life products (Chapman, 2005; Moss, 1985)</i>	<ul style="list-style-type: none"> • Design for attachment and trust (Chapman, 2005) • Design for reliability and durability (Moss, 1985)
<i>Designing for used product-life extension (Bakker et al., 2014; Linton & Jayaraman, 2005)</i>	<ul style="list-style-type: none"> • Design for ease of maintenance and repair • Design for upgradability and adaptability • Design for standardization and compatibility • Design for dis- and reassembly

Table 2.1. Product design strategies for slowing resource loops.

Designing for long-life products. The context of this design strategy is to ensure a product could be utilized for a long period (Bocken et al. 2016). The first scheme to fulfill the objective is by designing for attachment and trust (Bocken et al. 2016). In other words, consumers love, like, and trust the product for a long time. The process also includes establishing a long-lasting empathic partnership between the users and the product (Chapman, 2005). Second, “Design for durability” refers to the physical durability of a particular product. Material selection is imperative during the design process. “Design for reliability” is related to the possibility that a product could function over a specified period without any failures when being preserved according to the manufacturer’s instruction (Moss, 1985). One of the ways to achieve a reliable product is through product testing, i.e., it replicates the daily scenario to measure how reliable the product is (Bocken et al. 2016).

Designing for a used product-life extension. The context of this design strategy is to prolong the period of used goods utilization by introducing service loops such as, reuses, maintains, repairs and upgrades the technical aspects of the products (Bocken et al. 2016). “Design for ease of maintenance and repair” is the first strategy. Maintenance is defined as the performance of evaluation and servicing tasks, including technical, administrative, and managerial, in order to maintain the capabilities of a certain product (Linton & Jayaraman, 2005). The repair is measured through the ability to restore the product to a good condition after decay or damage (Linton & Jayaraman, 2005). Using this philosophy, the designer ensures the user can maintain the product in a flawless condition over time (British Standard, 2009). For instance, Fairphone designed its product in a way that users easily repair and replace broken parts thus, the phone remained impeccable for a long time (Pesce, 2015). The second strategy is about designing the product so that it can be expanded or modified in the future (Bocken et

al. 2016). Upgradability refers to a product’s capability to function well under changing circumstances by improving the quality, value, effectiveness, or performance (Linton & Jayaraman, 2005). Third, “Design for standardization and compatibility” means manufacturing parts of the product that would fit other lines of the products (Bakker et al. 2014). Fourth, “Design for dis- and reassembly” reflects modularity that is beneficial for materials with different cycles of life (biological or technological) (Bakker et al., 2014).

2.3.1.2 Product Design Strategies for Closing Resource Loops

The Cradle to Cradle (C2C) design philosophy has inspired many designers to utilize a circular approach to product design (Bakker et al. 2010; De Pauw et al. 2013). Based on this concept, there are two distinct strategies for product design (Table 2). Firstly, dissipative losses are treated to fit within the biological system, engaging in biological cycle (McDonough & Braungart, 2002). Secondly, the materials that are not suitable for the biological cycles are recycled, immerse them into the technological cycle (Ibid). Furthermore, products composed of the combination of both materials are regarded as “monstrous hybrids”, in which this product demarcated the recovery process in the system (Boulding, 1966).

Design strategies to close loops
<ul style="list-style-type: none"> • <i>Designing for a technological cycle</i> • <i>Designing for a biological cycle</i> • <i>Designing for dis- and reassembly</i>

Note: Designing for dis- and reassembly fit for closing and slowing loops strategies

Table 2.2 Product design strategies for closing resource loops.

Design for a technological cycle is only relevant for a product that serves as a service, in contrast to a product as a consumption (Bocken et al. 2016). The strategy stresses the importance of technical nutrients (materials) to be recycled continuously into new materials or products that have similar value to the original material (Boulding, 1966). There are two possible ways to achieve equivalent properties of the recycled materials, primary recycling and tertiary recycling (Bocken et al., 2016). Primary recycling is defined as the mechanical reprocessing of a material into another material with equivalent attributes (Hopewell et al. 2009). Whereas tertiary recycling implies the structural breakdown of a particular material into its core components followed by consecutive buildup of the material with equivalent attributes to the original one (Kumar et al. 2011).

Design for a biological cycle is applicable for product as consumption, which leads to dissipative loss of resources (McDonough & Braungart, 2002). The strategy underlines the importance of designing the product using safe and healthy materials (biological nutrients),

creating a natural symbiosis across its lifecycle (McDonough & Braungart, 2002). Biodegradability, the capability of a particular material to be degraded by biological activity, is a prevalent process in creating symbiosis (Vert et al. 2012). It allows a material to be biodegraded to start a new life cycle (Bocken et al. 2016). For example, composting permits organic substances to be decomposed biologically through microorganisms (Vert et al., 2012).

Design for disassembly and reassembly allows the combination of technological and biological nutrients (Bocken et al. 2016). It ensures that products and parts can be separated and reassembled easily. As a consequence, each material could correctly enter different cycles (Bakker et al. 2014).

2.3.2 Circular Business Model Strategies for Circular Economy Adoption

A business model illustrates how a particular firm does its business, including capturing value from its innovation (Bocken et al. 2016; Chesbrough, 2010; Tukker, 2004). It is known that once a business model has been established, companies often encounter difficulties in adapting their business models to new circumstances (Teece, 2010). As a result, firms frequently miss out on opportunities to exploit the value of their innovation (Chertow, 2000). Similar technology or product innovation embedded in different business models turns out able to yield different economic outcomes (Chesbrough, 2010). Therefore, it is prominent to develop new product development process (NPD) with clear business model strategies, such as go-to-market strategies and value capture strategies (Teece, 2010).

Implementing the circular economy concept into product design requires a new way of thinking in operating business. The higher the degree of newness on particular product innovation, the higher chances that an alteration out of the business model is necessary (Bhamra & Lofthouse, 2007). Based on business model frameworks derived from Short et al. (2014) and Bakker et al. (2014) in Bocken et al. (2016), key business model strategies that are suitable for slowing and closing resource loops are presented in the subsequent sections.

2.3.2.1 Business Model Strategies for Slowing Resource Loops

Business models to slow down the flow of resource loops propose long product life and product reuse through business model innovation (Bocken et al. 2016). Based on Bocken et al. (2016), four key business models are presented (Table 3): access and performance, extending product value, classic long life, and sufficiency. The following paragraphs will explicate these models in three different business model elements. These are, value proposition (product/service), value creation and delivery (how the value is being provided to consumer), and value capture (monetization).

Business Model Strategies for Slowing Resource Loops (Bocken et al., 2016)	
Strategies	Definition
1. <i>Access and performance model</i>	This model encourages to satisfy user needs without the existence of owning the physical products.
2. <i>Extending product value</i>	This model stresses the exploitation of the residual value of a product. The process can be illustrated as the flow from manufacture to consumer and then back to manufacturing. Moreover, the collection of products between different business units is also possible.
3. <i>Classic long-life model</i>	Herein, delivering long product life through relevant product design strategies should be prioritized
4. <i>Encourage sufficiency</i>	This model corroborates a solution that encourage end-users to reduce their consumption through different principles, such as durability, upgradability, service, warranties, and reparability. Furthermore, it does not support the commission approach in the business model.

Table 2.3 Business model strategies for slowing resource loops.

Access and performance model resembles the capabilities or services to fulfill consumer's needs without the need to own the actual product (Bocken et al. 2016). Another popular term includes Product Service System (PSS), which underlines a combination of product and services to deliver capability rather than ownership while reducing environmental impact (Tukker, 2004). Regarding value proposition, it focuses on the delivery of the service rather than the acquisition of the product. Moreover, manufacturers and retailers have the responsibility to maintain the services (value creation and delivery). Lastly, monetization is per service unit, such as time, the number of uses, performance, etc., (Bocken et al. 2016). The instrumental effect of implementing this model is that it can produce economic incentives for both manufacturers and users (Bocken et al., 2016). For instance, a manufacturer's profit possibly increases through the attributes of durability, reusability, etc. At the same time, users can spend their money wisely, depending on their consumption (Ibid). As a result, slow resource loops could occur. Examples of this business model are car-sharing, leasing jeans, and leasing phones.

Extending product value focuses on exploiting the residual value of products (Bocken et al., 2016). There are few examples of how this model is done. For instance, refrigerators and other white goods in the EU are examples of remanufacturing operations for residual products which have ceased to function (Wells & Seitz, 2005). This model's value proposition is located at exploiting the residual value of a product followed by delivering an affordable like new

product through product life extension strategies. The value creation and delivery could be fulfilled by take-back systems and collaborations with retailers, logistic companies and collection points to streamline the product return process. In addition, although the consequences of reprocessed residual value would potentially increase labor and logistic cost, the effect is compensated by the lower overall cost, thereby makes it a feasible option for the manufacturer (Bocken et al. 2016).

The **Classic long-life** model focuses on long-product life through design for durability and repairability (Bocken et al. 2016). The value proposition centered around high quality, long-lasting products and high levels of service. Moreover, value creation and delivery stress durable product design and high customer service levels. Lastly, the monetization achieves from the premium prices of the product due to the cost of long-term services and product warranty over the product's lifetime (Bocken et al. 2016). Luxury watches brands such as Rolex or Patek Philippe mirror the model by offering a lifetime product utilization (Ibid).

The **encourage sufficiency** business model is similar to the classic long-life model (Bocken et al. 2016). However, it underlines the non-consumerist approach to promotion and sales (Bocken & Short, 2016). The fundamental approach of the model is to create a durable product, thereby it allows users to utilize it as long as possible through high levels of services (Bocken et al., 2016). The value proposition of the model is durable product along with a high level of services. The value creation and delivery could be achieved by a non-consumerist approach to selling, i.e., fewer high-end sales rather than replacing obsolete products over a short period (Bocken et al. 2016). As a result, the product would be perceived as a premium-priced product to compensate for the short sales and high services (Bocken et al. 2016). Patagonia is a well-representative of this model (Patagonia, n.d.). It launched the iconic "Don't Buy This Jacket" advertisement to support the Common Thread Initiative, which stresses repairing and reusing its clothing (Bocken et al. 2016)

2.3.2.2 Business Model Strategies for Closing Resource Loops

Business models for closing the flow of resources pertain to exploiting any value from by-products or waste in the linear business approach (Bocken et al. 2016). The business model's scope is ranging from the micro-level to macro-level. For instance, firms could reuse their by-products within their manufacturing process (micro), or an independent network could leverage another company's by-product to create value out of it (macro) (Wells & Seitz, 2005). There are two possible business model strategies to achieve this goal, extending resource value and industrial symbiosis.

Business Model Strategies for Closing Resource Loops (Bocken et al. 2016)	
Strategies	Definition
1. <i>Extending resource value</i>	Utilizing the residual value of resources by turning them into new forms of value.
2. <i>Industrial symbiosis</i>	The business model utilizes the residual value outputs from one process as a feedstock for another operation. This business model is considered a process-oriented solution. Moreover, the symbiosis is generated through the geographical proximity of several businesses in a cluster.

Table 2.4 Business model strategies for closing resource loops

Extending resource value involves collecting wasted materials and resources, followed by reprocessing these into new forms of value (Bocken et al. 2016). The value proposition focuses on utilizing the residual value of resources while decreasing material costs and product prices. The value creation and delivery emphasize collaborating with another company to build a take-back system for the source materials. Lastly, monetization is achieved through transforming non-valuable resources into another form of valuable resources (Bocken et al. 2016). InterFace Net-Works™ is a leading exemplar of this model, a program that solves two fundamental problems at the same time: sea pollution and poverty. It introduces the activity of collecting finishing nets from coastal areas to clean up oceans and beaches while producing financial opportunities by training the impecunious people to recycle the waste materials into yarn, and eventually a carpet (Interface, n.d.).

Industrial symbiosis is considered a process-oriented solution. Herein waste from one output is perceived as feedstock for another process or product line (Chertow, 2000). The difference between industrial symbiosis and “extending resource value” lies in the scope of the places where the process and manufacturing occurs. Industrial symbiosis practices at a close-knit geographical area, whereas “extending resource value” could happen across the geographical area (Bocken et al. 2016). The value proposition would be a reduction in operating costs and risk. The value creation and delivery could be achieved through collaborative agreements aiming to decrease cost across the network and exchange by-products. Capturing the value by joint cost reductions and future collaboration potential would increase waste utilization (Ibid).

2.3.3 Product Design and Business Model Strategies for a Circular Economy

Based on the previous sections, Bocken et al. (2016) proposed a framework (Figure 1) to facilitate designers and business decision-makers to move towards a circular economy

approach within their businesses. Hence, an overall goal or vision about circularity must be in place, thereby it enables innovators to fully capture the business opportunity of the circular economy within a comprehensive objective to reduce sustainability pressure (Stahel, 2013). In addition, “system thinking” in conjunction with evaluating the framework is essential because it allows the evaluator to discover the broader effect from the alteration in business model and product design, especially as these are interrelated (Bocken et al. 2016). It is noteworthy that the transformation to CE is inherently complex due to many interrelated aspects. While these complexities are essential to understand the nature of CE transformation profoundly, they are outside the boundaries of this study (Ibid). The graph below illustrates the conceptual framework to support the move to a circularity approach based on product design and business model strategies (Ibid).

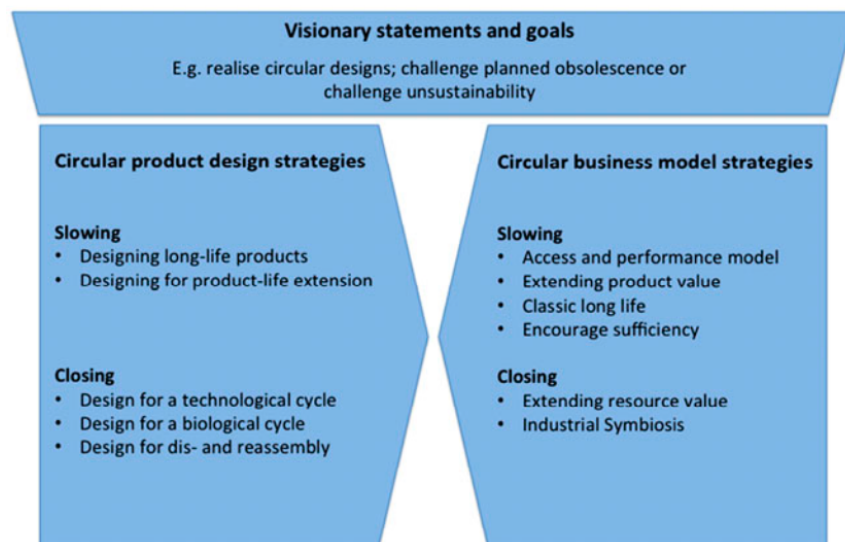


Figure 2.1 Circular product design and business model strategies by Bocken et al. (2016)

2.4 Conceptual Framework of The Study

Based on the aforementioned literature, a conceptual framework is constructed (Figure 2). The model’s foundation is based on Bocken et al.’s (2016) article, namely Product Design and Business Model Strategies for a Circular Economy. The research chooses this model because of relevance reasoning with the context of the study. i.e., Bocken et al. (2016) provided a general framework for designers and strategic decision-makers aiming to give clarity and direction for them to adopt circular design and circular business model. However, because of the conceptual aids derived from broad circular strategies and schemes, there is a call to develop the framework through case studies to test the identified strategies (Bocken et al. 2016).

To illustrate how the conceptual framework functions in the fashion industry, the case of Patagonia in the United States market is a clear example. In respect of the product design, Patagonia challenged the unsustainability and overconsumption through durable products followed by service loops of repairing. By encouraging consumers to reuse and buy secondhand products, Patagonia can achieve the idea of slowing the resource flow in the industry. In respect of the business model, the company advertised the “Don’t buy this jacket” advertisement to limit the industry’s growth. This act reflects a business model strategy to slow resource loops (Bocken et al. 2016).

In order to adopt a circular economy into a business successfully, the framework requires designers or decision-makers to have CE visions or goals already in place or at least have an intention to implement them within their firms. Therefore, this phase acts as a screening gate for respondents’ selection. Subsequently, the circular product design and circular business model strategies are evaluated, in terms of how the participants perceive these aspects to be imperative within circular economy implementation in Indonesia’s fashion industry. In addition, the challenges pertaining to the CE implementation are provided. As a result, this study proposes a substantiated framework by considering the fashion industry and Indonesia as a developing country. The results of this study are expected to provide a profound understanding for designers and business makers in Indonesia’s fashion industry about the implementation of CE, thereby helping them move towards the circularity approach.

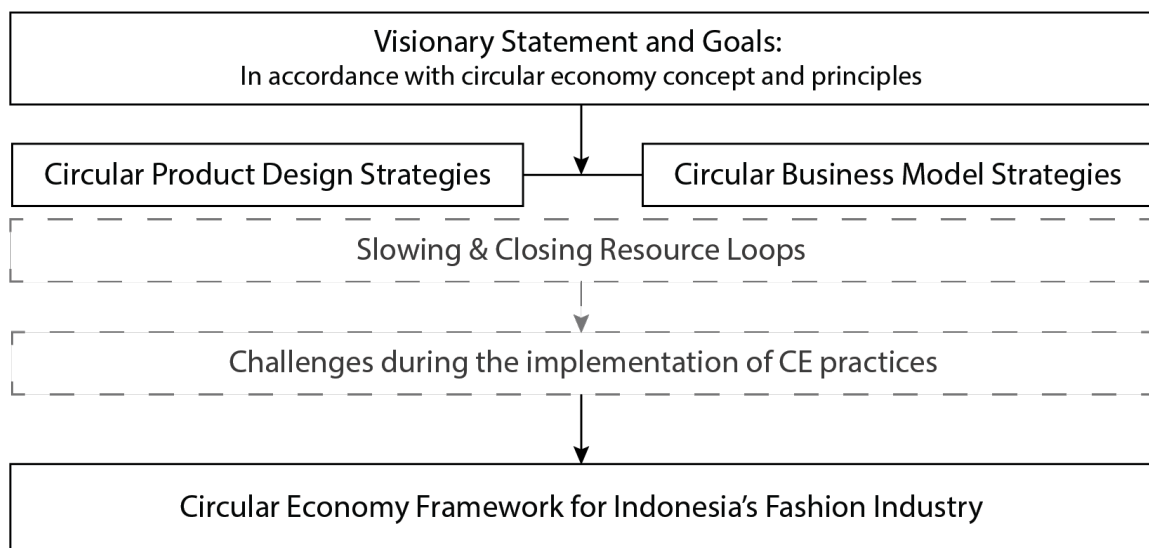


Figure 2.2 Conceptual framework

Chapter 3. Methodology

This chapter presents several sections in which it unfolds the necessary steps to answer the research question. Firstly, it corroborates the research to set the theoretical foundation on the methodology of the study. Secondly, the data collection method is presented. Thirdly, the data processing method throughout the study is described. Lastly, the study incorporates credibility and ethics norms throughout the research process.

3.1 Research Approach

A profound comprehension pertained to the research context by defining the research's ontology, paradigm, and epistemology was imperative in constructing an appropriate research methodology (Creswell, 2014; Lincoln et al. 2011). Ontology is about the nature of the entity and the assumption from that of reality (Bryman & Bell, 2011). The reality of this research retrieved from the enormous economic growth in the fashion industry while also causing detrimental impacts on the natural ecosystem. This view is the epitome of our current paradigm, linear consumption and production in neo-classical economy era. Consequently, there are urgent calls to alter the means business-as-usual in the fashion industry operate. The adoption of the circular economy concept into the fashion industry is perceived as essential towards sustainable development. To concludes, the study's reality was to examine the implementation of circular economy strategies in Indonesia's fashion Industry.

To discover the reality of the research, viewpoints from designers, innovators, or business decision-makers were relevant to the context and the framework of the study. Therefore, constructivism philosophical paradigm was utilized throughout the study. This paradigm stresses the participant's views about a particular phenomenon (Creswell, 2014). In this case, designers, innovators, or business-decision makers were expected to interpret the relevant practices towards the circular economy in Indonesia's fashion industry. Several challenges during the implementation of these practices were also explored.

Subsequently, the research's epistemology can be determined. Epistemology describes the optimal means of investigating the reality of the world. It clarifies how the knowledge can be obtained and what might be obtained from the method (Eriksson & Kovalainen, 2008). Because this research utilized the constructivism philosophical paradigm, qualitative approach through instrumental case study analysis was an appropriate philosophy paradigm. Qualitative

approach allowed the researcher to exploit innovators, designers, and decision makers interpretation (Collis & Hussey, 2013). While instrumental case study enabled the researcher to have an inductive approach (Yin, 2009).

3.2 Data Collection

Secondary data collection pertaining to the relevant concept was imperative as it acts as a foundation for the researcher to conduct the fieldwork. The researcher collected secondary data through written documents related to the research questions (Creswell, 2014). These attempts were a process where the researcher discovered and engaged relevant literature to clarify and identify suitable theoretical, conceptual framework (Mckay & Marshall, 2001). In this case, since the justification of the study stressed the importance of adopting a new means of doing business-as-usual in the fashion industry, this research started by seeking sustainable concepts that are in line with the phenomenon of the study. The circular economy was perceived as an appropriate theoretical foundation because of the similarities between the study's background and the motives that gave birth to this concept. In other words, the circular economy concept was highly rated for its possibility of tackling the neo-classical economy problem while offering a new tangible means of doing businesses. Subsequently, the research utilized Bocken et al.'s (2016) conceptual framework of product design and business model strategies for a circular economy. Bocken et al. (2016) proposed a broad conceptual aid to facilitate actors to move towards a circular economy. In addition, the authors also suggested evaluating the model through case study analysis to test the identified strategies in different contexts (ibid).

The researcher gathered primary data through in-depth interviews with innovators, designers, and business decision-makers. The research found that CEOs occupied these roles since they are responsible for making significant decisions, managing overall operations, and managing their resources (Hayes, 2020). The in-depth interview technique allowed the participants to interpret their behaviors and beliefs without restriction (Saunders et al. 2007). It was necessary since the nature of this study was an exploration of the implementation of the slowing and closing resource loops strategy in Indonesia's fashion industry (Boyce & Neale, 2006). Their experience pertained to the appropriate practices toward CE were elaborated according to their beliefs. Furthermore, the interviews were conducted through the online platform, such as Zoom and Google Meet. Although face-to-face interviews have their own advantage, it was not possible due to the researcher's circumstances. Firstly, concerning the covid-19 situation, the government urged everyone to follow social distancing regulation.

Secondly, the geographical distance between the researcher and the participant was too costly to perform in-site interviews.

The participants of the interviews were selected through purposive sampling. They were being chosen deliberately to help the researchers understand the contextual problem (Creswell, 2014). Several criteria determined whether the participant fit the context of the study. Firstly, the participant's roles were innovators, designers, or business decision-makers (Bocken et al. 2016). Secondly, the participants engaged in a company that embedded circular designs or was about to implement its circular design vision (Bocken et al. 2016). Thirdly, the participant took part in a company where it designed and produced its clothing line. The reasons were twofold. First, the framework of the research emphasized the product design process. Second, manufacturing operation was causing the most negative externalities in the fashion industry. Throughout primary data collection, the process ceased when the data collected was no longer producing new ideas for the research. In other words, it was saturated (Chamaz, 2006).

Prior to primary data collection process, the research utilized the knowledge of key informants regarding the potential participants and the interviews questions. The researcher perceived this was an imperative process as it increased the validity of the result in a qualitative study. The researcher contacted several industry experts through different means, such as Instagram, LinkedIn, Email, Personal Website, Company's website, etc. As a result, the study was able to reach two key informants, which are listed below.

No.	Name	Reasoning
1.	Sadikin Gani	He is the founder of Satusatu fashion Hub, a startup that provides a consultancy for fashion business development. Furthermore, he was a lecturer at ESMOD Jakarta.
2.	Nidiya Kusuma	She is a textile artist and a researcher that focuses on textile materials and natural dyeing methods.

Table 3.1 Key Informants

Afterward, with the help of the key informant's networks, the researcher contacted several potential participants for the study. Besides, the researcher did some research, particularly in the national and international media, to discover other individuals that fit the study's criteria. Subsequently, through similar means, the researcher contacted all of the potential participants. In total, there were 43 potential participants. However, only 10 participants were willing to take part in the research. The participants, including their company, are listed below.

No.	Name & Occupation	Reasoning
1.	Aryenda Atma, Founder and Creative Director of Pable Indonesia	Pable Indonesia put circular economy principles at the heart of the company. It provides textile recycling services in Indonesia.
2.	Shari Semesta, Co-Founder of Imaji Studio	Imaji Studio values mutual understanding of human and nature co-exist not only ethically but also harmony in creating fabric and apparel.
3.	Nicoline Patricia Malina, Founder of Lanivatti	Lanivatti is a slow fashion business. It proposes three core values at the moment, limited production, sustainable fibers, and local manufacturing with ethical work standards.
4.	Alvin Ang, Founder of Clean Clothes Only	Clean Clothes Only put sustainability into its core value. It utilizes sustainable materials and ethical manufacturing processes for the better future of the fashion industry.
5.	Felicia Budi, Founder of Fbudi	Fbudi has a vision towards a sustainable future. It provides custom design services using fabrics that are developed in collaboration with local creatives and artisans.
6.	Elizabeth Myra Juliarti, Founder of Siji	Siji is an environmentally sustainable fashion through timeless design and gender-fluid concept.
7.	Clarissa, Founder of I am Eccu	I am Eccu believes in conscious consumption within the fashion industry. Hence, its product is considered timeless and environmentally friendly.
8.	Indita, Head of Researcher of Setali Indonesia	Setali offers upcycling services for all kinds of clothes.
9.	Renata, Founder of Rereoutlined	Rereoutlined offers a more sustainable choice of clothing. Every piece of clothing is made by upcycling excess fabrics sourced from the factory.
10.	Oliv, Co-Founder of Control New	Control New upcycled fabric waste into authentic handmade goods.

Table 3.2 Primary Data Collection

Furthermore, triangulation is an essential additional practice when conducting case study research (Farquhar et al., 2020). It provides validity by converging findings, sources, or methods (Farquhar et al., 2020). The research seized other organizational records retrieved from the internet and other means of media. To increase the validity and credibility of the study, cross-examination between the primary data and organizational records was conducted throughout the research.

3.3 Data Processing

Data processing is the essence of theory building in case study research (Eisenhardt, 1989). The collected primary data was transcribed less than six hours after the researcher conducted the interview. It was imperative to reduced bias when the author interpreted participant statement (Bryman & Bell, 2011). Afterward, the researcher constructed open, axial, and selective coding to cluster the major themes regarding appropriate practices within slowing and closing resource loops strategy (Corbin & Strauss, 1990). However, since the nature of the in-depth interview was open, guided by the participants instead of the researcher, a new theme outside the current boundaries emerged.

Subsequently, the selective coding was done through the interpretive approach in qualitative research. The interpretive approach corresponds to the major theme with the researcher's knowledge or related theories (Elliot & Timulak, 2005). This process was essential because it enabled the researcher to reduce any bias while analyzing the qualitative data. The theory or previous research served as a theory triangulation to not only reduce any bias (Elliot & Timulak, 2005) but also examined the result from another perspective (Carter et al. 2014).

The coding and analyzing process were carried out with the help of ATLAS.ti. It is a powerful workbench software for qualitative analysis of different forms of data, such as textual, graphical, audio, and video data (ATLAS.ti, n.d.). It helped the researcher to code systematically and discovered the hidden means within the complex data material. Its feature allowed the researcher to create a relationship within the data in a meaningful way. Thus, visualizing the findings in a digital mind map eased the interpretation of the result within complex material.

3.4 Credibility and Ethics

In a qualitative research paradigm, the validity and reliability of research often refer to the credibility of the findings (Lincoln & Guba, 1985). In order to enhance the credibility of the study, Lincoln & Guba (1985) proposed that maximizing the trustworthiness of an investigation is essential for a credible and defensible result, thereby leading to the generalizability of the findings. Based on this proposition, Lincoln and Guba (1985) suggested establishing four aspects of trustworthiness: credibility, transferability, dependability, and conformability. Credibility refers to the internal validity of the findings (Lincoln & Guba, 1985). In this case, the author profoundly comprehended the context or reality of the study. Based on this understanding, the author proposed an appropriate methodology to answer the research question so that the findings of the result were credible and valid. Confirmability

describes the degree to which the findings are neutral. In other words, the respondent shaped the findings instead of researcher bias (Lincoln & Guba, 1985). During the research process, from defining the phenomenon of the study to drawing the result of the study, the author's supervisor helped and guided the research process to ensure a proper operation along the way. Transferability indicates an external validity or generalizability of the findings (Lincoln & Guba, 1985). Lastly, dependability refers to consistent findings shown by similar result if the research is repeated (Lincoln & Guba, 1985). Both of these aspects were fulfilled when the researcher achieved the confirmability and the credibility of the study.

Furthermore, ethical norms were embedded throughout the research process. During the field work, the author explicated the purpose of the study and asked for permission whether the researcher can record the interview. Moreover, during the data processing phase, the author was conscious of storing the data responsibly to satisfy confidentiality and anonymity aspects (Saunders et al. 2009).

Chapter 4. Result and Discussion

This chapter presents the findings of the study and explicates their relationship with several theories. The Result chapter is divided into three main structures: Design & Development Circular Design, Fabric & Clothing Collection or Manufacturing, and Imperative Factors to Accelerate the Process. These sub-chapters corroborate the essential principles and avenues towards circular economy practices in Indonesia's fashion industry. In addition, potential challenges are included. Afterward, the interpretation of the findings in regard to the theory is presented.

4.1 Design & development circular design

The Design & Development of Circular Design emphasizes integrating circular economy principles at the earliest product design stage (Bocken et al., 2016). This section describes several prominent tenets that are ingrained while designing apparel or a collection by designers. They are desirability, durability, resource reduction, deconstruct to upcycle, and downcycle. Furthermore, possible challenges and or opportunities during the implementation of each tenet are delineated. Afterward, these tenets are discussed under circular product design strategies.

4.1.1 Desirability

Felicia, the designer, and CEO of Fbudi, a company that offers custom design apparel, always prioritize the desirability aspect in her design. Felicia perceived desirability as one of the most important aspects when one designed apparel. When the consumer desired a particular product, the consumers will utilize the product as long as possible (Chapman, 2005).

"[When I designed my clothing], certainly, it has to fulfill the purpose [of the clothing, which is], the clothing should be used as long as possible by the consumer. In order to reach that, in my opinion, it has to be desirable. [The product needs to be desirable]. That's the main thing." (Felicia, designer, 2021)

The feeling of desiring a particular product can be defined into various aspects. Felicia stated that consumer's attachment to the product and the degree to which the product's design was trendy could affect one judgement of desirability (Bocken et al. 2016). Moreover, Noline, the founder of Lanivatti, a company that put sustainability at the core of its visions, added that creating a design based on consumer's necessities could also make the product more desirable.

"[I define desirability as] how consumers feel about their clothes, and whether they want to keep it for a long time, whether this piece is just a trend. [Because if it is, possibly the clothes would last very shortly]." (Felicia, designer & CEO of Fbudi, 2021)

"I put an extra focus on what we actually need as a working woman. That's what we offer...There's something that you might need, make your life easier, make you look good and comfortable, [therefore] you might want to keep it for a long time." (Nicoline, founder of Lanivatti, 2021)

Felicia underlined that desirability is not only affecting the usage time of apparel (Bocken et al. 2016) but also influencing one's business sustainability. In the context of ethical business, one of which are businesses that challenge planned obsolescence. Felicia frequently found that many companies in Indonesia tend to depend upon the good cause of ethicality without considering desirability aspect when designing apparel or collections. She warned that this practice might be beneficial in the first place. However, it's not enough to keep the business sustain. Desirability is imperative.

"In my opinion, in some of the ethical fashion businesses, desirability is a bit miss. Sometimes they communicate things like, we have a good cause behind our products, but that's all. They don't ever think about the desirability of their product. I think it won't sustain. I mean, when we try to sell an ethical product without it being desirable, perhaps people may buy once out of wanting to do good, but after that, they won't do it again." (Felicia, designer and CEO of Fbudi, 2021)

Incorporating desirability aspects into a collection possesses a significant challenge, especially in the realm of ethical businesses, in which most of them make use of eco-friendly materials. Nicoline explicated that eco-friendly material, for instance, lyocell, provides no structure for the apparel (Achlim, 2021). Consequently, loads of the ethical brands in Indonesia designed loose traits kind of apparel, in which the case of Myra's business. Myra created Siji on a mission to offer a gender-fluid concept through oversized design. Myra implied that it is challenging to design a desired clothing line when the materials have limitations.

"In terms of design, if you pay attention, there are definitely many ethical brands in Indonesia that have loosely designed, kind of yoga wear types of products. [The reason is] that is the nature of sustainable material. There is no structure... You're basically stuck with this kind of very soft and flowy material that you cannot really do a long of thins with." (Nicoline, founder of Lanivatti, 2021)

"The challenge is how to make our oversized design doesn't look like a bedsheet when our consumers are wearing it. So, there's still a pattern that stands out." (Myra, founder of Siji, 2021)

To overcome this problem, Nicoline and Myra underlined the importance of the pattern (McKenna, 2019). The only avenue to add structure into eco-friendly materials is by finding out a suitable pattern that emulates structure when designing a particular product.

"We just need research and we tried loads of cuts. We put lots of emphasis, lots of focus on the cuts. Because, although the material is very thin and soft, we still want to add some structure that can only derive from the cuts, the pattern." (Nicoline, founder of Lanivatti, 2021)

"We have to think about the silhouette, the pattern... [To overcome the challenge], it's more of designing a proper silhouette for each product" (Myra, founder of Siji, 2021)

4.1.2 Durability

Design for durability is defined as apparel designed and manufactured with quality to last in a long period (Bocken et al. 2016).

"Our apparel is designed and made with quality that it lasts a long time." *Shari*

Material selection and manufacturing process are essential in determining how durable the product is (Bocken et al. 2016). Myra posited that she intentionally utilized a particular eco-friendly material, namely calico, because of its durability. Furthermore, Oliv, co-founder of Control New, a company that upcycles fabric waste, added that not only the primary material but also other supporting processes and materials, such as the stitching, additional materials, etc., are necessary to manufacture durable apparel (Mateo, 2016).

"Calico is a material that does not require a lot of processing [to become durable], such as it doesn't need to go through [a] bleaching process, etc. It also has a strong weave; therefore, the material can take the wear and the tear longer compared to other materials." (Myra, founder of Siji, 2021)

"From the beginning, we tried to make products that were as durable as possible. To be durable, we had to have [the] good quality from the stitches to the additional material, and so on." (Oliv, co-founder of Control New, 2021)

In the context of material selection, in which most ethical businesses utilize eco-friendly fabric/thread, Felicia argued that this practice is imperfect. She posited that many industry players still perceived materials as a dichotomy between "good" fabric and "bad" fabric based on the consideration of how biodegradable the fabric is. Although this was one primary reason, Felicia called for more consideration and research in the realm of material selection.

"Thing that I regret from the sustainable fashion industry players is that sometimes they see things (material selection) as too shallow. They just want it to be easy. I mean which one is good fabric, and which one is not. In fact, there are so many things to consider. There are many layers. I hope people are more willing to peel off the layers, so it doesn't end there." (Felicia, designer and CEO of Fbudi, 2021)

The utilization of polyester in shopping bags is one of the great examples. Polyester is regarded as one of the environment-friendly materials because of its synthetic nature. However, the outcome would still be sustainable if one could design a product that fits polyester characteristics, e.g., water repellent and dust repellent. Research has shown that polyester shopping bags are the most sustainable than other bag materials, such as cotton or paper. This is because of its durability, reusability, and carbon footprint (Nordby, n.d.).

"For example, we've known that polyester is not biodegradable. But if we can make a product that suits the nature of the polyester, which is not permeable to water. Meaning it doesn't need

to be washed so often, [at the end of the day, it would become a sustainable product as well]. There was a research that compared many types of shopping bag. It turns out that the result was surprisingly the polyester bags. So, you cannot think of it as this is a good fiber and this is a bad one. Because nothing is absolute.” (Felicia, designer and CEO of Fbudi, 2021)

Therefore, as a designer, it is crucial to design based on the apparel function & purpose. Afterward, the designer makes use of appropriate materials and quality manufacturing to produce durable apparel.

“So, what I mean is that as a designer I try to decide the function of the clothes and what purpose it serves. Then how do we reach that purpose. With the use of the right materials and quality manufacture, the product will become durable.” (Felicia, designer and CEO of Fbudi, 2021)

Creating durable products poses some challenges. Firstly, Nicoline stated that eco-friendly thread merely doesn't have the ability to make the stitching durable. Therefore, polyester is still needed to manufacture durable apparel, especially in the thread composition (Mateo, 2016).

"The [eco-friendly] thread to stitch, it's really hard for us to utilize... If we want the clothes to last for a long time [specifically durable], then we must use the cotton blend mixed with polyester because that kind of thread makes the stitch more durable. [Otherwise,] when you stretch the stitch, it will break down." (Nicoline, founder of Lanivatti, 2021)

Secondly, Nicoline felt that ordinary consumers do not fully appreciate durability traits in apparel. Hence, it is challenging to market a product that doesn't excite consumers.

"We really emphasized the cutting and the stitches to make it durable. But it's something that not too many people care about. They just want the newest Trend. And that's something that we steer away from. So basically, we are steering away from everything that sells." (Nicoline, founder of Lanivatti, 2021)

However, on a positive note, there are niche groups of consumers that recognize the value of durability. Since the apparel is well made; good quality products, consumers trust the product more (Bocken et al. 2016). Hence, consumer trustworthiness, loyalty, and satisfaction are the potential opportunities for apparel like this (Ibid).

"Well, something like that (durable product) that makes people trust the product. I can say it's more of gaining trustworthiness, customer satisfaction, and loyalty. People are happy and they don't have any complaint about a product like this." (Oliv, co-founder of Control New, 2021)

4.1.3 Resource Efficiency

Design for resource efficiency is interpreted as a design pattern to prevent waste material from the production process (McQuillan, 2019).

"From the eyes of a designer, I tried to look at how a product can be designed to avoid waste during the manufacturing process.” (Felicia, designer and CEO of Fbudi, 2021)

Through the Zero Waste Pattern Cutting technique, Felicia endorsed the thought that waste pattern prevention at the design stage wouldn't compromise the aesthetic result of the overall design (McQuillan, 2019).

"From the beginning, I tried to implement Zero Waste Pattern Cutting... I want [other designers] to know that by removing waste out of the production process, it won't compromise the overall design." (Felicia, designer and CEO of Fbudi, 2021)

Specifically, the Zero Waste Pattern Cutting technique creates a construction/pattern design of apparel with additional consideration, which is the manufacturing process of the design won't produce much waste (McQuillan, 2019). Felicia believed that this process is a new approach to fashion education. Therefore, it is challenging to implement.

"Of course [Zero Waste Pattern Cutting technique] is more difficult. Because you have to design the construction [of the apparel] which I see, in fashion education, its actually quite new." (Felicia, designer and CEO of Fbudi, 2021)

During her tenure in fashion school, Felicia experienced that fashion design was about expression or differences (Hallnas, 2009). Consequently, problem-solving was not something perceived as essential in education. Later, the tenets changed from expression to start with problem, followed by solving it through the design, which is a new way of thinking in the realm of fashion industry (McQuillan, 2019). Hence, it is challenging, especially viewed from a design perspective.

"In my opinion, when I was in school, the priority in fashion design is about expression... it's more of a how you express yourself through fashion... [But there is a new approach, which is] how you train these prospective designers to start with the problem first, after that you try to solve it through design. It is a new approach in fashion education, [therefore], from [a] design perspective, it's challenging." (Felicia, designer and CEO of Fbudi, 2021)

On the other hand, this technique also serves as an opportunity for its users. Since resources are being utilized efficiently; little to no waste at all, the economic opportunity arising from this procedure is significant (McQuillan, 2019). Felicia illustrated this very well, which can be seen through the quote below.

"From the beginning that I created Fbudi, I already applied Zero Waste Cutting Pattern. But my main motive was more because it makes economic sense... I use my own capital, start small, why would I have to waste resources." (Felicia, designer and CEO of Fbudi, 2021)

4.1.4 Deconstruct to Upcycle

The tenet of deconstructing to upcycle is derived from the notion of exploiting pre-consumer and post-consumer waste in the fashion industry (Shurvell, 2020). Felicia posited that as long as designers have the relevant knowledge of taking advantage of the waste material, it will still present a value in the future.

"Whether it is a post-consumer [waste], when it's (the apparel) been bought and used, or it's (the apparel) still with us, the apparel hasn't been used by the consumer (pre-consumer), as much as possible, we don't throw it away. Because after all, I think it's still a resource... it's still a material that can be used if we know how to process it." (Felicia, designer and CEO of Fbudi, 2021)

To prolong the life of the waste garment, deconstructivism and upcycling techniques are utilized on the waste product or existing clothes (Shurvell, 2020). Deconstructivism means to dismantle the clothes (Hess, 2010). Moreover, upcycling means making a new piece of clothing by sewing used garments and other textiles together (Assoune, n.d.). In conclusion, deconstructing to upcycle means dismantling garment pieces, then rebuilding new refined apparel by sewing many parts together.

"We use the upcycling technique. So, we can extend the life of the garment by changing it again, deconstructed the pattern, etc. For example, changing the sleeve of a cloth. So as much as possible, it doesn't go the trash or landfills." (Indita, Head of Researcher of Setali, 2021)

"We deconstruct the product; we disassemble it to make new clothes again. That's one of the design approaches, deconstructivism. That means, you dismantle it then rebuild." (Felicia, designer and CEO of Fbudi, 2021)

Furthermore, this tenet is quite different than that of others. It requires the designers to alter the usual process of producing apparel. In simple terms, that is designing, fabric collection/manufacturing, and clothing manufacturing, respectively. However, in deconstruct to upcycle, the process starts with sourcing the waste fabric, followed by design and clothing production. Renita, the founder of Rereoutlined, a company that upcycles deadstock fabrics, explicitly stated that certain fabrics could only suit specific clothing designs (McKenna, 2019). Hence, she needed to be assured of what kind of fabrics that she has prior to designing.

"I only designed based on the fabrics I have. It's different from how you would normally design a collection. For me, it's fabric [collection], then design, then [clothing] production. It's always based on the fabric because you can't predict. I mean, apparently, a particular design cannot go with a certain fabric, [So the design is dependent on the fabric]. [Therefore], I have to source the fabric first and then do the design." (Renita, founder of Rereoutlined, 2021)

Deconstruct to upcycle owns several challenges and opportunities to its user. Firstly, since the work can only be done by manual labour, it affects the business in two aspects: high production cost and slow turnover of collections (Moreau et al. 2017). While scaling up the business means adding even more manual labour, which affects the operational cost, it won't significantly increase productivity.

"I must say that this is not a very profitable business because production cost [specifically from the manual labor] is very high. Because of the labor productivity [compared to machine], [we have] slow turnover of collection." (Renita, founder of Rereoutlined, 2021)

"In the end, to [scale up] our recycling, we need more labor. To disassemble the clothes, and produce it again... Indeed, I admit that it's hard to find efficiency in this case, we become slower, the resource used are actually more [especially the labor], and so on." (Felicia, designer and CEO of Fbudi, 2021)

Secondly, due to the aforementioned reasons, the price of upcycling apparel is higher than that of fast-fashion clothing. However, it turns out that the societies do not perceive the price reflects the product's value. They contend that products from waste and labour activities behind the manufacturing process do not reflect the premium prices (Pearce, 2009). Oliv posited that altering society's mindset about the upcycled product is her most formidable challenge. A more detailed explanation can be seen below.

"They see waste as something that has no value, then why would the price of the upcycled product be this high. Most people still don't know the process behind the product, the effort, etc. That's why they still think how the product from waste can be so expensive." (Oliv, co-founder of Control New, 2021)

"Change people's mindset and point of view [about the upcycled product] is our toughest challenge so far. The price that we charge, mostly it's from the labor right, so sometimes some people can't appreciate the service price from a product." (Oliv, co-founder of Control New, 2021)

Lastly, standardized quality throughout the collection, especially in terms of pattern motif and fabric composition, is utterly challenging to achieve. Pattern motif created through a delicate process of manual labor cutting and sewing naturally indicates consistency is difficult to achieve (Moreau et al., 2017). Not to mention getting the exact similar fabric pattern motif from waste is almost impossible. Even Renita has intrinsically said that in the context of deadstock fabric, i.e., pre-consumer waste, acquiring similar fabric composition is impossible.

"We can't make something exactly the same. For the exact same pattern motif, it's impossible. So that's the first challenge." (Oliv, co-founder of Control New, 2021)

"[For example, when you sourced for a deadstock fabric], there will be linen. There will be white linen, but it won't be the same fabric, [the same composition]. It's never the same if you use deadstock fabric... So that is challenging." (Renita, founder of Rereoutlined, 2021)

On the other hand, since acquiring the fabric is challenging, upcycled clothing/collection is only made in a small quantity. This makes the product has a perceived value of a one-of-a-kind or limited-edition type of product.

"We think although we can only produce a handful of clothes [for particular design], people sometimes think 'oh this is the only product.'" (Oliv, co-founder of Control New, 2021)

"Normally, from the deadstock fabric that I can get, then I built a collection out of it. [Although it's small batch], It actually makes it one of a kind, sort of limited-edition product." (Renita, founder of Rereoutlined, 2021)

4.1.5 Downcycling

The last tenet, downcycling, serves as the last resort to extract value out of apparel (Ellen MacArthur Foundation, 2015). Since this is the last resort, apparel that applies this principle must be in a condition where there are no other possible ways to extend the garment's life (Ibid). Aryenda, the founder of Pable Indonesia, a textile recycling company, explained the circumstances in the quote below.

"Recycle [, in the fashion industry is considered as downcycle] is the last resort of items that have no function at all. For example, items that are shabby, torn, and ugly. You have upcycled them and so on. Basically, other options have run out. The ending is recycling [downcycling]." (Aryenda, Founder of Pable Indonesia, 2021)

The nature of recycling in the fashion industry in Indonesia is that it is impossible to recycle pre-consumer or post-consumer apparel waste into material with an equivalent value of properties to those of the original as specified by Bocken et al. (2016) (McQuillan, 2019). Specifically, Aryenda posited that comparing the "comfort" attribute of recycled material to that of virgin material is not relevant. Therefore, the context of recycling in the fashion industry precisely is a downcycle.

"In the recycle [principle], you simply can't get the same 'comfort' when you compare recycled to virgin materials." (Aryenda, Founder of Pable Indonesia, 2021)

The reason has something to do with the recycling technology in the fashion industry (McQuillan, 2019). Aryenda stated that for apparel waste to be recycled, specifically pre-consumer textile waste, the technology requires the waste to be trimmed into small sizes. As a result, the fibers become short. This consequence is unavoidable in the realm of the textile recycling industry.

"So, when it comes to [pre-consumer] textile waste, for example, logs or pile of waste which has irregular shapes and irregular sizes, we usually cut them first. So, we cut in a certain size, the minimum is three finger joints, so it's about 5 cm wide, and the length is up to you. Therefore it can be processed in our processing machine. So, what are the consequence when you cut them into this small pieces like this? The fibers are short. This short fiber character that we can't afford with virgin material." (Aryenda, Founder of Pable Indonesia, 2021)

Furthermore, the technology also exposes other limitations regarding post-consumer waste. Aryenda explained that post-consumer waste is characterized by a mixture of fabric compositions, also called blended textiles, for instance, a fabric/clothe made up from a mixture of polyester, cotton, and viscose. There is no technology at a scale that could separate these mixtures (McQuillan, 2019). Consequently, everything must be blend into one pile. Hence, the recycling output can only reach the fiber stage.

"If it is post-consumer waste, which means the clothes that we wear, curtains, or household fabrics, because I don't know what the composition is, we also called it as man-made, so like

it or not, we have to merge them into one. We shatter them into one pile. The risk is that the output can only be fiber [instead of thread or fabric].” (Aryenda, Founder of Pable Indonesia, 2021)

Aryenda, the founder of Pable Indonesia, one of only ten textile recycling companies in the country, experienced various challenges when introducing as well as developing this principle and her business to society. Firstly, she felt that Indonesian societies, either consumers or business actors, are not knowledgeable enough to take advantage of textile recycling (Rizos et al. 2016). It means people tend to take it for granted without knowing the true purpose of textile recycling and or circular economy concept, which is to decouple growth from resource consumption (Ellen MacArthur Foundation, n.d.). The quotes below perfectly illustrate Indonesian society’s mindset about textile recycling.

“[Our experimental result] changes my perception to be careful to introduce our recycling project because it turns out that our societies are not ready yet. Not ready in a sense that they see Pable as a garbage dump... They just take their sins out of their wardrobe, then throw it to Pable [without any sense of responsibility].” (Aryenda, Founder of Pable Indonesia, 2021)

“I just replied to an email from a local brand that asked for a collaboration to make a dropbox (Pable’s recycling project). Their concern is ‘I want to raise society’s awareness so that they no longer throw textile waste into the landfills but through dropbox. As an exchange, our brand will issue a voucher of Rp. 50.000 (\$3.5) for all of our products. This is wrong, isn’t it.” (Aryenda, Founder of Pable Indonesia, 2021)

Secondly, textile recycling activities are an utterly labor-intensive process (Moreau et al. 2017). Aryenda explicitly stated that no technology could help them sort, grade, and cut the waste material. A detailed explanation can be seen below.

“The sorting process is really complicated. First, you have to sort by the material, like cotton, polyester, etc. Then, you have to sort it again by the color. The cotton that comes to us has red, green, yellow, blue, and so on. We have to sort them one by one... It’s all through labor [, no technology plays a role in here].” (Aryenda, Founder of Pable Indonesia, 2021)

“Like the cutting process, we don’t have any technology that can help us to cut these fabrics into the size we want. [So, everything is manual].” (Aryenda, Founder of Pable Indonesia, 2021)

Lastly, Aryenda knew that the textile recycling industry in Indonesia is tiny. She explicitly mentioned that it only consists of more or less ten companies in Indonesia. Meaning, the growth in the sector is not adequate to spark the new player to integrate into it. Pable’s low purchasing power shows its tedious growth. Neither the industry nor the society (Pearce, 2009) is prepared to accept recycled textile product.

“Our current capacity for textile recycling is 6000 tons per month. Now we are actually still in the 2000 tons per month phase. This means that we know that the absorption can only be up to 2000 tons maximum... Our industry is still not ready to accept that... That’s why we continuously inform our industry about the possibility of recycled product. What kind of

derivative products can be achieved through this.” (Aryenda, Founder of Pable Indonesia, 2021)

4.2 Fabric & Clothing Collection or Manufacturing

Once designers design their apparel according to the aforementioned tenets, the next stage is to produce or collect the fabric, which includes fiber production, fabric production, dyeing, and clothing manufacturing (Koszewska, 2018). This section presents the avenues concerning clothing and fabric collection or manufacturing in the context of Indonesia’s circular economy fashion business. The avenues are social empowerment, ethical outsourcing, and In-house manufacturing. Furthermore, potential challenges and opportunities are provided. Moreover, discussions about the relation between these avenues and circular economy are explained.

4.2.1 Social Empowerment

Shari Semesta, the Co-founder of Imaji Studio, a fabric studio that empowers local artisans, implicitly defined social empowerment as engaging local artisans throughout the process of manufacturing the fabric as well as the apparel.

“Every fabric in Imaji Studio is all handmade. So, from the process of making the actual white fabric into the natural dyeing process, we involve our local artisans with creating the fabric.” (Shari, co-founder of Imaji Studio, 2021)

In Indonesia, integrating social aspects within the circular economy business is seen as something relevant and necessary. The sole reason is the low productivity of textile workers in the villages. As a result, villagers lived in poverty (Topp, 2021). Aryenda’s experience perfectly illustrated the whole situation. She found that the worker’s lack of knowledge about the other possible product apart from their product heritage was the leading cause of this (Ibid). Consequently, they can’t diversify their risk into another product. Hence, when the demand for their heritage product is low, their productivity will go simultaneously. Moreover, Shari confirmed this fact by emphasizing the lack of facilities for the villagers to develop.

“When I came to this village, I saw them as if every day they were like giving up on producing mops and napkins, and they never imaged that they would develop other products other than what they have been doing for four generations. Also, when I came to their workshop, one workshop had 20 manual weaving machines, which means if we traced back to 10 or 20 years ago, maybe all the machines were utilized. However, when I came there, only two people working with two machines, [which means their productivity keeps decreasing.]” (Aryenda, Founder of Pable Indonesia, 2021)

“We have such creative people that have nowhere as a platform to evolve.” (Shari, co-founder of Imaji Studio, 2021)

Because of this social issue, ethicality is perceived as imperative by circular fashion businesses in Indonesia. They assisted them by presenting job opportunities that pay rightfully (Rivera et al. 2020) to improve the worker's over time.

"We just want to think about the ethics... So, we did a survey about villages in East Java that can help us to produce this fabric. Therefore, we can raise their economic value." (Aryenda, Founder of Pable Indonesia, 2021)

"The people that create our natural dye, our artisans and our handweavers, they're actually very well paid." (Shari, co-founder of Imaji Studio, 2021)

Empowering local artisans and villagers presents its challenges for business owners. Firstly, the notion of social empowerment is about ethicality. Meaning, the company must embody a fair and transparent decision in all its business process (Topp, 2021). Shari's business, Imaji Studio, is the epitome of integrating ethical values along the value chain. She emphasized paying rightfully by considering the fairness aspect in the process. Consequently, this action leads to production costs being much higher than business-as-usual (Moreau et al. 2017).

"It was costly because we have to pay the artisans right too. We do things ethically. We don't buy things that are in bulk and really cheap. Instead, we buy things that are created by these artisans with the handweavers and the dyeing as well. So, that is really costly when you buy something that is handmade in Indonesia and that goes through that much of a process. We want to be fair with them. If the techniques [are] really hard, we don't want to pay them the same price." (Shari, co-founder of Imaji Studio, 2021)

Secondly, empowering local artisans and villagers also affects production time (Moreau et al. 2017). Most of the work done by the locals is manual, for instance, natural dyeing, hand weaving, manual weaving machine, etc. Hence, the time needed to accomplish the whole production will be much higher than business-as-usual (Ibid). Consequently, when Shari & Oliv encountered a massive order, they faced time pressure to finish production. Even Shari needed to turn down her offer because the time pressure was intolerable.

"Because sometimes I'd have to turn down an offer in creating something because it's too big. I'd to have a really long time in creating it." (Shari, co-founder of Imaji Studio, 2021)

"Honestly, if there is an order for such big quantities in a short period of time, it's very pressured. One of our most felt challenges was when there was a big order." (Oliv, co-founder of Control New, 2021)

Lastly, learning to communicate with the locals is imperative for future long-term relationships between the supplier (locals) and the business. Shari underlined the importance of adapting her communication style in order to minimize possible risks in the future. She learned by mistake that, without any thorough communication with the locals, the business was damaged in various ways. She explained that:

"At first, it was quite difficult because we were just learning how to communicate better and like to minimize all the risk involving miscommunications or wrong approaches and stuff like that [with the artisans]. We learnt it by mistake, of course. There were some aspects when we were with our artisans that they sold our samples to another brand and stuff like that. But yeah, because we haven't learned to communicate as detailed as possible with them... We have to be very detailed with them, like, how we want things to be done, how much, how many, and by when. it's all very detailed, like as detailed as possible to minimize any risk" (Shari, co-founder of Imaji Studio, 2021)

On the other hand, although communication with the locals challenges business owners, it also provides an opportunity to maintain a good relationship between the two stakeholders. Since the locals are at the heart of the business, it is necessary to engage them in the process so that both parties could understand each other well (Rizos et al. 2016).

"Getting the part in the process is such a huge win for me, because like, they're very creative people. They're amazing artists. So getting them involved every time we create a collection is such a big part of how we maintain our relationship." (Shari, co-founder of Imaji Studio, 2021)

4.2.2 Ethical Outsourcing

The context of ethical outsourcing is twofold. Business owners/designers outsource responsible materials characterized by eco-friendly or recycled material and outsource companies with transparent working conditions. Nicoline posited that both of these aspects are things that are manageable by the business owners/designers. The use of responsible materials presents an impact through its biodegradation ability to start on a new cycle and closing resource loops (Braham, 2017). Moreover, ensuring proper working conditions would guarantee ethical value throughout the process (Rivera et al. 2020). Myra added that to not only monitor working conditions but also other supporting processes, such as waste management, whom you are working with, etc., especially in the context of the smaller manufacturer.

"Something that you can really control, first, is the material. If you are using responsible material, then I think it's already pretty good because you don't contribute to the waste... [Second], making sure that the working condition [of the factory] is proper, ethical... I've heard about factories that don't even have toilets." (Nicoline, founder of Lanivatti, 2021)

"I know very well how's the fabric being washed, I know where it's washed, I know where the waste is dumped, and I also know who works there. Because I work closely with small industries, there only a few people work there, so I know for sure how things work. If people ask me about [how my clothes were being made], I can answer them." (Myra, founder of Siji, 2021)

The act of ethical outsourcing turns out an utterly challenging matter for business owners/designers in Indonesia. Firstly, outsourcing responsible material isn't a feasible business decision, particularly for a nascent company (Rizos et al. 2016). The underlying reasons are it's an expensive material and only a handful of such suppliers exist in Indonesia. Nicoline and Renita's quotes well illustrate this issue.

"I think how to outsource the fabric is the hardest challenge... The only place that I can get [the organic material is] from Bali, which has all of the supply of natural material, natural dye, natural silk. However, that turned out to be very expensive." (Nicoline, founder of Lanivatti, 2021)

"I planned on using eco-friendly fabrics, but that is not very price-friendly. So if I were to use eco-friendly fabric, there would be a major change in my price range." (Renita, founder of Rereoutlined, 2021)

Clarrisa and Alvin gave an idea of how expensive the responsible material is. Clarrisa, the founder of I am Eccu, a company that only uses biodegradable materials, posited that the price of pure linen is around \$8.5. Whereas Alvin, the founder and designer of Clean Clothes Only, a company that utilizes sustainable materials, described recycled material cost him about \$15 per meter.

"The price of pure linen is about Rp. 120.000 (\$8.5) per meter. It's so expensive [compared to the blended one]." (Clarissa, founder of I am Eccu, 2021)

"Fast fashion brand won't use this kind of fabric (recycled fabric). It's so expensive, about \$15 a meter." (Alvin, founder and designer of Clean Clothes Only, 2021)

Secondly, when business owners or designers outsourced responsible fabrics, transparency concerning how these fabrics were being made is difficult to acknowledge. They couldn't get access to get to know the process behind them, such as the waste issue, the labor condition, etc. (Taylor, 2019).

"There is one problem, which is we don't know how this fabric is being made." (Clarissa, founder of I am Eccu, 2021)

"Underlying these fabrics, we don't know about the waste problem, the labor problem, basically we don't know many things." (Myra, founder of Siji, 2021)

Nicoline posited that she requires a certified working condition for her vendors to overcome the transparency issue. The research found that very few participants, especially the smaller businesses, mentioned this avenue.

"[We did this by], the vendors, outsourced companies that we work with, we required them to have a certified standardization, making sure that all the working conditions were actually proper." (Nicoline, founder of Lanivatti, 2021)

4.2.3 Ethical In-House Manufacturing

The reason why Renita favors in-house manufacturing has something to do with the aforementioned challenge, lack of transparency among outsourced companies, i.e., under what conditions the clothes are being made (Taylor, 2019). She underlined the importance of being involved in all stages of production to make sure every process was done ethically.

"I have my own production teams. I don't want to outsource from other production houses so that I can manage their wage. I wanted also to be ethical. I wanted also to be fair to all of my

employees. So, I have to be involved in like in all the stages of the production." (Renita, founder of Rereoutlined, 2021)

Renita mentioned that in-house manufacturing has its challenge, which is the value of ethicality within a company largely will depend upon the capital it possessed (Moreau et al. 2017). The reason is similar to the previous Shari's statement about ethicality. To do the right things mean to pay the employees rightly or fairly.

"When it comes to manufacturing, how ethical you can be will depend upon how much money you have, how much capital you have. [Because] everything comes down to the process right. So, if I were to do fabric manipulation, it will be very costly" (Renita, founder of Rereoutlined, 2021)

4.3 Accelerating Indonesia's Fashion Industry Circularity

Since circular economy principles are still perceived as a new approach in Indonesia's fashion industry, business owners/designers explicitly stated that there are two imperative factors in the meso and macro level to accelerate the whole industry circularity. Collaboration and government involvement have a significant influence on CE implementation. Nevertheless, it doesn't rule out the possibility of affecting the micro-level. It involves all stakeholders, from consumers to business actors.

4.3.1 Collaboration

The importance of collaboration was emphasized by Shari, who stated:

"Collaboration is always better than competition." (Shari, co-founder of Imaji Studio, 2021)

The act of collaboration impacts Indonesia's fashion industry in many possible ways. Firstly, since the circular economy in the fashion industry with its new paradigm to alter the way business-as-usual operates, the societies, not only consumers but also business actors, have to acquire relevant knowledge to do the alteration successfully. Therefore, educating people and spreading awareness are essential in doing so (Fadeeva, 2005). Aryenda mentioned that because few people have discovered or have enough knowledge about fabric recycling, educating people about its value is one of Pable's current missions. Being open-source followed by collaborations to communicate a similar message throughout all stakeholders have helped Pable fulfil its missions.

"Many of our B2B clients have contacted us. They said, 'we want to try to also introduce the recycled fabric characters to our users'. So, they also have started to educate that you won't get the same comfort if you compare recycle fabric with virgin fabric. They've been willing to communicate the same thing as us... I think, now, the most important thing is just being open source to everyone." (Aryenda, founder of Pable Indonesia, 2021)

Nicoline confirmed by stating that everyone must collectively work together to spread the movement. She explained:

"The thing with fashion magazines is they actually endorse the culture of trends, right? Fashion magazines are not the media you think about when you want to advertise sustainability. But since Sejauh and Lanivatti partnered with them several times, they decided to [chip in] and wrote a lot of articles about it. Like I said earlier, we can't do it ourselves. It has to be with the media, other brands, influencers, etc. Everyone has to hold hands together [to spread the awareness]." (Nicoline, founder of Lanivatti, 2021)

Secondly, many of the aforementioned challenges are in relation to capital. Evidently, collaborations can compensate capital tightness/capital-constrained during the implementation of circular economy tenets in Indonesia's fashion industry (Rivera et al. 2020). Aryenda proved this insight by describing that collaboration in the form of exploiting other manufacturing fabric recycling machines had saved her five years' worth of investment when she built Pable.

"We collaborate with another manufacture that gave us their machine capacity to be used by Pable. [Because of this], we can enter the realm of recycling. If we need to build from scratch, the investment was way too big. We need to learn the system, which is going to be longer. Also we needed to train a lot of people. If I try to calculate the investment, I can say that I need probably a minimum of five years to set up Pable." (Aryenda, founder of Pable Indonesia, 2021)

Lastly, in these uncertain times, collaboration potentially increases a company's agility to sustain the business. Shari intrinsically reasoned that because the pandemic has badly affected Indonesia's fashion industry, she needed to find a way to recover her business. Collaborations with different industries have positively influenced her business by decreasing the occurring risk on its industry (Fadeeva, 2005). She stated that:

"We do several products for outside industries, either local or international. For example, we made cutlery bags for other companies using natural fibers, or we do fabric masks for Singapore tech cosmetic companies using natural dyes techniques... Collaboration pieces are the best way to go in this pandemic because we can always cross-market our products to other brands as well." (Shari, co-founder of Imaji Studio, 2021)

4.3.2 Government Support

Although the government has issued the Presidential Decree 59/2017 concerning SDGs implementation (Kemkhadze, 2019), Aryenda and Nicoline stated that the fashion industry towards circularity needs more concrete support from the government. Aryenda posited that she has never seen any practical support from the government. Moreover, Nicoline's experience illustrates this issue. She described that one of the reasons Indonesia has utterly limited natural cotton suppliers (as stated in the challenges) is that the government does not protect its industry from the competitive advantage of imported products (Kuo et al. 2010). The local natural cotton supplier couldn't compete with or have the competitive advantage of

imported Chinese fabrics. That is a meager price. Consequently, the natural cotton industry in Indonesia has arguably ceased to exist.

"The Indonesian government can only discourse on a paper. I have never seen the implementation or support like that." (Aryenda, founder of Pable Indonesia, 2021)

"Polyester fabric from China is really cheap, a meter only Rp. 3.000 [about \$0.20] ... [This is affecting] the natural cotton factory in which manually processed by skilled workers. The whole industry is almost closed because everyone using cotton from China. Nobody wants to make the knit anymore, [they couldn't compete with imported fabric price.]" (Nicoline, founder of Lanivatti, 2021)

Therefore, there is a solicitation from the industry's players for help from the relevant ministries to support the sustainable fashion industries in the future.

"We need regulation or campaign or anything from the government. At least from the relevant ministries, such as Ministry of Trade, etc." (Aryenda, founder of Pable Indonesia, 2021)

4.4 Discussion

The discussion section consists of two remarkable findings. Firstly, it extrapolates the conceptual relationship between the model of the study and the Circular Economy practices in two contexts: fashion industry and developing countries, particularly Indonesia. Secondly, it provides a new and a clearer understanding of the social dimension in circular economy implementation in developing countries. Both of these findings are clarified based on relevant theories and empirical evidence regarding the issues.

4.4.1 Fashion Industry Product Design for Circular Economy

In general, the findings of the study, especially the tenets in which designers and business owners embedded during the earliest stage of product design, well reflect the circular product design strategies by Bocken et al. (2016). However, the nature of the industry appears to moderate the relevance of the generic product designs. Therefore, through the development of this case study, the identified design strategies by Bocken et al.'s (2016) are further substantiated in accordance with industry nature specific. In the next paragraph, each of the fashion industry tenets and Bocken et al. (2016) design strategies are discussed and justified to become pertinent to designers and decision-makers in the fashion industry.

4.4.1.1 Design Strategies for Slowing Resource Loops

According to Bocken et al. (2016), design strategies, Designing for long-life products and product-life extension are the avenues to extend the utilization period of a product. Therefore it can slow down the flow of resources. However, according to the findings, the former is, at best, a significant conceptual aid for the designers and decision-makers. In

contrast, the latter seems insignificant because of the nature of the product. The former is reflected by the **Desirability** and **Durability** tenets. Desirability mirrors the Design for attachment and trust purposes, creating a product, capsule collection, or apparel that consumers will love and trust longer (Bocken et al. 2016). Moreover, the durability reflects Design for reliability and durability. In this matter, the material and the manufacturing process are intentionally chosen to fulfill the purpose of physical durability. Hence, the products are highly likely to operate for a long time (Bocken et al. 2016).

The findings suggest that these slow loop strategies are interconnected with the close loop strategies, specifically the Design for the biological cycle. Although the Design for biological cycle can stand alone as one of the essential tenets by designers, it is not. The reason is the Design for the biological cycle emphasizes the use of safe materials for natural systems (Bocken et al. 2016). Indeed, most of the designers are utilizing sustainable materials that are eco-friendly or recycled. However, the traits of these types of materials are confining the Desirability and Durability of the product itself. The challenges experienced by Nicoline and Myra justify that the designers and business decision-makers should not orient towards sustainable materials. Instead, prioritize the more extensive purposes, which are the function of the clothes, i.e., define the function of the clothes followed by design the appropriate materials to achieve desirability and durability. Thus, long-life products can be achieved. Nevertheless, as long as the sustainable materials perceived as appropriate for desirability and durability purposes, the designers can still utilize them.

On the other hand, none of the Designs for product-life extension strategies (Bocken et al. 2016) are mentioned by the participants. Based on the researcher's empirical understanding of the result, the reason is presumably because of the product's nature. Designers or business decision-makers did not need to deliberately design a collection of clothes so that they can be easily repaired, maintained, etc. The nature of apparel product provides that ability by itself. Hence, participants perceived it as a standard method that does not requires specific attention. For instance, one does not need to design for a specific pattern to repair a hole in a cloth.

4.4.1.2 Narrowing Resource Loops

According to Bocken et al.'s (2016) framework, the narrowing resource loops approach pertained to reducing resource use related to the product and production process. However, since the efficiency approach does not address its relationship with time, many critics perceive its ability to speed up the linear resource flows could forfeit material circularity. Hence, Bocken et al. (2016) does not address this strategy.

While this is correct, one of the vital pillars of circular economy pertained to design-out waste has to come into considerations (McQuillan, 2019). Design-out waste practice tends to occur towards the product use stage and through recycling (McQuillan, 2019). This is where the **resource efficiency** tenets through zero waste design pattern present its proposition: eliminating material waste through design (McQuillan, 2019). As a result, in conjunction with the timeless design (Rissanen, 2011) and its outcome to reduce the yield for a given design (McQuillan, 2019), resource efficiency through zero waste design has a significant relevance with circular economy principles and it solves the industry's problem.

COS project in 2017 that developed a limited-edition collection specifically emphasizes waste reduction through pattern cutting explains this relationship. The quotes below illustrated the relation between design elements, garment proportions and fabric width (McQuillan, 2019).

"With the shape of the hem determining the shape of the sleeve heads, the design of this cotton poplin shirt dress uses up any surplus fabric to show the geometric potential of a single length of fabric."

Karin Gustaffson, COS creative director, implied that each apparel shape is determined by how at best to use the entire width of the fabric therefore, no waste was produced (McQuillan, 2019).

4.4.1.3 Design Strategies for Closing Resource Loops

Closing resource loops in the fashion industry seems to be a complex issue among stakeholders. According to Bocken et al. (2016), there are three avenues to achieve material circularity. However, each of these strategies has their own problem to the fashion industry. Design-for-biological-cycle, has been addressed in the previous discussion, it begins with the Bocken et al.'s (2016) notion of Design for dis- and reassembly. In the context of separating materials that will enter different life cycles, (e.g., biological and technical nutrients) it is merely an impossible task for the fashion industry. Charter (2018) stated that garments are the epitome of flawed ideas in material circularity. The reason is the mixture of biological nutrients and technical nutrients (mixed fibers of cotton, elastane, metal, or plastic trims) in individual products making separation activities challenging without quality reduction (Peters et al. 2018). Likewise, automated recycling is almost impossible (McQuillan, 2019). Aryenda's statement about the nature of recycling in the fashion industry confirmed this issue. In particular, she delineated the difference between post-consumed and pre-consumed types of fabric that affect the separation activities and the recycling result.

Consequently, since the separation process has deducted material quality which acts as the primary source of fabric recycling activities, the subsequent process will follow its characteristics. Aryenda's description of the fabric recycling process justified this fact.

Moreover, this study does not find any detailed findings of the process that can compensate for the separation process's challenge. Hence, the notion of Design-for-a-technological-cycle that requires forms of recycling that can generate outcomes with equivalent properties is almost impossible in the fashion industry. Although Bocken et al. (2016) consider **Downcycling** tenet as a non-cyclical flow of resource, therefore, do not fit the circular approach to product design, it is the most viable and feasible approach to the notion of closing & slowing the resource loops. Even though, in reality, it only delays the linear flow of production to waste (Bocken et al.,2016).

Furthermore, indeed the tenet of **Deconstruct to Upcycle** fits within the notion of Design for a technological cycle as it emphasizes upcycling activities. However, it is noteworthy to understand that Design-for-a-technological-cycle underlines the continuous flow of resources (Bocken et al. 2016). Based on the findings, the study can't conclude that the upcycling methodology within the fashion industry could achieve this proposition. Indita implicitly explained that the upcycling activities could prolong the utilization period of the clothing. Therefore, even though the fashion industry uses the terminology of "upcycle", the impact does not reflect the definition of upcycling based on plastic recycling terminology by Hopewell et al. (2009) and Bocken et al. (2016). Through the Design for upgradability and adaptability, Deconstruct-to-Upcycle tenet only extends the life of the garments, i.e., slowing resource loops. Nevertheless, it is possible that the upcycling activities could achieve the idea of material circularity. However, there need to be assessment tools to discover the circularity index that does not fit within the scope of this study.

Overall, the practice of circular economy in the fashion industry seems to be a complicated matter. Although some of the tenets provide the ability to slow the resource loops, closing the resource flow is an impeccable theory but rather utterly difficult in reality. Not to mention the catch-22 problem that can occur when one tries to execute these tenets. For instance, to create a durable and the desired collection, designers need to use polyester thread. Polyester owns a disadvantage, which is non-biodegradable characteristics. Furthermore, Fellner et al. (2017) and Brooks et al. (2018) argued that the notion of close loop resource is still flawed even if the industry could achieve the perfect material recapture. The likes of efficiency and material recapture often increase production and consumption, as the raw materials saved through these avenues become the fuel for growth (i.e., the rebound effect) (McQuillan, 2019). Therefore, it is imperative to understand that these tenets alone are not enough to reach the idea of the circular economy. Rather, these methods and solutions, in

conjunction with genuine circular economy fundamental, which does not center towards growth in consumption (Brooks et al. 2018), should be prioritized above anything.

4.4.2 The Social Dimension of Circular Economy Implementation

Based on the study findings, the social dimension is associated with the implementation of a circular economy in Indonesia's fashion industry. Scholars have agreed that circular economy weaknesses, particularly the lack of social and institutional dimensions (CIRAIG, 2015), made the conceptual relationship between the theory and its social impact vague (Rivera et al., 2020). This research points out two significant associations between the social dimension and the circular economy, including the affected stakeholder

Firstly, Moreau et al. (2017) posited that maintaining products and materials at the highest possible values would affect the cost-effectiveness at the expense of lower energy intensity and higher labor intensity. It is particularly true during the effort of closing the resource loops. The implementation of Deconstruct to Upcycle and Downcycling tenets exposes designers and business decision-makers with challenges pertained to labor-intensive activities, thereby affecting the cost of production. Renita and Felicia agreed that to remanufacture or recycle a fashion product, particularly through upcycling, requires more labor to deconstruct and rebuild the product. Hence, although it fulfills the purpose of the environmental dimension, upcycling fashion product comes with an expense of efficiency in business e.g., higher production cost and slow turnover collection.

Secondly, social dimension was also discovered within the fabric and clothing production or manufacturing phase as well as circular economy supporting factors. In accordance with Rivera et al.'s (2020) study, the social dimension contributes in the form of employment, social inclusion, sharing economy, and institutions/governance.

Rivera et al. (2020) argued that employment in CE has an imperative role in overcoming socio-economic challenges by providing new jobs to cope with unemployment and social inequity issues, especially in a growing population in a shifting economy. It was reflected by the designers and business decision-makers empowering local people or local communities to solve welfare issues in the villages. Aryenda's motive to empower local people is the epitome of circular economy social dimensions. She wanted to lift the village economic value by providing them an opportunity to work.

Not only social dimension in CE could improve social benefits from poverty alleviation (Siyambalapitiya et al. 2018), but also it improves human rights and social justice (Rivera et al. 2020). Participants of the study explicitly underlined that another reason their production

costs are higher than that of business-as-usual is fairness throughout the value chain. Designers or business decision-makers valued their employees' effort, or suppliers' effort (social empowerment) fairly and transparently so that justice along the value chain is achieved. In addition, participants were also aware of human rights and social justice issues when they tried to outsource from another company. They made sure to outsource from factories wherein the working condition fulfill the norms and the measures of human rights and social justice in Indonesia.

Moreover, collaboration to support the fashion industry towards circular economy activities reflects the importance of the social dimension in the form of sharing economy/collaborative economy (Rivera et al., 2020). Cherry & Pidgeon (2018) pointed out that sharing economy leads to more efficient and resilient financial resource use. Indeed, the study discovered similar results as what has been experienced by Aryenda had she not collaborated with a local factory to acquire a recycling machine. However, this study also emphasizes its significant impact on spreading society's awareness about circular economy knowledge. This is particularly relevant because the context of the study is in Indonesia, a developing country wherein information about the circular economy is very limited.

Lastly, participants called out for support from the government to provide the basic requirements for transitioning to CE (Lammi et al. 2019). The case of natural cotton factory in Indonesia is the epitome of the lack of support from the government. Therefore, to accelerate the implementation of CE, stimulation in the form of new policies pertained to sustainability will ease all the stakeholders in the transition process (Lammi et al. 2019).

Chapter 5. Conclusion & Recommendation

The economic growth in the fashion industry sector, alongside its detrimental externalities on the environment, is an epitome of our current paradigm, the neo-classical economy. Moreover, the fact that Asia-Pacific countries are instrumental in the production and consumption of the fashion industry while abandoning enormous negative externalities that affect the environment and social well-being made a move towards a circular Economy in here much more relevant. By this notion, this research answered the following question: *How to implement the circular economy concept in Indonesia's fashion industry?* The study utilized Bocken et al.'s (2016) framework, namely Product Design and Business Model Strategies for a Circular Economy. Through this framework, this study evaluated the most relevant CE practices in two natures, which were the fashion industry and developing countries, particularly Indonesia. Case Study analysis through In-depth interviews with innovators, designers, and business decision-makers was conducted to collect the primary data.

The results showed that the notion of circular economy in Indonesia's fashion industry needs adjustment to work. Slowing resource loops through design for desirability and durability assures a long-life product. Moreover, although resource efficiency/narrowing resource loops through zero waste design potentially accelerate the linear economy, it still presents a solution for the industry's problem. Furthermore, closing resource loops is merely an impossible task to achieve now. The most viable and feasible avenues to reach this idea in the fashion industry are through downcycling and deconstructing apparel to upcycle. It is noteworthy that these tenets alone are not the definite solution to moving towards circular economy. Rather, these tenets, alongside the mindset of limiting the growth of consumptions, could compensate for the potential drawbacks of current avenues.

This study also discovered that the social dimension plays an important role when implementing the CE concept. It contributes in the form of employment, social inclusion,

sharing economy, and institutions/ governance. However, this requires further research to measure and to assess the dimensions clearer.



Figure 5.1 The Implementation of Circular Economy in Indonesia’s Fashion Industry

4.1 Theoretical Implication

Indeed, a circular economy offers a new paradigm to drive sustainable development and a harmonious society (Zhiyun & Nailing, 2007). However, due to the complexity of the relationship between an agent with other essential elements (Ellen MacArthur Foundation, 2015), the implementation of CE requires a comprehensive understanding of system thinking (Geng et al. 2014). The development of a case study to test the identified strategies by Bocken et al. (2016) is one way to do so. This study provides a more precise understanding of the conceptual overview of a circular economy and its implementation within the fashion industry. The study presents an inclusive look at the design of the alternative solution and its impact throughout the production process within the fashion industry in developing countries, particularly Indonesia. Furthermore, considering CE’s weaknesses, especially the lack of social and institutional dimensions (CIRAIG, 2015), this study presents an insight into how the social dimension holds an imperative role within CE practices in Indonesia. Moreover, this study contributes to the limited body of research in the realm of circular economy and the fashion industry in Indonesia.

4.2 Practical Implication & Recommendation

The findings of the study serve as a conceptual aid for the designers and business decision-makers to move towards the circular economy in Indonesia’s fashion industry. The substantiated framework represents the relevant avenues, including potential challenges from the design process to the manufacturing process. Furthermore, the lack of government support certainly hinders the transition towards CE initiatives. However, the collaboration spirit can

compensate for these drawbacks. In addition, stand on the bigger purpose when one decides during the designing and manufacturing process is the best way to support the continuity of this transition, albeit it might cost the business in the short term. Likewise, to prevent the rebound effect, system thinking and a genuine circular economy mindset remain important throughout the implementation of the tenets.

4.3 Limitations & Further Research

The findings of the study serve as a conceptual aid for the designers and business decision-makers to move towards a circular economy in Indonesia's fashion industry. The substantiated framework derived from the case study analysis presents a limitation by the nature of the methodology. Besides, there are only a few works of literature that exist under the current population. Therefore, to increase the generalizability of the research and the knowledge under the comparable background, further research should utilize quantitative methods across similar settings and populations.

Furthermore, the results of this study are derived from a sample of 10 participants in Indonesia's fashion industry. Therefore, it may show limited generalizability. It is also essential to prove the general understanding of the result beyond the existing setting, particularly in Asia-Pacific countries, since they are the subject of the study's phenomenon.

In addition, although this study has proved a relationship between circular economy implementation and social/institutional dimension, particularly in relation to the effort to close the resource loops and manufacturing process, the researcher was only able to discover the association through descriptive explanation without an appropriate measurement tool. Therefore, there is still so much interconnection and clarification to seek in the realm of social and institutional dimensions of CE (CIRAIG, 2005). Further research should include the social dimension as one of the essential elements in CE's implementation in Asia-Pacific countries. Methods for assessing social sustainability will need to be developed in overcoming current CE's weakness (Bocken et al. 2016).

Lastly, this research presents an initial insight into how challenging it is to implement a circular economy in Indonesia's fashion industry. There is an asymmetry between the notion of circular resources and its implementation due to several issues. Therefore, to remain vigilant of the rebound effect that might emerge because of this asymmetry (Bocken et al. 2016), further research will need to discover the consequences of adopting each strategy through system thinking principles (Bocken et al. 2016). Consideration from the economic, environmental,

technological, and social aspects as well as the interactions among them can better clarify CE's implementation in the future (Hardaker, 1997).

4.4 Research Reflection

The researcher's position as a master's student in Entrepreneurship and Innovation in the Netherlands and as an Indonesian impacted the research process in many ways. Firstly, since the interview was conducted using the participant's mother tongue, Bahasa Indonesia, the participants could conveniently share their stories. During the interview, there was a feeling of a combination of formal and informal interactions when the interviewees tried to share their experiences. The formal interactions occurred when the participants respect the researcher's position as an academia person. The informal interactions happened primarily through informal jargon in order to transfer the meaning of a message clearly. Furthermore, many of the participants were aware that European countries are leading in the realm of sustainability. Consequently, because the researcher introduced himself as a student in the research university in the Netherlands, the participants perceived the researcher as a legitimated person. Therefore, the data collection process ran smoothly, albeit done through online platforms. In addition, because the object of the research, the fashion industry, was not the researcher's expertise, it might influence the research process negatively. However, to be equipped with sufficient knowledge, the researcher has conducted more studies about the necessary terminology and fundamental theories in the fashion industry that affiliate with sustainability. Furthermore, the researcher tried to reduce bias during the data collection and data interpretation process significantly by investigating different resources, developing his knowledge, and applying scientific advice from academic experts.

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Appendices

Questions for participants

The implementation of a Circular Economy Approach in Indonesia's Fashion Industry

Introduction

1. Could you tell us a little bit about your company?
2. Could you tell us a brief of a story either personal or non-personal in regard to the reason building this business? In other words, the “why” in your business?

Visionary Statement

3. What is your vision and mission when you decide to establish this business?
4. So far, how's the process to achieve that? what are the instrumental and detrimental aspects along the way?

Product Design

5. The product design is quite comprehensive process, I divide it into several parts, which are designing the product, fabrication process, dyeing process, and manufacturing process. Could you emphasize in which process your business involved in?
6. Designing the product (the traits of the product) (examples questions below)
 - What exactly did you emphasize on designing a product?
 - How did you do it? (technicalities)
 - What's set you apart from the business-as-usual in this process?
 - Through this process, what are the impacts that you create?
 - Do you encounter any challenges during this process? If yes, please elaborate more on this.
7. Fabrication process (from raw materials to a fabric; spinning and weaving) (examples questions below)
 - What are your preferred materials for your products?
 - How is the fabrication process such as spinning and weaving? (technicalities)
 - What's set you apart from the business-as-usual in this process?
 - Is there any particular reason regarding to this?
 - Through this process, what are the impacts that you create? social, environmental, and economic, and to the community and the business as well
 - Do you encounter any challenges during this process? If yes, please elaborate more on this.
8. Dyeing process (examples questions below)
 - What is your preferred methods for dyeing your products?
 - How is the dyeing process? (technicalities)
 - What's set you apart from the business-as-usual in this process?
 - Is there any particular reason regarding to choosing this?

- Through this process, what are the impacts you create? social, environmental, and economic, and to the community and the business as well
 - Do you encounter any challenges during this process? If yes, please elaborate more on this.
9. Manufacturing process (examples questions below)
- What is your preferred methods for dyeing your products?
 - How is the dyeing process? (technicalities)
 - What's set you apart from the business-as-usual in this process?
 - Is there any particular reason regarding to choosing this?
 - Through this process, what are the impacts you create? social, environmental, and economic, and to the community and the business as well
 - Do you encounter any challenges during this process? If yes, please elaborate more on this.

Circular Business Model

10. How would you frame your Unique Value Proposition among competitors?
11. Can you explain how you operate your business?
- Key partners
 - Key resources
 - Key activities
12. Through the way you operate your business, what are the advantages of them?
13. Do you encounter any challenges?
14. How do you make money? Challenges and opportunities?

Sustainability

15. What are your opinion about sustainable fashion industry in Indonesia at the moment, and what are the possible way to accelerate the positive changes for the future?