

Research Article 06

**Circular Business Model Innovations for Sustainability:
Insights from Sri Lanka**

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Abstract

Waste is known as a valuable resource and proper waste management would help to identify new business opportunities in the environmental sector. Circular entrepreneurship plays an important role to create innovative business models from waste to reduce negative environmental impact. In this setting, present study aims to uncover circular business models in Sri Lanka emphasizing its drivers, challenges, and contribution to sustainability. The study employed qualitative research approach by conducting in-depth interviews with 6 circular entrepreneurs. The findings of the study reveal that addressing environmental issue, passion, knowledge and experience, creativity, networking, research & development, and learning drive them to create circular business models. Further, they are facing several challenges particularly lack of access to finance, inadequate support from the government, finding market, lack of knowledge and negative attitudes among the community, and lack of technology. This study provides insights to the practitioners and policy-makers in Sri Lanka to facilitate circular entrepreneurs to successfully develop circular business models that impact the triple bottom line and achieve sustainable development goals. The study expands the knowledge of circular business model innovation specifically in developing countries. The study conveys unique results in relation to circular business model innovation in Sri Lanka and practical implications for the stakeholders to develop this sector.

Keywords: Challenges, circular business model innovations, circular entrepreneurship, drivers, sustainability

Introduction

Waste is a resource for a country which creates number of novel business opportunities if it is managed properly. Improper waste management creates health and environmental hazards, and threatens to well-being of the people, as well as the sustainability of an economy. In this context, Circular entrepreneurship came into the agenda of sustainability and presently it plays an important role to create innovative business models from waste to reduce negative environmental impact. The Sustainable Development Goals for 2030 emphasized that “Circular Entrepreneurship” is imperative to achieve United Nations sustainable development goals (UN, 2016). Three pillars including environmental, social, and economic contribute for the sustainable development (Bocken et al., 2018; Elkington, 1998). These three pillars of sustainable development emphasize economic prosperity through increased productivity; environmental quality through reduced pollution of air, water, and land; and social equity promotion through increased employment, both in terms of quantity and quality (Halog & Anieke, 2021). Circular entrepreneurship literature emphasizes that shared value creation could be achieved through business model innovation (Cullen and De Angelis, 2021). Circular entrepreneurship focuses on reusing, recycling, refurbishing, re-manufacturing or up cycling waste through circular closed-loop processes when compared with the linear economic model (Henry et al., 2020). Circular entrepreneurship provides immense benefits such as extending the lifetime of materials and products, increasing material efficiency, reducing energy consumption, and generating economic opportunities for local communities (Sung et al., 2019). Such benefits create blessing for a country like Sri Lanka which has limited resources and foreign exchange, as well as facing economic slowdown. Circular entrepreneurs design and implement circular business models (CBMs) that are based on using little resources as long as possible, while extracting as much value as possible in the process. CBMs are perceived to be the driving force behind the transition from a linear to a circular economy (Lewandowski, 2016). It was found that CBMs apply specific circular strategies to capitalize on the economic and environmental value embedded in products (Nussholz, 2017). Linder & Williander (2017) and Rosa et al., (2019) identified CBM as a new kind of business model, where the value creation is grounded on keeping the economic value embedded into products after their use and exploits it for new types of market offerings. Circular entrepreneurs need to implement new types of business models by re-thinking value propositions and developing value chains that offer feasible cost efficiency, production effectiveness, and business performance (Geissdoerfer et al., 2020). Responding to the rising demand for circularity, companies have developed different types of circular business models (Ferasso et al., 2020) that deliver superior customer value propositions, while resolving resource issues and combating the dominant linear “take - make- dispose” business model (Bocken et al., 2019). For example, a world recognized furniture brand, IKEA offers several services to help customers reduce waste and dispose of items in an environmentally friendly way including: Removal and recycling, Packaging disposal, and Re-manufacturing. Within this scenario, circular entrepreneurship can be a source of innovation and new revenues, particularly when a suitable business model is found (Hopkinson et al., 2018). Although number of research has been done to date on circular entrepreneurship, lack of intention was given on how circular entrepreneurs engage in designing innovative business models while emphasizing the triple bottom line (Profit, People, Planet) concept (Cullen, 2023; Fraccascia et al., 2019; Gregori et al., 2024), especially from the SMEs perspective and business start-ups (Henry et al., 2020). Further, new circular business models require re-using the waste for re-introducing the waste as a resource (Uvarova et al., 2020).

Circular entrepreneurship is paramount in Sri Lankan context with the gradual increase of the population (Department of Census and Statistics, 2023) which cause to more waste generation and environmental pollution (Fairoz et al., 2023). Circular business models plays an important role to Sri Lanka after the collapse of the Meethotamulla waste disposal site in 2017 which created severe environmental issues and death of lives. Subsequently, the economic downturn in Sri Lanka resulting from the COVID-19 pandemic created many issues for society while burdening the livelihood of people (Fairoz et al., 2023). Hence, transition towards circular economy would benefit these economies and therefore, it is imperative to develop circular business models in all sectors of the economy in order to reduce the generation of waste and increase the efficiency in use of resources (Gunasekara, 2021), as well as face successfully for resource deficit of the country. Introducing new circular business models plays a worthy impact on the Sri Lankan economy to ensure sustainability. Even though circular business models is an emerging research area around the world, there is still a lacuna of research on the circular business models in Sri Lankan context (Jayasinghe et al., 2020) as well as research on management insights (Donner et al., 2021). Also, circular business models in developing economies are needs to be explored in-depth research (Ezeudu & Kennedy, 2024). Moreover, Suchek et al., (2022) emphasized the need for new studies to deepen the understanding of circular business models in different contexts. Thus, present study aims to explore the circular business models in Sri Lanka including the drivers, challenges, and contribution to sustainability.

Literature Review

Circular Economy (CE) and Circular Entrepreneurship

Circular economy is an emerging research field with an increasingly coherent set of shared beliefs and concepts, with the participation of multiple actors (Kirchherr et al., 2023 and Suchek et al., 2022). CE is an alternative model to the linear economy which is mainly based on “take-make-dispose” with a lack of concern for the natural environment and society (Sauvé et al., 2016). Geissdoerfer et al. (2017) conceptualized the CE as, “*a regenerative system in which resource input and waste, emission, and energy leakage are minimized by slowing, closing, and narrowing material and energy loops. This can be achieved through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing, and recycling*”. Thus, the CE model proposed to utilize materials and products over time through slowing, closing, and narrowing production cycles (Bocken et al., 2016). Zucchella & Urban (2019, P.195) defined Circular Entrepreneurship as “*the processes of formation and exploitation of opportunities, using both commercial and ecological logics to address environmental challenges with the aim of closing, slowing, and narrowing the loop of resources and regenerating/reconstituting natural capital*”. Circular entrepreneurship is a suitable context to study co-creation processes among actors and it includes both entrepreneurial processes of opportunity exploration and exploitation (Beatrice & Magnani, 2023). The goal of circular entrepreneurship is to close, slow, and narrow the loop of resources while regenerating and reconstituting natural capital. Circular entrepreneurs are crucial to any economy, they identify creative ways to reuse and recycle waste while inducing consumer awareness and promoting green products (Veleva & Bodkin, 2018).

This study adopted the Entrepreneurial Value Creation theory (EVC), Ecological modernization theory (EMT), and the theory of triple bottom line (TBL). EVC explains the entrepreneurial experience from the entrepreneurial intention and discovery of a business opportunity to the growth of entrepreneurial skill and appropriation of the entrepreneurial reward (Mishra and Zachary, 2015). EMT seeks for using resource-efficient innovation to

protect or restore environmental quality (Janicke, 2020). This theory is frequently linked to eco-efficient innovation, which entails the development of environmentally friendly technology through increased resource productivity (Lidskog & Elander, 2012). Theory of TBL enlightens the impact of businesses in the aspects of profit, people, and planet (Elkington, 1998).

Circular Business Model (CBM)

The business model concept gained popularity and started evolving into its modern interpretation during the dot.com boom of the 1990's (Wirtz et al., 2010), when innovative revenue mechanisms were introduced (Geissdoerfer et al., 2020). As defined by Osterwalder and Pigneur (2010), “*A business model describes the rationale of how an organization creates, delivers, and captures value*”. The concept of circular business model emerged in 2006 in an article by Schwager and Moser (2006) that explored individual business model types for circular value creation (Geissdoerfer et al., 2020). Table 1 illustrates several important definitions on circular business models.

Table 1: Definitions of Circular Business Models

Author/s	Definition
Mentink (2014)	A circular business model is the rationale of how an organization creates, delivers and captures value with and within closed material loops.
Den Hollander et al., (2016)	A circular business model describes how an organization creates, delivers, and captures value in a circular economic system, whereby the business rationale needs to be designed in such a way that it prevents, postpones or reverses obsolescence, minimizes leakage and favors the use of ‘resources’ over the use of resources in the process of creating, delivering and capturing value.
Linder and Williander (2017)	Circular business model (CBM) is a business model in which the conceptual logic for value creation is based on utilizing economic value retained in products after use in the production of new offerings. Thus, a circular business model implies a return flow to the producer from users, though there can be intermediaries between the two parties. The term circular business model therefore overlaps with the concept of closed-loop supply chains, and always involves recycling, remanufacturing, reuse or one of their sibling activities (e.g. refurbishment, renovation, and repair).
Geissdoerfer et al., (2020)	CBM can be defined as sustainable business models (SBM) which are business models that provides solutions for sustainable development by creating additional monetary and non-monetary value by the pro-active management of a multiple stakeholders and incorporate a long-term perspective that are specifically aiming at solutions for the circular economy.
Oghazi and Mostaghel, (2018)	The rationale of how an organization creates, delivers, and captures value with slowing, closing, or narrowing flows of the resource loops.

Ünal et al., (2019) A circular business model represents a holistic system of co-evolving managerial practices for collective value creation, delivery and capture, which provide solutions for sustainable development.

Source: Literature review

Circular Business Model (CBM) Innovation

The business model must be dynamic with the ability to respond quickly to any changes within the internal and external business environment. This leads to the discussion about new business models or business model innovations (Mishra et.al., 2015; Giesen et al., 2010). Organizations that are willing to adopt CBMs need to implement new types of business models by rethinking value propositions and developing value chains that offer feasible cost efficiency, production effectiveness, and business performance (Rashid et al., 2013; Schulte, 2013 cited in Geissdoerfer et al., 2020). For responding to the rising demand for circularity, companies have developed different types of circular business models (Ferasso et al., 2020) that deliver superior customer value propositions, while resolving resource issues and combating the dominant linear “take - make- dispose” business model (Bocken et al., 2016). CBM innovations are a new kind of business models, where the value creation is grounded on keeping the economic value embedded into products after their use and exploit it for new types of market offerings. This action requires a set of return flows (from end users to producers), eventually through intermediaries (Linder & Williander, 2017 cited in Rosa et al., 2019). Changes to at least two elements of business models or the introduction of a completely new business model can be considered as a business model innovation (Uvarova et al., 2019). The circular economy can be a source of innovation and new revenues, particularly when a suitable business model is found (Hopkinson et al., 2018). Circular business model innovation (CBMI) is concerned with increasing positive advantages harnessing opportunities, and reducing negative impacts on the environment and society at large without undermining economic growth (Awan & Sroufe, 2022 cited in Ezeudu & Kennedy, 2024). Sustainable business models require creativity and a design thinking in order to change traditional business approaches and find new opportunities for the revenue generation (Evans et al., 2017; Van Bommel, 2018). At present, for the survival and competitiveness of the company, the business model innovation is as important as introducing new products and technologies. Business model innovations can bring new customer markets, build a new long-term relationship with customers and ensure more “returning” customers (Gronum et al., 2016; Bocken et al., 2019). Uvarova & Korpa (2020) created a Circular Business Model with 10 R key activities by considering the multi-dimensional aspects of R principles as shown in Figure 1.

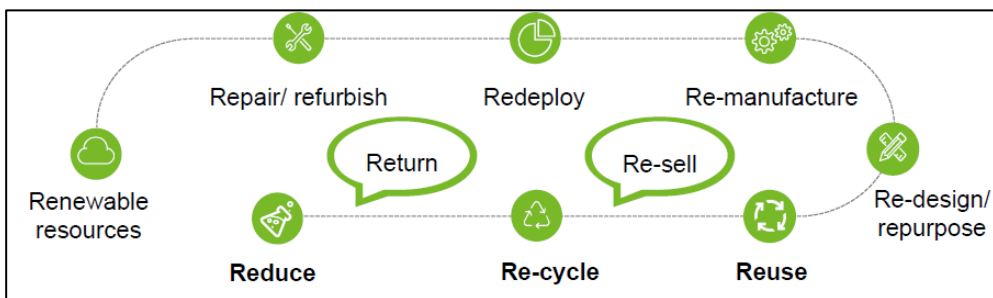


Figure 1: 10R Key Activities of the Circular Business Models
 Source: Uvarova et al., 2020, P.136

Circular Business Models and Sustainability

The TBL framework for sustainable development promotes firms to develop business models that consider all stakeholders' well-being, and not just business shareholders while bring value to people, profit, and the planet (Elkington, 1998). Circular entrepreneurs are the ones who seek to generate change (creating social, cultural, or environmental value) through the expansion or creation of economic activity, by identifying and exploiting new products, processes, or markets (Ormiston and Seymour, 2011). Social sustainability refers to *"benefits for society, local people and the local community, to resolve social problems around local communities such as enhancing community health and safety and uplifting the well-being of local people"* (Sinthupundaja et al., 2020). Economic sustainability could be measured by sales, profit, liquidity, efficiency, and competitiveness (Khan & Hou, 2021). Social value of an enterprise can be measured by using employee retention, business health culture index, women in management, technology for non-profits, employee engagement, social investment and employee volunteerism (Austin & Seitanidi, 2012). Environmental sustainability relates to *"the betterment of the natural environment. It also refers to resolving environmental problems around global communities, such as reducing waste and pollution"* (Sinthupundaja et al., 2020). Environmental value can be measured by using indicators like total energy consumes greenhouse gas footprint, data center energy and renewable energy (Austin & Seitanidi, 2012). Hultberg and Pal (2021) examined the scalability of circular business models by using the sample of 11 circular businesses in the Swedish fashion re-sale sector by identifying the main challenges from a TBL perspective and the strategic resources required to mitigate these challenges. Biogas plant, up cycling, environmental bio refinery, agricultural cooperative, Agro Park, and support structure are identified as different types of circular business models in the agro-waste sector (Donner et al., 2020). Drawn a sample of 39 case studies from 15 countries, the study revealed that these models differ in their way of value creation, but strongly depend on partnerships and their capacity to respond to changing external conditions. Suchek et al., (2022) developed a framework for circular entrepreneurship including antecedents, consequences, and support ecosystem for circular entrepreneurship, and emphasized the need for new studies to deepen the understanding of circular entrepreneurship in different contexts. A study by Donner and Radic (2021) conducted an empirical study in the olive waste sector based on 41 cases drawn from 12 Mediterranean Countries. It explored that innovative business models such as olive waste valorization and bioenergy production have emerged and still olive biomass is under-valorized.

Through the application of a qualitative case study approach, Jayasinghe et al., (2020) conducted a SWOT analysis by investigating three up cycling eco-enterprises in Sri Lanka as well as the challenges facing them in sustaining growth and scale-up. Findings revealed that limited access to funds, lack of business and marketing skills, and access to suitable markets are major challenges faced by eco-enterprises. Study found that lack of operational efficiency due to time-consuming processes and the lack of knowledge and supporting of-the-shelf solutions are challenges to scalability on the economic dimension whereas lack of means of measuring environmental value and competing in a linear economy are the challenges encounters on the environmental dimension. Further, lack of means of working environment, and engaging customers to be involved in resale was considered as challenges facing on the social dimension. Walker et al., (2021) examined the relationship between circular economy practices and sustainability of the 155 firms established in Italy and the Netherlands. Findings indicate that CE is considered as one of the tools to achieve sustainable development, particularly in the environmental domain by focusing on environmentally friendly resource use. Ezeudu & Kennedy (2024) examined the CBMs adopted by beverage and brewery companies in Nigeria through a qualitative case study found that collaboration, social

inclusiveness, waste management, durable product design, and cost reductions are enablers whereas absence of effective legislature, lack of infrastructure, lack of technological innovation, unavailability of finance, and the emergence of large retail stores that operate on a disruptive business model are identified as barriers of implementing CBMs. Rizos et al., (2016) identified the barriers and challenges for SMEs in adopting circular business practices and concluded that insufficient consumer preference for green products, lack of appropriate values, culture, & knowledge, limited technological support, lack of research and development finance are the challenges faced by SMEs. Uvarova et al. (2020) examined the challenges faced by rural SMEs in six European Union countries. They found that lack of innovation culture, adaptation to rapidly changing market conditions, lack of highly qualified employees especially in an agriculture and related industries, low profitability and long period of economic return on investments, lack of cooperation between rural SMEs and other sectors, and lack of support programs for the development of circular business models are challenges in adopting CBMs.

Research Methodology

Research Design

This study embraced interpretive research paradigm and qualitative research design to explore how circular business models create, deliver, and capture value while searching the drivers, challenges, and contributes to the sustainability. The participants for this study were selected using a purposive sampling method, which is particularly useful in qualitative research to obtain a concentrated sample of individuals who have experiences or perspectives that pertain to the phenomenon of interest. Participants were selected from a circular entrepreneur's forum, and field tour. The sample was limited to six circular business models in Southern province of Sri Lanka because they are pertinent examples to generate insights into the phenomenon of our research with the best practices of circular business models (Ünal et al., 2019). Several discussions with participants enabled the researchers to maintain the good relationship. Prior to conduct interview, researchers contacted each circular entrepreneur to ask his/her willingness to participate in the study, and allocated a specific date and time which is more convenient for them. Further, researchers promised to protect the anonymity and confidentiality of the participants and the information.

All circular entrepreneurs were interviewed independently to have an in-depth understanding of the phenomena and each interview lasted for 2 hours when the data were saturated and no new data were emerged. In-depth interviews were conducted via the online Zoom platform as well as through telephone conversation also conducted in mother tongue with the selected circular entrepreneurs by using an interview guide to reveal the value proposition, delivery, and capture, as well as drivers, challenges, and how they contribute to the sustainability. With the consent of the participants, interviews were recorded and then translate into English and transcribed for data analysis. Then researchers initially analyzed the transcripts several rounds until the entire set of transcripts were coded and analyzed. Narrative analysis was adopted since it emphasizes interrelationship between researcher and participant while participant's experiences through co-creation (Clandinin & Connelly, 2000).

Results and Interpretations

This section presents empirical finding by emphasizing the types of circular business models, drivers, challenges, and contribution made to achieve sustainability.

Drivers of Creating Circular Business Models

Table 2 presents the drivers of identifying circular business opportunities to develop circular business models such as Producing eco-pellets and generating electricity from the waste of Rice Husks, producing healthy food and drinks from the waste of banana trees, producing crafts from Eakle which is waste from coconut tree, producing crafts from fabric wastes generated by a handloom factory, creating upcycling products from the waste of polythene and producing value additions from coconut shell waste.

Table 2: Drivers of Introducing Circular Business Models by Circular Entrepreneurs

Circular Entrepreneur	Circular Business Models	Drivers of identifying business opportunities to create innovation from waste
1	Producing eco-pellets and Generating electricity from Rice Husks (Cycling & Extending Model - Recycling /Regenerate/Recovery)	<ul style="list-style-type: none"> • Waste of rice husks creates environmental pollution through burning & landfilling and find ways to reuse them • knowledge and experience as a rice mill owner • Creativity • Cross-sector collaboration • Networking with the companies in India Thailand, China, and Vietnam • Well-developed supply chain
2	Producing healthy food and drinks from the waste of banana trees (Banana Stem/Belly) (Cycling model)	<ul style="list-style-type: none"> • Ample banana trees are cut by banana farmers during harvesting creates waste • Banana stem is well known as a healthy food among the villages but it has not yet been seized for industrial application • See the opportunity of reusing and up cycling banana stem into a rich source of nutritious food and drinks

		<ul style="list-style-type: none"> • Knowledge and experience in the food science and technology as an undergraduate • Creativity • Research and development • Learning • Cross-sector collaboration
3	Producing crafts from Eakle (waste from coconut tree) (Cycling & Extending Model - Re-use /Upcycling/ Durable products/ Consumer education)	<ul style="list-style-type: none"> • Attended to a training program on making value-added products from bamboo organized by the National Craft Council • Coconut leaves are abundantly available in the area • Access to materials free of charge without incurring any transport costs • Creativity • Crafting and learning skills • Networking
4	Producing crafts from fabric wastes generated by a handloom factory (Upcycling model)	<ul style="list-style-type: none"> • Large amount of fabric waste is generated from the factory and intend to create value additions • Creativity and artisan skills • Wanted to make the factory as sustainable and place of tourist attraction • Demand for environmental friendly creative works
5	Producing value additions from polythene and plastics (Cycling & Dematerializing Model - Recycling /Up cycling/ Consumer education to increase demand)	<ul style="list-style-type: none"> • Reduce environmental pollution • Social oriented • Creativity and innovation • Abundant Supply • Opportunistic • New learning skills
6	Producing value additions from coconut shell waste (Cycling Model – Reuse /Up cycling)	<ul style="list-style-type: none"> • Improper disposal of coconut shells, which contributes to the spread of diseases like dengue • Vocational Training and Expertise • Desire to Utilize Skills • Passion for Sustainable and Circular Practices

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- Entrepreneurial Spirit
 - Market Demand and Customization
 - Recognition in Exhibitions
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Source: Survey data (2024)

Views of respondents on circular business models, entrepreneurial processes of opportunity exploration and exploitation can be summarized as follows:

Respondent 1 (CE1) is a rice mill owner who has a good entrepreneurial network as well as international collaborations which support him in acquiring technical know-how to start up circular business models.

Respondent 1 stated,

“Many people in our area are paddy farmers and also many rice mills are located in the area, which created tons of rice husks like mountains and no use of these for other purposes and just burning and landfilling threats to the environment. So I was inspired to take this as a business opportunity and started to produce eco-pellets and got permission from Ceylon Electricity Board (CEB) to supply electricity generated from rice husks”.

Respondent 2 (CE2) is a university undergraduate specializing in food science and technology. Knowledge and skills that he gained through education, creativity, and continuous learning and experimenting motivated him to initiate a circular business model of producing nutritious food and drinks from banana stems that are considered as waste after harvesting bananas. As he expressed,

“Especially during the period of COVID 19 with the vacation and free time, we were assigned to do a project and submit a report. So, I was inspired to exploit this opportunity to make value additions from banana stem to introduce a commercially viable product from waste rather than just doing something to fulfill the requirement of the university. Banana stem is well known as a healthy food among the villages but it has not yet been seized for industrial application and I got the opportunity of reusing and up cycling banana belly into a rich source of nutritious. ”

Respondent 3 (CE3) got to know about a training program on making value-added products from bamboo with the direction of her sister since she has crafting skills. Since then, she was trying different types of raw materials to create crafts and tried Eakle as well since they are abundantly available and wasted.

“I instigate to startup this business since I can use my crafting skills as well as there is a good demand for environmental friendly products. I made contact with some hotels in Hikkaduwa to sell my products. The product is durable as far as wood and its eco-friendly”.

Respondent 4 (CE4) is running a handloom factory, which creates large amount of fabric and yarn waste. Now he is running the factory as a zero waste factory introducing diverse range of value additions such as soft toys, wall hangers, handbags, pencil purses, key tags, etc. and also uses fabric waste and yarn waste for filling purpose of toys, making the trunk, tails, and ears of elephants, hats, designing purpose, etc. And also use defeated fabrics to make

handkerchiefs, serviettes, stool covers, Table cloths, book covers, pencil cases, belts of travelling bags, etc. He mentioned,

“Our fabric waste is used even small cut pieces to make value additions;for example small cut pieces are used to make a belt for the bags used by foreigners. Design bags from patchwork for a niche market are my focus since it is creative and has high demand. Foreign buyers are happy with such natural crafting that demonstrates the weaving process by using the original fabric waste. In addition, art museum provides knowledge, beauty, and harmony for the visitors. In addition, we use discarded machine parts, like Beeralu, shuttle, bobbin, etc. to create small pieces of art for use as souvenir items of the factory visit. Moreover, I introduced an “Art Museum” concept by collecting fabric and other waste to demonstrate handloom weaving among tourists, as well as making ornaments by using broken machine parts. This creates social value concerning the community and the environment”.

Respondent 5 (CE5) used polythene and plastic waste to make upcycling products. He gained practical exposure since he started working at a plastic manufacturing plant after school and higher studies. Then he could acquire the related technology through collaboration and started working with recycling plastic to produce pellets and up cycling polythene waste for unique fascinating creations such as wallets, files etc. with the combination of other waste materials like fabric, sack etc. As he stated,

“Since I love the environment, I noticed that plastic and polythene waste create harmful effects to the environment and I identified this as a business opportunity and started working on it with my knowledge and experience. Then.... I am aware of the village community and the shop owners regarding this issue and asked for their continuous support in collecting polythene and plastic.....but it was very hard work since they provide unclean polythene. Now I have a wide supply chain islandwide. Then I collaborated with several universities and corporates and experimented to introduce a block made of polythene waste to create a model house as well as a roofing sheet out of plastic and polythene waste”.

Respondent 6 (CE6), focuses on preserving the rich cultural heritage of Sri Lanka by using traditional techniques and designs in their products. He empowers local communities by providing livelihood and skill development opportunities. The entrepreneur fosters learning and development in the community by sharing craft techniques, skills and knowledge with local students and vocational college students. Environmental sustainability is also a primary focus and business addresses environmental problem of improper disposal of coconut shells, which leads to the spread of diseases like dengue. He creatively repurposing such discarded shells into various ornaments and handicrafts, as he stated that;

“I noticed.....coconut shells were not disposed of in an orderly manner and were freely discarded in the surrounding environment. This led to the spreading of diseases, particularly dengue, which is associated with the breeding of mosquitoes in stagnant water collected in discarded shells. Also, I completed vocational teacher training and a fitting course, gaining expertise in working with materials like coconut shells that instilled the necessary skills and knowledge to start a business with my passion. Presently, there is a good demand for these products from tourists and tourist hotels”

Characteristics of Circular Business Models

Key characteristics of a business model focus on value proposition, value creation & delivery, and value capturing logic. Hence, these three characteristics of circular business models are explained in Table 3.

Table 3: Characteristics of the Selected Circular Business Models

Circular Business Model	Value Proposition	Value Creation & Delivery	Value capture
1	Adding value from wasted rice husks and value offers for the customers, producers, and waste generators.	Create and deliver value for customers. Reduce cost and negative impact through internal technology Create partnerships with cement factories, CEB, foreign countries, & investors to initiate the project	Reduce the cost for raw materials (wasted rice husks) by using waste as inputs rather than virgin resources Capture environmental value through minimizing pollution by avoiding landfilling
2	Produce high-quality healthy food from Banana stems for an affordable price Minimizing waste materials (Banana stem)	Developing relationships with banana farmers to acquire adequate sourcing during the harvest season, and Ministry of Agriculture to get business development support and advisory services. Network with super market and trade shows	Charge premium price from the health-conscious customers. Capture environmental value by using waste as a resource and reduced cost of the product
3	Create durable handicrafts from Eakle through the lifecycle thinking. Source material free of charge & sell at affordable price High-quality products	Create links with the National Handicraft Council and tourist hotels to showcase and sell the products. Network building with CBOs to train and empower women	Charge premium price from tourists

	Reduce waste and resources in the design and production processes of handloom.	Linking Laksala, tourist hotels, and local markets to showcase and sell the products.	Charge premium price and capture profit
4	Use artisan skills to create Art Museum and souvenirs for tourists using fabric waste and wasted machine parts.	Promote foreign tourists to visit the factory	Reduce cost by using waste as raw material Reach zero-level waste
	Combine different types of wastes such as polythene, gunny, & fabric to create new products with the technology.	Create island island-wide supply chain to obtain polythene and plastic waste.	Capture profit
5	Promote lifecycle thinking - aware customers and communities to use, recover, and maintain post-consumer materials; for example, the consumer of how to dispose of the material after consumption	Develop partnerships with foreign partners to acquire technology Make a relationship with several state universities to engage in R&D activities. Member of the Good Market Colombo to sell the products	Capture environmental value by reducing pollution and reusing waste Capture social value by educating the communities
	Create diverse range of value additions from coconut shell waste. Attractive, natural, and healthy	Make relationship with tourist hotels, and local community to acquire raw materials and to sell finished handicrafts	Capture profit from premium price in the tourism sector. Secure environmental value through reducing costs and sourcing raw materials from waste.
6	High quality with an affordable price		Capture social value by minimizing health hazards by disposing of coconut shells on the land.

Source: Survey data (2024)

Challenges Encountered by Circular Entrepreneurs

Circular entrepreneurs are facing diverse challenges in sourcing, producing, and delivering their products to customers. Major challenges encountered by circular entrepreneurs are illustrated in Table 4. Finding the market, lack of finance, inadequate technology, lack of

government support, and competition among intermediaries and waste collectors are the major challenges faced by many circular entrepreneurs. As CE 2 stated;

“A major challenge that I am facing today is the financial problem. I have only one machine now and since I need another machine to expand my production and have required quality certifications. I talked with several banks with the coordination of the Ministry of Agriculture, collateral is the major issue when acquiring a bank loan”.

Similarly, CE 1 expressed;

“I contacted local banks and China Bank, but they need collateral, since my electricity generation project needs high investment, I have no collateral. Then I could find a partner to invest in the project. Moreover, there is a long process to obtain licenses from diverse organizations such as the Ministry of Health, Central Environmental Authority etc. which takes much time”.

Table 4: Challenges Encountered by Circular Entrepreneurs

Circular Entrepreneur	Circular Business Models	Challenges
1	Producing eco-pellets and Generating electricity from Rice Husks	<ul style="list-style-type: none"> • Finding the market for pellets • Ricing electricity bills lead to increase the maintenance cost • Frequent breakdown of machinery • Lack of finance • Attracting investors • Takes a long time for obtaining license from multiple authorities • Lack of support from the government
2	Producing healthy food and drinks from the waste of banana trees (Banana Stem/Belly)	<ul style="list-style-type: none"> • Inability to access finance from banks due to collateral • Access to technology • Lack of support from the government
3	Producing crafts from Eakle (waste from coconut tree)	<ul style="list-style-type: none"> • Finding skilled employees to finish the final outlook • Finding market
4	Producing crafts from fabric wastes generated by a handloom factory	<ul style="list-style-type: none"> • Lack of government support • Lack of technology for using natural dyes
5	Producing value additions from polythene and plastic waste	<ul style="list-style-type: none"> • Having cleaned polythene • Lack of technology • Lack of access to finance • Lack of knowledge in the community

		<ul style="list-style-type: none"> • Competition among intermediaries and waste collectors
6	Producing value additions from coconut shell waste	<ul style="list-style-type: none"> • Secure market demand since there are competitors • Lack of government support • Lack of technology

Source: Survey data (2024)

Circular Business Models and Sustainability

Table 5 portrays detailed information on how circular business models contribute to the economic, social and environmental sustainability. In general, these circular business models achieve economic sustainability by sourcing raw materials for free of charge or for low cost, provide income for suppliers, employment for villagers, earn foreign exchange etc. CE 1 stated;

“Since many rice mills were located in the area, tons of rice husks are disposed to landfilling threats to the environment. I could source these materials for zero cost at the beginning, but when I started the factory, mill owners provided them for low cost. The factory can supply 2.5 MV to CEB and 0.5 MV for personal use per day which consumes about 50 tons of rice husks. I would be able to supply electricity for about 35,000 households out of this 03MV.”

CE 5 also expressed that;

“Initially, I participate the village level community meeting to aware the people regarding the environmental issue and asked them to sort out their waste and handover their plastic and polythene waste to the business for a cost. I have aware the local wholesalers and retail shops as well to collect polythene waste. Finally, I could create a strong supply chain island wide”.

CE 4 stated that;

“Even though we conducted awareness program to the community to obtain cleaned polythene, they are still unaware and not follow proper guideline to sort out polythene. Thus is a big issue for us because we need to put additional effort to clean them”.

Table 5: Sustainability of Circular Business Models

Circular Entrepreneur	Economic Sustainability	Social Sustainability	Environmental Sustainability
1	<ul style="list-style-type: none"> • Reduce the cost of sourcing raw material • Create a supply chain in the area • Supply electricity for households • Income generation 	<ul style="list-style-type: none"> • Reduce health hazards in the community • Enhance the technical knowledge and capability of the employees • The community could access an 	<ul style="list-style-type: none"> • Reduce risk of landfilling and burning of rice husk • Reduce emissions and environmental pollution • Reuse waste to create value-addition

	<ul style="list-style-type: none"> • Provide job opportunities for villagers 	<ul style="list-style-type: none"> • alternative energy source with low-cost • Network development 	
2	<ul style="list-style-type: none"> • Provide job opportunities for the villages • Create demand for the product both local and international • Reduce the cost of sourcing raw material • -Income generation 	<ul style="list-style-type: none"> • Provide a rich source of healthy food and drink for the customers • Skill development of employees • Network development 	<ul style="list-style-type: none"> • Re-use waste to create value additions • Supports banana farmers to reduce their waste from their farms and threat from insects built in banana stem
3	<ul style="list-style-type: none"> • Create demand for the product both local and international • Source raw materials free of charge • Income generation • Demand from the tourism industry 	<ul style="list-style-type: none"> • Empower women to support their livelihood • Provide training for women to develop their skills and direct them to participate in competitions. • -Network development • -Enhance the entrepreneurial ability of women • -Support to promote local craft 	<ul style="list-style-type: none"> • Re-use waste to create value additions • Produce green products that are eco-friendly and durable as wood
4	<ul style="list-style-type: none"> • Attract tourist • Income generation • Source raw materials for zero cost 	<ul style="list-style-type: none"> • Empower women • Enhance creative skills of women 	<ul style="list-style-type: none"> • Reduce Environmental pollution by reusing waste • Produce eco-friendly products
5	<ul style="list-style-type: none"> • Good source of income generation • There is a high demand from locals and tourists in the good market 	<ul style="list-style-type: none"> • Provide employment for local villages • Enhance their artisan skills 	<ul style="list-style-type: none"> • Reduce environmental pollution from plastic & polythene

	<ul style="list-style-type: none"> • Source raw materials for low cost • Create a good supply chain 	<ul style="list-style-type: none"> • Benefits for suppliers • Social network development 	<ul style="list-style-type: none"> • Enhance community awareness regarding sorting and disposing garbage
6	<ul style="list-style-type: none"> • Supporting to the local economy • Creating jobs to the villages • Attracting tourists for local artisan products 	<ul style="list-style-type: none"> • Preserving cultural heritage • Empowering communities • Educate customers 	<ul style="list-style-type: none"> • Waste reduction • Sustainable resource management

Source: Survey data (2024)

Conclusion and Recommendation

This study explores the drivers, challenges, and sustainability of the 06 circular business models in Southern Sri Lanka through in-depth interviews. This work contributes to the knowledge of circular business models in a developing economy context and strengthens empirical literature. The findings of the study are harmonious with previous studies which suggest that circular business models create value and contribute to sustainability (Dantas et al., 2022; Cullen et al., 2021, Jayasinghe et al., 2020), and the integration of creative designs through applying 5R concepts support sustainable business innovations (Wanniarachchi et al., 2020). Moreover, personal motivation, knowledge & skills, opportunity identification, and environmental concerns drive to initiate circular business models and this is in line with previous studies as well (Kolpinski et al., 2022). Challenges faced by circular entrepreneurs in introducing circular business models emphasized that lack of finance, inadequate technology, lack of support from the government, competition, and inadequate market are also in line with the previous studies (Ezeudu & Kennedy 2024; Rizos et.al, 2016; & Uvarova et al., 2020).

This study provides insights into the practitioners and policymakers in Sri Lanka to facilitate circular entrepreneurs to successfully exploit circular business opportunities that impact triple bottom lines as described in Table 5, and achieve sustainable development goals. Mainly contributing to reducing and reusing waste, creating a number of livelihoods and employments, enhancing quality of life of the community, and contributing to minimize the environmental impact of the waste. Specifically, government support is required to strengthen and facilitate circular entrepreneurs specifically for funding, training, and access to technology for successfully developing these circular business models. A proper mechanism needs to be established by the government to obtain licenses efficiently from multiple authorities to launch circular businesses. Further, Business development service organizations (BDS) need to provide their services especially for circular entrepreneurs towards motivating and promoting them to initiate circular business models as well as continuous monitoring is needed to inspire them on the way to success. Moreover, the public, private, and third sector needs to work together to aware the community, industry, waste collectors, schools, and universities regarding circular business practices.

Limitation and Future Research Direction

There are certain limitations in this study. First, the research is based only with a sample of 6 circular business models in the Southern province of Sri Lanka and applied a qualitative approach which restricts the possibility of generalizing the findings. Future research may explore different circular business models in developing economies to strengthen the empirical findings. Moreover, quantitative studies are needed by drawing a large sample of different industries in diverse economic contexts.

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