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Life, Death and Resurrection of Products: In Search of a Circular Economy in Zimbabwe

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Abstract

Purpose: Transforming Zimbabwe's economy from linearly biased to circular has become imperative if the country is to create a sustainable economy that is deliberately intended to be regenerative and restorative. The paper examines factors that facilitate the creation of a circular economy (CE) in Zimbabwe.

Theoretical framework: The paper modifies the theory of planned behaviour (TPB) to demonstrate how the country can transition from a traditional linear economy (TLE) to a circular economy.

Design/methodology/approach: A binary choice model was used to analyse quantitative data collected using a stratified sample of 100 environmentalists chosen from a cross-section of manufacturing firms drawn from Harare, Zimbabwe.

Findings: The main findings show that the probability of transiting to a CE from an LES depends on government environmental policies, consumer and producer behaviour, and cultural and social belief shifts.

Research, Practical & Social Implications:

Originality/value: The study pioneers using binary choice models to explain factors that facilitate the transition from a linear economy to a circular economy.

Keywords: Circular Economy, Linear Economy, Ecology, Zimbabwe, Theory of Planned Behaviour

1. Introduction and Background

The inevitability of transiting Zimbabwe's economy from the contemporary TLE towards a CE is gaining a substantial toehold. Like in many developing economies, the rapid pace of technological progress and the never-ending impact of globalisation have ushered in many benefits to countries like Zimbabwe. Specifically, the country has recently seen a general rise in consumer welfare, reduced deadweight losses, improved living standards due to affordable domestic and imported goods, and sustained progress by firms towards adopting clean production processes. On the negative side, the country has also witnessed significant systemic and structural transformations leading to the over-consumption of scarce natural resources. Producer prolificacy and consumer profligacy have contributed significantly to environmental damage and loss of biodiversity. This is because the once traditionally agricultural-dependent economy has become increasingly industrialised, resulting in extravagant consumption of non-renewable resources.

Since 1980, Zimbabwe has pursued a TLE where renewable and non-renewable resources are deemed readily available, copious, cheap to dispose of, and without concern for ecological footprint. The TLE is based on the principle of sourcing raw materials, transforming them into finished products, and selling the products to the end consumer, who then discards the products as soon as they come to the end of their shelf lives (Kumar & Reinartz, 2016; Khalid et al., 2018; Shamah et al., 2018). This process is also known as the "cradle-to-grave" or "take-make-waste" economy and often results in the rapid depletion of resources and waste production challenges (McDonough, 2010; Chen et al., 2019). The 'take-make-waste' economy has raised saturnine disquietudes not only in Zimbabwe but also in other developing countries on the need to design, develop and grow economies that promote recycling, regeneration, restoration and resuscitation of products (Mutambara & Muzurura, 2023; Garg & Shama, 2019; Xie et al., 2019; Parida et al., 2019). Although projections of non-renewable resource wastages are challenging to obtain in Zimbabwe, the effect will probably be a significant comeuppance for future generations given the rapid growth of the population and current improvident natural resource spending. Hence, CEs are now being enabled as an unavoidable substitute for a TLE. A CE promotes sustainable growth of an economy through increasing the throughput of natural resource utilisation. It also helps to resurrect "dead" products dumped after one use, giving them a new lease of life, a process that can be termed prolongation of product life.

A CE originates from industrial ecology (Bertassini et al., 2021; Dokter et al., 2021). The fundamental emphasis in a CE is on recycling residual waste materials and by-products (Edbring et al., 2016; Ertz et al., 2017; Khor

& Hazen, 2017; Cullen, 2017), promoting resource use minimisation (Santa-Maria et al., 2021; Carmichael et al., 2021), adopting clean technology (Gruen, 2017; Welch et al., 2017), innovative business models, processes and practices in production and consumption of goods and services using complex synergies (Mathew & Tan, 2016; Zink et al., 2016). In a CE, the production system reduces reliance on economic activities that cause intensive emissions (Felix et al., 2018; Russo et al., 2019; Confente et al., 2019).

The adoption of a CE allows firms and consumers to reuse, recycle and restore by remanufacturing a product that cannot be repaired and also to repair that product if broken (Pailiuk, 2018; Jabbour et al., 2019; Varju et al., 2019; Kirchherr et al., 20017; Korhonen et al., 2018; Stahel, 2016). Using a population growth rate of 2%, the paper predicts that at least 25 million people in Zimbabwe will consume water, food, public transport, and education and health services by the turn of this decade. The rapid population growth rate will propel increased demand for non-renewable resources, thus causing phenomenal challenges in resource depletion and waste management. A further problem confronting Zimbabwe is the sustainability of a TLE, especially in promoting inter-generational equity, eradicating poverty, and strengthening socio-economic resilience using scarce resources. In this age of rapid and irresponsible usage of non-renewable resources, fair access or/and prudent utilisation of resources have become an *au courant* concern for many people. The country is still beginning a long journey towards achieving economic circularity.

This has severe implications for circular economy adoption strategies in that modularity, adaptivity and versatility strategies may need to be embedded in the early stages of this journey. This process might also require a significant transformation of the economy, particularly in the way Zimbabwe businesses and consumers behave and interact with markets (see Dokter et al., 2021; Bertassini et al., 2021; Di Maio et al., 2017; Santa-Maria et al., 2021). Numerous reasons justify the extant study. First, a CE is based on the concepts of eco-efficiency natural resource utilisation efficiency, where the key objectives are to develop, design and adopt a set of critical processes and measures that are intended to drive the TLE towards a more circular, green and sustainable economy (Raikamal et al., 2021; Cullen, 2017; Lee & Kim, 2018; Decrop et al., 2018; Lutz et al., 2017). By transiting to a circular economy, the country may be able to abandon the essentially existing TLE that encourages wasteful production and consumption and production of goods

Furthermore, CE may assist Zimbabwe in minimising the use of virgin material inputs in production processes. This is because a TLE encourages the making, utilisation, and disposal of waste. In turn, this may help in minimising production output waste by closing the ecological and economic loops of non-renewable resource flows (Zou & Chan, 2019; Wang et al., 2018; Atlason et al., 2018). This then allows the economy to extract the maximum value from natural resources through repeated usage, recovery and regeneration of products after the shelf life (see Ellen et al., 2015; Kirchherr et al., 2017; Pizzol et al., 2017; Repo et al., 2018). Second, constructing industrial systems in Zimbabwe to address the reusability of products and raw inventories and leveraging the restorative capacity of renewable products might enable the country to minimise value destruction. This may also help the country maximise value creation in product and process linkages, thus extending product life (Mugge et al., 2013; Piscicelli et al., 2017).

Therefore, a CE can prompt rapid economic growth in periods of natural resource scarcity (see Varju et al., 2019; Khalid et al., 2018; Welch et al., 2017). Circular economic systems enhance economic growth by reducing extravagant consumption and production systems whilst improving the throughput of energy flows. Consequently, this also allows industries to depend on high-value inventory cycles. The paper has two main objectives. The principal objective is to examine a circular economy's key determinants using the planned behaviour theory. The subsidiary objective is to explain how the country can transit safely from a TLE to a CE without exacerbating anti-cyclical natural resources shocks and cycles.

2. Literature Review

A Circular Economy (CE) transforms our resource management by integrating technical and biological cycles through various supportive activities, as the Ellen MacArthur Foundation (EMF, 2013) outlined. The EMF identifies three key principles of circular economic systems: (1) preserving and enhancing natural capital, (2) extending the circulation of materials and products, and (3) designing for waste management. Kirchherr et al. (2017) define a CE as an economic system that aims to reduce, recycle and recover materials during production, distribution and consumption processes. CE systems replace the end-of-life concept primarily associated with linear economic systems (EMF, 2013). A CE is an industrial system designed to restore and regenerate materials (Hobson et al., 2018). The definition by Hobson substitutes the end-of-life concept common in many definitions by shifting towards product restoration, elimination of toxic chemicals and increased use of renewable energy.s. These issues impair reuse and return to the biosphere (EMF, 2013). A CE operates at different levels: the micro level involving products, firms and consumers (Ellen et al., 2015; Davidson et al., 2017; Ertz et al., 2017), the meso level consisting of eco-industrial parks (Garguilo et al., 2015; Welch et al., 2017; Möhlmann, 2017; Welch et al., 2017) and macro level involving cities, regions, nations and transboundary (Ellen et al., 2017; Godelnik, 2017; Benoit et al., 2017). Kirchherr et al. (2017) contend that a Circular Economy (CE) promotes the reuse of materials and products through recycling, restoration, and

recovery, effectively minimising waste and advancing sustainability rather than resorting to disposal. Numerous studies highlight various dimensions of a CE, including industrial ecosystems (Ghisellini et al., 2017; Yla-Mella et al., 2016; Abdar & Yen, 2017), product-service systems (Tukker, 2015; Gruen, 2017; Roos & Hahn, 2017), cleaner production (Leider & Rashid, 2016; Ellen et al., 2017; Benoit et al., 2017), eco-efficiency (Haas et al., 2015; Decrop et al., 2018), resilience of socio-ecological systems (Bocken et al., 2016), performance economy (Stahel, 2010), zero emissions concepts (Guo et al., 2016; Hazen et al., 2017; Xu et al., 2017), natural capitalism (Jena & Garmah, 2015; Hazen et al., 2017), and the potential for economic growth (Ellen et al., 2017).

Many economic agents are increasingly becoming sensitive to the environmental impacts of manufactured products (Chilombe & Chiziwa, 2024; Jenkins et al., 2019; Russo et al., 2019; Ertz et al., 2017; Zou & Chan, 2019). The advantage of transiting to a CE is that it decouples value creation from waste generation by fundamentally transforming production and consumption processes and practices (Kirchherr et al., 2017). However, numerous studies on CE systems do not focus on how a developing country can transit safely from a TLE to a CE but instead address production and consumption by concentrating on circular solutions and factors that hinder the adoption of a CE (Biel, 2017; Notarnicola et al., 2019; Castellani & Sala, 2017). Consumer and user acceptance, culture, social behaviours, consumer interest and awareness of CEs are significant barriers constraining the adoption of circular solutions (Bocken et al., 2016; Kirchherr et al., 2017; Rizos et al., 2016).

A CE should not only be about resource efficiency but also about sustainable development, with companies and consumers assuming the role of enablers (Činčalová et al., 2024; Rizos et al., 2017; Alkhodary, 2023; Decrop et al., 2016; Evans, 2018). Ghisellini et al. (2016) assert that consumers can be considered passive and rational recipients who follow product labels and other production side signals when making consumptive decisions. Re-manufactured products are a consequence of reusing processes, repairing, restoring and replacing components of products that are considered not useless (Gargiulo et al., 2015; Catulli et al., 2017). Several studies show consumers hesitate to adopt new products due to perceived lower quality (Evans, 2018; Ellen et al., 2015). There are three types of product system sharing in circular solutions: results-oriented, product-oriented, and outcome-oriented (Pettersen, 2015; Repo et al., 2018; Pizzol et al., 2017). Under the outcome-oriented product system, sharing firms have incentives to reduce costs, allowing them to create more opportunities for improved efficiency and enhancing sustainability. Kostakis and Tsagarakis (2022) used panel data to examine the socio-economic characteristics of CEs within the European Union to demonstrate that research and development, taxes, and employment rates affect recycling and circularity rates. Zhang and Liu (2022) used the modified technology acceptance model to show the impact of perceived ease of use, environmental awareness and knowledge on adopting a circular economy in China.

2.1 Theoretical Framework and Hypotheses Development

Protean theoretical frameworks have been employed in the empirical literature to examine factors motivating the transition to CEs in developing economies. These include the rational theory, the consumer preferences theory, the technology acceptance model (TAM), the theory of reasoned action (TRA), the means-end theory, Lancaster's model, the theory of planned behaviour (TPB), and the simple expectancy-value theory (Khan & Mohsin, 2017; Barbarossa et al., 2017; Kumar, 2019; Hoffmann et al., 2019). Other factors identified in various frameworks of CE include consumers' lifestyles and dynamic consumer actions (Cullen, 2017; Muge,2017; Mylan, 2017), cultural meanings, identity creation and differentiation, green consumerism (Repo et al., 2018; Lakatos et al., 2016; Mathew & Tan, 2016; Edbring et al., 2016), voluntary simplicity, anti-consumption, institutions and structures of the system, lifestyles (Cho et al., 2017; Khor & Hazen, 2017; Bocken et al., 2016; Ghisellini et al., 2016). However, the most popular theory that has been often used to investigate the intention to adopt CE in other developing countries is the TPB (see Abbey et al., 2015; Ajzen, 1991; Hazen et al., 2012; Khor & Hazen, 2017; Hazen et al., 2012; Khor & Hazen, 2017; Michaud & Llerena, 2011; Piscicelli et al., 2015; Schotman & Ludden, 2014; Chou, 2011; Van Weelden et al., 2016). The key constructs used in this paper include government policies (Goyal et al., 2018; Garlapati, 2016), big data and information flow (Parida et al., 2019; Jawahir & Bradley, 2016); consumer behaviour, cultural factors, social factors (Schivinski et al., 2019; Neufeld, 2016; Leonards et al., 2016), cognitive biases and psychological existentialism (Dokmai, 2018; Leslie et al., 2016). Hence, the conceptual and research test model on CE factors is referenced below in Figure 1.

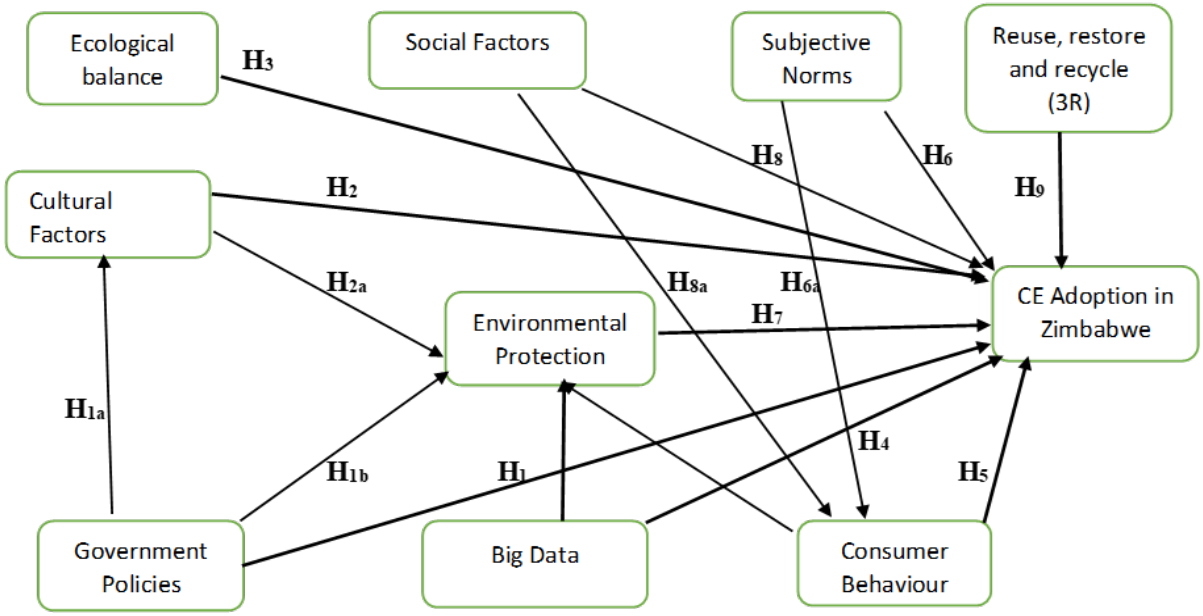

Figure 1: Circular Economy Factors

Source: Own

Government Policies:

Koyal and Weis (2019) state that policies are critical in transitioning to a CE. Governments can offer incentives such as reduction of taxes and subsidies to promote environmental protection (Patwa et al., 2021; Jones & Calster, 2019). Forcing firms to adopt eco-efficient industrial parks (Chen et al., 2019; Abbey et al., 2017) and actively encouraging local communities to engage in activities that support a sustainable society by reducing waste all support a CE (Činčalová et al., 2024; Mataruka et al., 2024; Shahidullah, 2019; Gupta & Koontz, 2019). Urban planning promotes environmental protection and resource management efficiency (Patwa et al., 2021; Furlong et al., 2019; Carmichael et al., 2019; Ahluwalia, 2019). Regulations can also support environmental protection and adopting a circular economy (Kozhukhova et al., 2019; Yang et al., 2019; Piscicelli et al., 2017). Hence, the following are the primary and secondary hypotheses.

H_1: *Government policies positively influence the likelihood of accepting a circular economy in Zimbabwe.*

H_{1a}: *Government policies that protect the environment increase the probability of transiting to a CE in Zimbabwe*.

H_{1b}: *Government policies influence cultural factors that motivate consumers and firms to transit to a CE in Zimbabwe voluntarily*

Cultural factors affect consumer behaviour through cultural ideologies, social class, and peer group attitudes (Patwa et al., 2021; Ramya & Ali, 2016; Jafari & Viscont, 2015; Alexandries & McDonald, 2016). Tang and Zaichkowsky (2019) argue that consumer behaviour in developing economies is influenced by culture, which causes consumers to utilise products over their lives through reuse, recycling, and restoration.

H_2: *Cultural factors positively influence the probability of transiting to a CE in Zimbabwe.*

H_{2a}: *Cultural factors influence environmental protection an enabler for the probability of transiting to a CE in Zimbabwe*

Ecological Balance:

Ecological balance is necessary if the environment is to be protected and remain sustainable in line with expanding populations (Patwa et al., 2021; Demise, 2017; Catulli et al., 2017). Ecological balance calls for resource efficiency, the use of clean and renewable energy sources (Evans, 2018; Liedtke et al., 2015), and proper waste management practices to reduce wastage and what goes into landfills (Patwa et al., 2021; Hobson et al., 2018; Ellen et al., 2017). Consuming goods sustainably avoids waste, reduces the consumption of non-renewable resources, saves energy, and helps reduce the greenhouse effect (Patwa et al., 2021l; Long & Armstrong, 2017; Catulli et al., 2017). This helps to close the loop by creating a complete cycle (Sahel, 2016; Kirchherr et al., 2017). To balance industrial development and environmental protection, there is a need for green material movement and distribution (Činčalová et al., 2024; Govindan & Hasanagic, 2018; Patwa et al.,

2021). Patwa et al. (2021) concur that reverse supply chain management enhances the nexus between the producer and consumer by closing the loop and permitting consumers to purchase some old and refurbished products.

***H_3**: Ecological balance positively affects the likelihood of adopting a CE in Zimbabwe.*

Big Data:

Jabbour et al. (2017) demonstrate intelligent systems that rely on big data management, which allows the tracking of information in green economies, an enabler for CE adoption (Patwa et al., 2021). Sivarajah et al. (2017) show that big data is influenced by artificial intelligence, the Internet of Things, and cloud computing. These tools can integrate ecological issues, production, and consumption (Solanki et al., 2019; Yaqoob et al., 2019).

***H_4**: BIG data positively affects the probability of transiting to a CE in Zimbabwe.*

Consumer Behaviour is defined as circular behaviours and psychological attitudes surrounding the acceptance of CE's psychological attitudes toward circular behaviours (Chandrasekaran et al., 2019; Singhal et al., 2019; Van Reijmersdal & Poels, 2019). The collective attitude of producers and consumers can influence government policies and the transition to a CE (Muranko et al., 2019; Nair & Gulati, 2019; Kumar, 2019). Hudders et al. (2019), Schivinski et al. (2019), and Schivinski and Dabrowski (2016) suggest that consumer behaviours shift due to advertisement, promotion and use of social networks.

***H_5**: Consumer behaviour positively influences the probability of transiting to a CE in Zimbabwe*

Subjective Norms:

These are habits and beliefs that are highly automated behaviours that cause consumers and firms to adopt and accept a CE (Patwa et al., 202; Hazen et al., 2017; Van Weelden et al., 2016; Abbey et al., 2017; Lakatos et al., 2016; Santamaria et al., 2016). To transition to a CE calls for fundamental changes in consumer behaviour (Catulli et al., 2013). Consumer attitudes are a composite of feelings, beliefs, social norms and behavioural intention to adopt a business model or a new technology (Netter, 2017; Khor & Hazen, 2017; Vehmas et al., 2018).

***H_6**: There is a positive relation between subjective norms and the probability of accepting a CE in Zimbabwe*

***H_{6a}**: There is a positive relation between social norms and the probability of accepting a CE in Zimbabwe*

Environmental Protection:

Many economic agents are becoming more aware of the need to keep the environment clean and healthy. Social Development Goal 11 speaks of clean communities and cities.

***H_7**: There is a positive relation between environmental influences and the probability of moving towards a CE in Zimbabwe.*

Social Factors:

Social structures and community relationships help to influence consumer behavioural intention to adopt CEs (Ellen et al., 2015; Lawson et al.,2016; Xu et al., 2017). Some of the more common social-level factors include subjective norms (Lee & Kim, 2018), the ideology of consumerism (Ellen et al., 2015; Bocken et al., 2016) and psychological essentialism (Newman & Knobe, 2018).

***H_8**: Social factors influence the probability of transiting towards a CE in Zimbabwe.*

***H_{8a}**: Social factors influence consumer behaviour necessary for transiting to a CE in Zimbabwe*

Recycle, restore and reuse (3R): The ability to reuse, recycle and restore products helps in the adoption of CEs (Lee & Kim, 2017; Gruen et al., 2017; Cho et al., 2017; Khor & Hazen, 2017; Guo et al., 2016). Patwa et al. (2021) argue that recycling, restoration and reusing policies directly impact society, the environment and the economy.

***H_9**: There is a positive relation between 3R and the likelihood of accepting CEs in Zimbabwe.*

Theoretical framework

A theoretical demand for transiting to a CE can be specified as in equation i

$$CE = F(X) \quad \text{(i)}$$

Where CE depicts the Circular Economy, and X represents a series of factors that influence the adoption of CE. The elements of *X* can be into sub-sectoral vectors representing government policies (GP), culture factors (CF), social factors (SF), big data (BD), 3R, subjective norms (SN), ecological balance (EB), consumer behaviour (CB) and environmental protection (EP) as in equation ii:

$$\boldsymbol{CE = F\ (GP, Cf, SF, BD, 3R, SN, EB, CB, EP)} \quad \text{(ii)}$$

We can express equation ii as a linear regression, as shown below

$$CEs = a_0 + \partial_1 GP + \partial_2 CF + \partial_3 SF + \partial_4 BD + \partial_5 3R + \partial_6 SN + \partial_7 EB + \partial_8 CB + EP_9 + \varepsilon \quad \text{(iii)}$$

Recognising that transiting to a CE is complex and not linear, the paper posits that the country has two clear choices: (1) transiting to a CE or (ii) not transiting that is remaining a TLE. This suggests a two-dependant regression equation. Since the regression equation has two dependent variables whose choice and effects are uncertain, binary choice models like the Tobit, Logit and linear probability models (LPM) can be utilised in this research. We chose the logit model since using the LPM might not guarantee that the probability will lie between one and zero. In addition, the Probit model has shortcomings because it cannot compute marginal effects if the papers use a dummy variable. The main disadvantage of the LPM is that there is no guarantee that the probability will lie between 0 and 1. Therefore, the logit equation was transformed as in equation iv.

$$P_i = E(Y - 1IX_i) = \partial_i + \partial_2 X_i \quad \text{(iv)}$$

P_i is the probability of moving towards a CE, and Xi is a vector of regressor factors. This equation can be changed into a cumulative logistic function, as shown below;

$$\Pr(y_i = 1|x_i) = \frac{e^{x_i\partial}}{1+e^{x_i\partial}} = \frac{1}{1+e^{-\partial x_i}} = \Lambda(x_i^{\partial}) \quad \text{(v)}$$

$x_i\partial$ It is a linear function of some kind which if substituted into G: $\Re \twoheadrightarrow (0)$, G is a probability function that takes values between 0 and 1. Hence, we get the following probability function

$$\mathcal{L} = \prod_{1=1}^{N} \Lambda\,(x_i\partial)^{y_i}[1 - \Lambda(x_i\partial)]^{1-y_i} \quad \text{(vi)}$$

This equation can be linearised by transforming it into a natural logarithm function;

$$ln\mathcal{L} = \sum_{i=1}^{N}(\,y_i \ln[\Lambda(x_i\partial)] + (1 - y_i)\ln\,[1 - \Lambda(x_i\partial)] \quad \text{(vii)}$$

If we substitute equation 10 into 12, we get

$$ln\mathcal{L} = \sum_{i=1}^{N}\left\{y_i ln\left[\frac{1}{1+e^{-\partial x_i}}\right] + (1 - y_i) ln\left[1 - \frac{1}{1+e^{-\partial x_i}}\right]\right\} \quad \text{(viii)}$$

Model specification

The *Xi* can be expanded to take a familiar form as follows:

$$P(h = 1/X) = \{\boldsymbol{F}\ (GP, CF, SF, BD, 3R, SN, EB, CB, EP)\} \quad \text{(ix)}$$

Where *P* [*h* = 1 / *X*] is the probability that the country can either transit to a CE or not

$$P(CE = 1/X) = a_0 + \partial_1 GP + \partial_2 CF + \partial_3 SF + \partial_4 BD + \partial_5 3R + \partial_6 SN + \partial_7 EB + \partial_8 CB + EP_9 + e_t \quad \text{(x)}$$

MATERIALS AND METHODS

3.1. Theoretical Framework Adopted

This study is grounded in the circular economy (CE) principles. It aims to understand the transition from a traditional linear economy (TLE) to a CE among manufacturing firms in Harare, Zimbabwe. The methodology employed a structured questionnaire to gather quantitative data, focusing on key constructs of resource efficiency, waste management, and product design, reflecting contemporary CE principles (Bocken, 2019; Kirchherr et al., 2017; Ghisellini et al., 2017).

3.2. Research Philosophy

A positivist approach was adopted to collect empirical data on the transition to a CE. This perspective prioritises objective data collection and analysis, concentrating on observable realities through quantitative methods. The structured questionnaire facilitated the exploration of relationships between CE adoption and operational efficiencies in the manufacturing sector (Mataruka, 2022; Aityan, 2022; Bocken & Geradts, 2020; Bocken et al., 2016).

3.3. Research Approach

The study utilised a deductive approach, beginning with established theories regarding CE principles and testing these against collected data. This approach was particularly fitting for assessing the impact of CE practices on operational efficiency, ensuring that findings were supported by empirical evidence (Sloan & Quan-Haase, 2022; Ratten, 2023).

3.4. Research Design

A quantitative research design was employed, utilising numerical data and statistical analyses to examine the relationship between CE principles and operational efficiency in manufacturing firms. The final questionnaire comprised 15 close-ended questions, ensuring a structured investigation into how various quantitative variables interacted within the research context (Hair Jr, Page, & Brunsveld, 2019; Činčalová et al., 2024).

3.5. Research Strategy

A cross-sectional survey method was selected to gather data from a statistically valid sample of manufacturing firms in Harare. Of the respondents, 60% were males aged 20 to 50, while the remaining participants included females from

diverse age groups, ensuring a comprehensive sample. The survey included 15 close-ended questions and was pre-tested on 10 respondents to enhance clarity and effectiveness. The flexibility of the survey allowed for broad participation, although self-reported data was acknowledged as potentially biased (Mataruka et al., 2024; Mataruka, 2022; Ball, 2019).

3.6. Time Horizon

The study adopted a cross-sectional approach, collecting data at a single point in time due to limited resources and time constraints (Ratten, 2023). This method provided a snapshot of CE adoption among the surveyed firms, facilitating immediate insights into their operational practices.

DISCUSSIONS OF FINDINGS

4.1 Descriptive Statistics

As shown in Table 1, 3R has the highest standard deviation.

Table1: Descriptive Statistics

Code	Factor	Number of observations	SD	mean	Minimum	Maximum
GP	Government policy	100	14.9	46.78	11	16
CF	Cultural factors	100	2.87	1.90	1	5
SF	Social factors	100	0.61	0.56	2	4
BG	Big data	100	3.89	3.89	2	15
3R	3R	100	45.7	50.01	4	59
SN	Subjective norms	100	0.40	0.35	5	15
EB	Ecological balance	100	10.11	8.92	7	20
CB	Consumer behaviour	100	3.70	2.23	11	49
EP	Environmental protection	100	0.51	0.46	10	21

Prepared by Authors 2024

4.2 Multicollinearity Tests

Table 2 demonstrates that all variables are within the threshold of 0.80, suggesting that they are independent.

Table 2 Multicollinearity tests

code	GP	CF	SF	BG	3R	SN	EB	CB	EP
GP	1.00								
CF	-0.09	1.00							
SF	-0.02	0.05	1.00						
BG	0.40	-0.11	0.04	1.00					
3R	-0.04	0.05	-0.05	0.01	1.00				
SN	-0.05	0.06	0,05	0.03	-0.07	1.00			
EB	0.07	0.05	0,01	0.05	-0.04	0.23	1.00		
CB	0.07	0.06	0.03	0.01	0.03	0.07	0.08	1.00	
EP	0.06	0.03	0.12	0.08	0.10	0.08	0.01	0.12	1.00

Source Prepared by Authors (2024)

4.3 Logit Regression Output

Findings show that government policies towards ecology, cultural factors, social factors, 3R, subjective norms and consumer behaviour influence the probability of adopting a circular economy in Zimbabwe. Factors like GP, CF, SN and CB have negative coefficients, implying that an increase by one unit will reduce the adoption of a circular economy in Zimbabwe.

Table 3: Logit Regression Output

Factor	Coefficient	Standard error	z-score	PR>z
hGP	-.02	.01	-3.02	0.03*
hCF	-.25	.21	-2.10	0.00**
hSF	.15	.32	5.45	0.00**
hBD	.04	.12	0.24	0.78
3R	.02	.10	3.45	0.05*
SN	-1.05	.45	-3.45	0.00
EB	-.25	.02	-0.45	0.48*
CB	-.15	-.02	-3.96	0.00**
EP	-.17	.34	-0.47	0.00**

Pseudo R square: 016 P> chi-square: 0.00 Log-likelihood: -187 N: 100 LR chi-square:56				

Significant at 95% * Significant at 99% level **
Source Prepared by Authors (2024)

4.4 Log Odds Ratios

Table 4 below presents the odds ratios finding, which shows how a unit increase in a factor increases the odds of the country transiting to a CE. The odds ratio of GP is 0.88, indicating that a change of one unit decreases the odds of accepting a CE in Zimbabwe. The odds ratio of CF is 0.74, suggesting a 1% change in the adoption of CE if an environmental culture is incalculated in consumers and producers. SF have an odds ratio of 2.25, implying that a unit change in social factors increases the probability of transitioning to a CE.

Table 4: Log Odds Ratio

Factor	Odds Ratio	Standard Error	Z-score	P>Izl
hGP	.88	.01	-3.05	.03
hCF	.74	.12	-3.10	.05
hSF	2.25	.65	4.85	.00
BD	1.03	.10	.65	.78
3R	1.01	.01	2.26	.00
SN	.44	.25	-3.60	.00
EB	.97	.09	.98	.65
CB	.78	.07	-3.98	.01
EP	.98	.42	-3.85	.03

Source Prepared by Authors (2024)

4.5 Marginal Effects

Proper interpretation of marginal effects (ME) is essential in discussing Logit regression equations since ME show the magnitude of the effects of changes in the regressor variable on the regressand variable. (Cameron and Trivedi, 2009). The marginal effects are shown in Table 5 below.

Table 5: Marginal Effects

variable	Dy/Dx	Standard error	Z-score	P>| z|	Mean
hGP	-0.46	0.01	-5.10	0.01	45.50
hCf	-0.04	0.11	-3.32	0.02	6.60
hSF	0.12	0.02	2.96	0.05	5.41
hBD	0.05	0.05	0.34	0.65	8.55
3R	0.05	0.03	2.97	0.00	60.66
SN	-0.17	0.06	-0.30	0.24	10.48
EB	-0.05	0.08	-0.70	0.46	8.70
CB	0.25	0.05	-2.88	0.00	11.30
EP	0.55	0.10	-4.23	0.01	0.60
Marginal effect after logit y=Pr(CE/(predict=088					

[*] dy/dx represents a discrete change of the dummy variable from 0 to1
Source Prepared by Authors (2024)

The predicted probability of adopting CE in Zimbabwe is 0.85, indicating that 88% of consumers and producers will likely transition to a CE. This finding implies that the government must develop laws that protect the environment and ecology, particularly that force producers to promote sustainable use of non-renewable resources. For example, offering subsidies and incentives to firms that abandon linear production systems may allow these firms to reduce the costs of transiting to a CE. It also allows firms to be competitive by redesigning innovative business models, especially those that allow lower carbon, sulphur, and nitrous emissions during production. This finding is in line with similar studies (see Patwa et al., 2021; Jones & Calster, 2019; Koval & Weis, 2019; Arapostathis & Fotopoulos, 2019; Chen et al., 2019; Guttentag et al., 2018; Choe et al., 2017). The coefficient of CF is 0.04, demonstrating that as culture evolves, producers and consumers may want to shift to recycling products. The hypothesis was supported at a 99% level of confidence. The results agree with several studies using cultural factors as an essential determinant of circular economy (see

Patwa et al., 2021; Hwang & Griffiths, 2017; Lutz et al., 2017; Khor et al., 2017). The finding has clear implications for transitioning to a CE in Zimbabwe. Societal beliefs, norms, and values influence the adoption of CE. These factors are also related to cultural, social and perhaps psychological factors. For instance, consumer ethics and societal and cultural factors can influence how consumers reuse, recycle and restore products. Social factors increase the probability of transiting to a CE by 15% at ($P<0.04$), a result confirmed by Booker and Meelan (2017) and Lee and Kim (2018). Reusing, recycling and restoring (3R) products increases the probability of accepting a circular economy by 5% at a 5% significance level. 3R helps develop key principles of CE, such as cascading, longevity, renewability, upgrade, reuse, dematerialisation, refurbishment, and capacity sharing. This finding implies that transforming the economy from a linear towards a circular economy is possible, especially if the emphasis is placed on environmental quality and societal well-being. The effects of resource inefficiency, waste landfilling and climatic changes have become a significant problem for the country, hence the urgent need for the government to take responsibility for quickly developing policies that prompt a cultural orientation towards adopting a sustainable circular economy. Reusing, recycling and restoring manufactured products help to reduce the exhaustion of non-renewable resources (Kozhukhova et al., 2019; Chen et al., 2019). The behaviour of consumers increases the probability of accepting CE by a factor of 0.25 at a 99% confidence level. Consumer awareness is considered critical in accepting CE, a result confirmed by many studies (Parida et al., 2019; Awasthi et al., 2019; Confente et al., 2019).

5. Conclusion

The country can safely transition from the TLE to a CE if it addresses production costs and innovative business models that allow product reuse, restoration, and recycling. Offering subsidies and incentives to businesses that promote circular economies could be another culvert for facilitating smoother adoption of a CE. We used a probabilistic regression equation to determine key factors that increase the likelihood of moving towards a CE.

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The authors of this article carried out the same tasks concerning the study. Specific areas were the background concept and theoretical frame (all authors), updating and editing the original background (Mataruka & Muzurura), Literature updating (Mataruka & Muzurura), methodology (all authors), data management (Chikosha & Tarirai), and data analysis (all authors), discussion of results (all authors), final editing, submission, and correspondence (Mataruka & Muzurura).

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The article followed all ethical standards appropriate for this kind of research.

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References

Abbey, J. D.; Kleber, R.; Souza, G.C.; Voigt, G., (2017). The Role of Perceived Quality Risk in Pricing Remanufactured Products. *Production. Operation. Management. 26*, 100–115.

Abbey, J. D.; Meloy, M.G.; Guide, V.D.R.; Atalay, S., (2015). Remanufactured products in closed-loop supply chains for consumer goods. *Production. Operation. Management* Vol. 24 No. 3, 488–503.

Abdar, M.; Yen, N.Y., (2017) Design of A Universal User Model for Dynamic Crowd Preference Sensing and Decision-Making Behaviour Analysis. *IEEE Access*, *5*, 24842–24852.

Aityan, S. K. (2022). *Business research methodology: research process and methods*. Springer.Bryman, A. (2016). *Social research methods* (5th ed.). Oxford: Oxford University Press.

Ajzen, I., (1991). The theory of planned behaviour. *Organisation Behaviour and Human Decision. Process. 50*, 179–211.

Alkhodary, D., (2023). Integrating Sustainability into Sustainable Management. A Path Towards Long-Term Business Success. *International Journal of Professional Business Review 8*(4): 01-32

Awasthi, A. K., Li, J., Koh, L., & Ogunseitan, O. A. (2019). Circular economy and electronic waste. *Nature Electronics*, *2*(3), 86-89.

Ball, H. L. (2019). Conducting online surveys. *Journal of human lactation*, *35*(3), 413–417.

Bardhi, F.; & Eckhardt, G.M. (2012). Access-Based Consumption: The Case of Car Sharing. *Journal of. Consumption. Research*, *39*, 881–898.

Benoit, S., Baker, T.L., Bolton, R.N., Gruber, T., & Kandampully, J., (2017). A triadic framework for collaborative consumption (CC): Motives, activities, resources & capabilities of actors. *Journal of Business Research. 79*, 219–227.

Binninger, A.S., Ourahmoune, N., & Robert, I., (2015). Collaborative consumption and sustainability: A discursive analysis of consumer representations and collaborative website narratives. *Journal of Applied. Business. Research*, *31*, 969–986.

Bocken, N. M., & Geradts, T. H. (2020). Barriers and drivers to sustainable business model innovation: Organization design and dynamic capabilities. *Long range planning*, *53*(4), 101950.

Bocken, N., Strupeit, L., Whalen, K., & Nußholz, J. (2019). A review and evaluation of circular business model innovation tools. *Sustainability*, *11*(8), 2210.

Bocken, N. M., De Pauw, I., Bakker, C., & Van Der Grinten, B. (2016). Product design and business model strategies for a circular economy. *Journal of Industrial and Production Engineering*, *33*(5), 308-320.

Böcker, L., & Meelen, T., (2017). Sharing for people, planet or profit? Analysing motivations for intended sharing economy participation. *Environ. Innovation. Soc. Transit.*, *23*, 28–39.

Borrello, M.; Caracciolo, F.; Lombardi, A.; Pascucci, S.; & Cembalo, L., (2017) Consumers' Perspective on Circular Economy Strategy for Reducing Food Waste. *Sustainability*, *9*, 141.

Catulli, M., Cook, M., Potter, S., (2017a). Product Service Systems Users and Harley Davidson Riders: The Importance of Consumer Identity in the Diffusion of Sustainable Consumption Solutions. *Journal of Industrial. Ecology*, Vol. 21 (5): 1370–1379.

Chandrasekaran, S. T., Thiruvenkadam, T. & Subrahmanian, Mu. (2019). Impact of Online Learning on Teenagers Buying Behaviour. *The Online Journal of Distance Education and e-Learning, 7*(2), 89.

Chen, A. S., Song, Y., & Anggraeni, K. N., (2019). Promoting industrial symbiosis in China's industrial parks as a circular economy strategy. The Circular Economy and the Global South: *Sustainable Lifestyles and Green Industrial Development134*.

Chilombe, Joseph, and Symon Chiziwa. "CSR and Environmental Responsibility Eco-friendly Practices. In Corporate Social Responsibility-A Global Perspective. IntechOpen, 2024.

Cho, S., Park, C.W., Kim, J., (2017). Leveraging Consumption Intention with Identity Information on Sharing Economy Platforms. *Journal of Computer. Information. System*, 1–10.

Činčalová, S., Mataruka, L., Masarova, K., & Muzurura, J. (2024). Driving Profitability Through Social Responsibility: Unveiling the Success Story of Automotive Plant Stellantis Slovakia. *Business Management/Biznes Upravlenie*, (2).

Confente, I., Scarpi, D., & Russo, I., (2019). Marketing a new generation of bio-plastics products for a circular economy: The role of green self-identity, self-congruity, and perceived value. *Journal of Business Research. 112*, 431–439.

Cullen, J.M. (2017). Circular economy: theoretical benchmark or perpetual motion machine? *Journal of Industrial Ecology*, 21 (3): 483–486.

Davidson, A., Habibi, M.R.; & Laroche, M., (2017). Materialism and the sharing economy: A cross-cultural study of American and Indian consumers. *Journal of Business. Research*, *82*, 364–372.

Decrop, A.; del Chiappa, G.; Mallargé, J.; & Zidda, P., (2018) Couchsurfing has made me a better person and the world a better place: The transformative power of collaborative tourism experiences. *Journal of Travel Tourism and. Marketing. 35*, 57–72.

Dewberry, E.; Cook, M.; & Angus, A., (2013). Gottberg, A.; Longhurst, P. Critical reflections on designing product-service systems. *Decision. Journal.* 2, *16*, 408–430.

Edbring, E.G., Lehner, M.; & Mont, O., (2016) Exploring consumer attitudes to alternative consumption models: Motivations and barriers. *Journal of. Cleaner Production*, *123*, 5–15.

Ellen MacArthur Foundation. (2015). *Growth within: A Circular Economy Vision for a Competitive Europe;* Ellen MacArthur Foundation: Cowes, UK, 2015.

Ertz, M., Durif, F., & Arcand, M., (2017). Life after death? Study of goods multiple lives practices *Journal of Consumer Marketing*, 34 (2): 108-118.

Evans, D.M. (2018). What is consumption, where has it been going, and does it still matter? *Sociology. Rev.*

Garg, M. & Sharma, P. (2019). Stakeholder engagement and sustainable development: A systematic review. *International Journal of Professional Business Review, 4*(2), 45-55

Gargiulo, E., Giannantonio, R., Guercio, E., Borean, C., & Zenezini, G. (2015). Dynamic Ride Sharing Service: Are Users Ready to Adopt it? *Procedia Manufacturing*, *3*, 777–784.

Geissdoerfer, M., Savaget, P., Bocken, N., & Hultink, E. J., (2017). The Circular Economy—A new sustainability paradigm? *Journal of Clean Production*,*143*, 757–768.

Ghisellini, P., Cialani, C. & Ulgiati, S., (2016). A review on circular economy: the expected transition to a balanced interplay of environmental and economic systems, *Journal of Cleaner Production, Vol. 114: 11-32.*

Ghisellini, P., Ji, X., Liu, G., & Ulgiati, S. (2018). Evaluating the transition towards cleaner production in China's construction and demolition sector: A review. *Journal of Cleaner Production, 195, 418-434.*

Godelnik, R., (2017). Millennials and the sharing economy: Lessons from a 'buy nothing new, share everything month' project. *Environ. Innovation Sociology. Transition*, *23*, 40–52.

Gruen, A., (2017). Design and the creation of meaningful consumption practices in access-based consumption. *Journal of Marketing Management*, *33*, 226–243.

Guo, B., Geng, Y., Sterr, T., Zhu, Q., & Liu, Y., (2016). Investigating public awareness on circular economy in western China: A case of Urumqi Midong. *Journal of Clean Production*, *142*, 2177–2186.

Gupta, D., & Koontz, T. M., (2019). Working together? Synergies in government and NGO roles for community forestry in the Indian Himalayas. *World Development, 114*, 326–340.

Guttentag, D., Smith, S., Potwarka, L., & Havitz, M., (2018). Why Tourists Choose Airbnb: A Motivation-Based Segmentation Study. *Journal of Travel Research.*, *57*, 342–359.

Haas, W., Krausmann, F., Wiedenhofer, D., & Heinz, M. (2015). How circular is the global economy: An assessment of material flows, waste production, and recycling in the European Union and the world in 2005. *Journal of Industrial Ecology*, *19*(5), 765-777.

Hair Jr, J., Page, M., & Brunsveld, N. (2019). *Essentials of business research methods*. Routledge.

Hazen, B.T., Overstreet, R.E., Jones-Farmer, L.A.& Field, H.S., (2017). The role of ambiguity tolerance in consumer perception of remanufactured products. *International Journal of Production Economics*, 135(2): 781-790.*135*, 781–790.

Hobson, K.; Lynch, N.; Lilley, D.; & Smalley, G., (2018) Systems of practice and the Circular Economy: Transforming mobile phone product service systems. *Environment. Innovation. Sociology. Transition*, *26*, 147–157

Hofmann, E., Hartl, B., & Penz, E., (2017). Power versus trust—What matters more in collaborative consumption? *Journal of Service Marketing*, *31*, 589–603.

Huber, A., (2017). Theorising the dynamics of collaborative consumption practices: A comparison of peer-to-peer accommodation and cohousing. *Environ. Innovation. Sociology. Transition.*, *23*, 53–69.

Hwang, J., & Griffiths, M. A. (2017). Share more, drive less: Millennials value perception and Behavioral intent in using collaborative consumption services. *Journal of Consumption. Marketing*, *34*, 132–146.

Iran, S., & Schrader, U., (2017). Collaborative fashion consumption and its environmental effects.*Fashion Marketing Management International. Journal*, *21*, 468–482.

Jabbour, C. J. C., de Sousa Jabbour, A. B. L., Sarkis, J., & Godinho Filho, M., (2019). Unlocking the circular economy through new business models based on large-scale data: An integrative framework and research agenda. *Technological Forecasting and Social Change, 144*, 546–552.

Jena, S.K., & Sarmah, S.P., (2015). Measurement of consumers' return intention index towards returning the used products. *Journal of Clean Production*, *108*, 818–829.

Khor, K.S., & Hazen, B.T., (2017). Remanufactured products purchase intentions and behaviour: Evidence from Malaysia. *International Journal of Production Research*, 55(8): 2149-2162.

Kirchherr, J., Reike, D., & Hekkert, M., (2017). Conceptualising the circular economy: An analysis of 114 definitions. *Resource. Conservative. Recycle,*127, 221–232.

Klöckner, C.A., (2015). The Psychology of Pro-Environmental Communication, Palgrave Macmillan: London, UK, 2015, Volume 67.

Kozhukhova, M., Amanzholova, B., & Zhiyenbayev, M., (2019). The Legal Regulation of Energy Efficiency and Energy Saving Policies in the Republic of Kazakhstan. *International Journal of Energy Economics and Policy, 9*(4), 54.

Kumar, A., (2019). Exploring young adults' waste recycling behaviour using an extended theory of planned behaviour model: A cross-cultural study. *Resources, Conservation and Recycling, 141*, 378–389.

Lakatos, E.S., Dan, V., Cioca, L.I., Bacali, L., & Ciobanu, A.M. (2016). How supportive Romanian consumers of the circular economy concept are: a survey, Sustainability, Vol. 8 (8): 789-796.

Lawson, J., Gleim, M.R., Perren, R., & Hwang, J. (2016). Freedom from ownership: An exploration of access-based consumption. *Journal of. Business. Research*, *69*, 2615–2623.

Lee, S., & Kim, D.Y., (2018). Brand personality of Airbnb: Application of user involvement and gender differences. *Journal of Travel Tourism and Marketing*, *35*, 32–45.

Liedtke, C., Baedeker, C., Hasselkuß, M., Rohn, H., & Grinewitschus, V., (2015). User-integrated innovation in Sustainable Living Labs: An experimental infrastructure for researching and developing sustainable product-service systems. *Journal of Clean Production*, *97*, 106–116.

Lutz, C., Hoffmann, C.P., Bucher, E., & Fieseler, C., (2017). The role of privacy concerns in the sharing economy. *Information and Communication. Sociology*, *4462*, 1472–1492.

Mataruka, L., (2022). Information Systems Resources, Competitive Advantage, and Zimbabwe's Firm Performance: An Integration of the Resource-based View and Dynamic Capabilities View of the Firm, *International Journal of Economics, Commerce and Management, United Kingdom,* Volume 10 Issue 11, pp.259-282.

Mataruka, L., Činčalová, S., Mapokotera, C., Muzurura, J., & Mkumbuzi, W. (2024). Philanthropy's role in mediating the relationship between corporate social responsibility (CSR) and sustainable corporate performance (SCP) in Zimbabwe's service sector: Evidence from managerial cognitions. *African Journal of Commercial Studies*, *4*(1), 1-16.

Mathews, J. A., & Tan H. (2016). Circular economy: Lessons from China. *Nature* 531(7595): 440–442.

Möhlmann, M., (2015). Collaborative consumption: Determinants of satisfaction and the likelihood of reusing a sharing economy option. *Journal. Consumption. Behaviour*, *14*, 193–207.

Mugge, R., (2017). A consumer's perspective on the circular economy. In *Routledge Handbook of Sustainable Product Design*, Routledge: London, UK, pp. 374–390.

Muranko, Z., Andrews, D., Chaer, I., & Newton, E. J., (2019). Circular economy and behaviour change: Using persuasive communication to encourage pro-circular behaviours towards purchasing remanufactured refrigeration equipment. *Journal of Cleaner Production, 222*, 499–510.

Mutambara, E. & Muzurura, J., (2023). Factors influencing the successful marketing of bioplastic products in Zimbabwe. Towards a Circular Economy by 2030 *International Journal of Innovative Research and Scientific Studies*: 6(2):389-398.

Mylan, J., (2017). Understanding the diffusion of Sustainable Product-Service Systems: Insights from the sociology of consumption and practice theory. *Journal of Clean Production*, *97*, 13–20.

Nansai, K., K. Nakajima, S. Kagawa, Y. Kondo, S. Suh, Y. Shigetomi, & Oshita Y., (2014). Global flows of critical metals necessary for low-carbon technologies: The case of neodymium, cobalt, and platinum. *Environmental Science & Technology* 48(3): 1391–1400.

Neto, J.Q.F., Bloemhof, J. & Corbett, C. (2016). Market prices of remanufactured, used and new items: Evidence from eBay. *International Journal of Production Economy*, *171*, 371–380.

Netter, S. (2017). User Satisfaction and Dissatisfaction in the App Sharing Economy. In *Sustainability in Fashion*, Springer International Publishing: Cham, Switzerland, pp. 217–244.

Pappas, N. (2017). The complexity of purchasing intentions in peer-to-peer accommodation. *Int. J. Contemporary. Hospitality Management*, *29*, 2302–2321.

Parida, V., Burstrom, T., Visnjic, I., & Wincent, J., (2019). Orchestrating industrial ecosystem in the circular economy: A two-stage transformation model for large manufacturing companies. *Journal of Business Research, 101*, 715–725.

Park, H., & Armstrong, C.M.J., (2017). Collaborative apparel consumption in the digital sharing economy: An agenda for academic inquiry. *International Journal of Consumption. Studies*, *41*, 465–474.

Piscicelli, L., Cooper, T., & Fisher, T., (2017). The role of values in collaborative consumption: Insights from a product-service system for lending and borrowing in the UK. *Journal of Cleaner Production*, 97(1): 21–29.

Pizzol, H.D., de Almeida, S.O.; & do Soares, M.C., (2017). Collaborative consumption: A proposed scale for measuring the construct applied to a carsharing setting. *Sustainability*, *9*, 703.

Rajkamal S. J., Senthil VA.,Velmurugan BM. & Suryakumar C. (2021). Green Entrepreneurs Challenges and Innovation: The Struggles They Face. *International Journal of Professional Business Review, 7*(2):1-21

Rashid, A., & Chaturvedi, A. (2019). Cloud computing characteristics and services: A brief review. *International Journal of Computer Sciences and Engineering, 7*(2), 421–426.

Ratten, V. (2023). *Research Methodologies for Business Management*. London: Routledge.Sloan, L., & Quan-Haase, A. (2022). *The SAGE handbook of social media research methods*.

Repo, P., Anttonen, M., Mykkänen, J., & Lammi, M. (2018). Lack of Congruence between European Citizen Perspectives and Policies on Circular Economy. *European Journal of Sustainable. Development*, *7*, 249–264.

Rizos, V., Behrens, A., Van Der Gaast, W., Hofman, E., Ioannou, A., Kafyeke, T., Flamos, A., Rinaldi, R., Papadelis, S., & Hirschnitz-Garbers, M., (2016). Implementation of circular economy business models by small and medium-sized enterprises (SMEs): Barriers and enablers. *Sustainability*, *8*, 1212.

Roos, D., & Hahn, R., (2017). Understanding Collaborative Consumption: An Extension of the Theory of Planned Behaviour with Value-Based Personal Norms. *Journal Business Ethics*, 1–19.

Santamaria, L., Escobar-Tello, C., & Ross, T., (2016). Switch the channel: Using cultural codes for designing and positioning sustainable products and services for mainstream audiences. *Journal of Clean Production*, *123*, 16–27.

Schivinski, B., & Dabrowski, D. (2016). The effect of social media communication on consumer perceptions of brands. *Journal of Marketing Communications*, *22*(2), 189-214.

Schivinski, B., Langaro, D., & Shaw, C. (2019). The influence of social media communication on consumer attitudes and behavioural intentions concerning brand-sponsored events. *Event Management*, *23*(6), 835–853.

Schor, J. (2014). Debating the Sharing Economy; Great Transition Initiative: Cambridge, MA, USA, 2014, pp. 1–19.

Schotman, H., & Ludden, G.D.S., (2014). User acceptance in a changing context: Why some product-service systems do not suffer acceptance problems. J*ournal of Decision. Research*, *12*, 188–203.

Shahidullah, S. M., (2019). Capacity-building in science and technology in the third world sector. A literature review. *Journal of Cleaner Production, 178, 618–643.*

Singhal, D., Tripathy, S., & Jena, S. K. (2019). Acceptance of remanufactured products in the circular economy: An empirical study in India. *Management Decision, 57*(4), 953–970.

Solér, C., Baeza, J., & Svärd, C., (2015). Construction of silence on issues of sustainability through branding in the fashion market. *Journal of Marketing Management*, *31*, 219–246.

Stacey, P.K., & Tether, B.S., (2015). Designing emotion-centred Product Service Systems: The case of a cancer care facility. *Decision Studies*, *40*, 85–118.

Tang, F., & Zaichkowsky, J. (2019). Special issue introduction: Consumer ethics in the Asia Pacific Region. *Asia Pacific Journal of Marketing and Logistics, 31*(3), 578–579.

Tukker, A. (2015). Product services for a resource-efficient and circular economy–a review. *Journal of Cleaner Production*, *97*, 76–91.

Van Eijk, F., (2015). Barriers & Drivers towards a Circular Economy: Literature Review, *Acceleration: Naarden, The Netherlands*, 2015, pp. 1–138.

Van Weelden, E., Mugge, R., & Bakker, C. (2016). Paving the way towards circular consumption: Exploring consumer acceptance of refurbished mobile phones in the Dutch market. *Journal of Cleaner Production*,*113*, 743–754.

Varju V, Wojcik , M, & Knieling, J. (2019). Urban regions shifting to a circular economy: understanding challenges for new ways of governance. *Urban Plan 4*(3):19–31

Wang, Y., Huscroft, J.R., Hazen, B.T., & Zhang, M. (2018). Green information, green certification and consumer perceptions of remanufactured automobile parts. *Resource. Conservation and. Recycling*, *128*, 187–196.

Welch, D., Keller, M., & Mandich, G. (2017). Imagined futures of everyday life in the circular economy. *Interactions*, *24*, 46–51

Xu, X., Zeng, S., & He, Y., (2017). The influence of e-services on customer online purchasing behaviour toward remanufactured products. *International. Journal of Production. Economy*, *187*, 113–125.

Yang, S., & Ahn, S., (2016). Impact of motivation for participation in the sharing economy and perceived security on attitude and loyalty toward Airbnb. *Information*, *19*, 5745–5750.

Ylä-Mella, J., Keiski, R.L., & Pongrácz, E., (2015). Electronic waste recovery in Finland: Consumers' perceptions towards recycling and re-use of mobile phones. *Waste Management. 45*, 374–384.

Zhang, L., Xue, L., & Zhou, Y. (2019). How do low-carbon policies promote green diffusion among alliance-based firms in China? An evolutionary-game model of complex networks. *Journal of Cleaner Production, 210*, 518–529.

Zink, T., Geyer, R., & Startz R., (2016). A market-based framework for quantifying displaced production from recycling or reuse. *Journal of Industrial Ecology* 20(4): 719–729.