Circular economy adoption by SMEs in the emerging markets: towards a multilevel conceptual framework

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Abstract

Adding to the growing literature on circular economy (CE) and employing the theoretical lens of change management, this research explores SMEs' challenges in the emerging markets context of India for adopting CE practices. We use a multi-case qualitative design, interviewing senior leaders and owners of Indian SMEs, CE intermediaries and two large firms on the nature and extent of critical barriers and enablers of CE adoption. Including CE market intermediaries, sustainability and CE managers of large organizations, who are required to educate and incentivize CE adoption of their SME value chain members, we analyze the barriers and opportunities from both sides of the coin. We develop a multilevel theoretical framework grounded in CE and change management literature, which presents the nature and extent of CE activities, barriers and contextual enablers of SMEs' adoption of CE in emerging markets. Implications for policy, theory and practice are also discussed.

Keywords: Circular economy; change management; India; SMEs; theory-building

1. Introduction

The circular economy (CE) concept has its origins in industrial ecology and environmental sustainability theories (Liu et al., 2018; Saavedra et al., 2018) and challenges the prevailing idea of sustaining linear economic growth, which assumes that resources are infinite (Garcés-Ayerbe et al., 2019; Geissdoerfer et al., 2017). Since Kenneth Boulding's (1966) prediction of a *spaceman economy*, the concept of a CE has gained prominence, attracting academics, policymakers and entrepreneurs to progress towards a new economic model whereby resources and energy from discarded products can be re-introduced back into the economic system (The Ellen MacArthur Foundation, 2012; Rizos et al., 2015, 2016). The pressure on depleting natural resources, global warming and environmental pollution have posed severe environmental, social and economic consequences for humans, businesses and governments, forcing them to reconsider their relationships with the natural environment (Geissdoerfer et al., 2017; Prieto-Sandoval, Jaca & Ormazabal, 2018).

The above issues have also led to the adoption of the concept of CE initiatives by several countries (Korhonen, Honkasalo & Seppälä, 2018; OECD, 2017; Singh, Chakraborty & Roy 2018), creating new opportunities for businesses, employment generation, reduction in material costs, and improving the security and stability of supply chains (Kalmykova, Sadagopan & Rosado, 2018). Despite these positive developments in several countries, the adoption of CE ideas by small and medium-sized enterprises (SMEs) has not been fully embraced. SMEs are part of the industrial ecosystem (Ormazabal, Prieto-Sandoval, Puga-Leal & Jaca, 2018) and use materials and energy from and supply to larger enterprises (Park, Sarkis & Wu, 2010). Despite some initial steps by a minority of SMEs, most of them are still adopting a reactive approach to environmental issues and view investment in CE projects as an economic burden and are yet to establish a business case link between CE practices and profit (Ormazabal et al., 2018).

The current literature on the nature and extent of CE activities undertaken by SMEs in emerging market economies points to enormous opportunities for value creation (Agyemang et al., 2019; Geng & Doberstein, 2013), such as by lowering their greenhouse gas emissions and extending the product life of goods produced (Agyemang et al., 2019; The Ellen MacArthur Foundation, 2015) and creating a new industrial ecology of CE activities (Kalmykova et al., 2018). Our paper contributes to the literature on CE in SMEs from emerging markets in several ways. First, we address the research on CE adoption in SMEs in emerging markets, keeping in mind the Special Issue's call on challenges and barriers in adopting CE by SMEs in emerging markets. Second, this scholarship is also critical given the plethora of challenges that SMEs face in general and, more specifically, expect to do more in this vital area. Finally, we develop a novel conceptual framework of CE adoption through the theoretical lens of managing change and considering CE as an innovative approach to sustainably managing businesses. This theoretical lens shows *how* owners of SMEs and CE intermediaries can play a role in overcoming the barriers and facilitate the adoption of CE approaches by SMEs in India. We categorize these influences as cognitive, volitional and action influences on the adoption of CE practices. We further scrutinized these barriers on their amplification scale, i.e. the level at which they affect SMEs. For this, we argue that these barriers exist on a continuum encompassing at macro-, meso- micro-level. Finally, we identify three CE adoption practices or enablers (*rituals, recitals,* and *routines*) employed by SMEs to implement CE effectively. These practices are depicted in our conceptual framework as vital in understanding how, despite the three levels of cognitive, action and volitional barriers affecting CE adoption, and using the 4R principles of reducing, reusing, recycling and repurposing these additional three Rs or the 'soft' or human factors enable the successful adoption of the 4R CE principles.

We build on the popular conceptualization by the Ellen MacArthur Foundation, a CE,

which they defined as "an industrial economy that is restorative or regenerative by intention and design" (2013b: 14). We define CE as "*a form of a significant change in managerial approach focusing on the innovation of an organization's business model, processes and new ways of thinking about its product design and underlying manufacturing processes for sustainable growth*". We note that resource use must follow the widely cited CE principles of reducing, reusing and recycling (King et al., 2006; Brennan et al., 2015; Dey et al., 2020; Ghisellini et al., 2016. We further note that these principles are operant at multiple system levels- micro, meso and macro (Fang et al. 2007; Sakr et al. 2011; Jackson et al. 2014) and explore additional techniques from an innovation and change management perspective (Nilakant & Ramanarayan, 2006) to sustain the implementation of a CE approach in an emerging market context, focusing on SMEs.

Environmental practices can help enterprises move towards a sustainable future and reap economic, environmental, and social benefits; however, few studies focus on emerging economies (Winans, Kendall & Deng, 2017). Even fewer consider the role of SMEs in embracing the concept. There are several barriers identified in the literature on CE adoption in SMEs. From a systems perspective, there exist macro-, meso and micro-level barriers (Garcés-Ayerbe et al., 2019; Fang et al. 2007; Govindan & Hasanagic, 2018; Guldmann & Huulgaard, 2020; Jackson et al. 2014; Rizos et al., 2015, 2016; Sakr et al. 2011). Moreover, the evidence from SMEs' adoption of CE in emerging markets, such as India, is even sparse (Singh et al., 2018).

The systems-level perspective recognizes changes are needed at a micro-level (e.g. product and processes levels through managers', leaders' and the owners' exercise of personal agentic resources (Malik & Sanders, 2021), highlighting a cultural and behavioural change operant at this level (Rizos et al., 2016). Furthermore, managers' risk-averse behaviours towards CE adoption result in poor value propositions evaluation (Liu & Bai,

2014). Thus, micro-level resistance to change is a significant hurdle to CE adoption for SMEs (Rizos et al., 2016). Similarly, at a meso-level, lack of capital and support, such as industrial parks and CE practice communities, present barriers to changing business models from linear to CE (Fang et al., 2007). Such a move requires implementing various operational and managerial practice changes (Malik et al., 2021; Rizos et al., 2016).

A related issue is policy stakeholders and large businesses' inability to articulate the benefits of the CE approach for SMEs (Ritzén & Sandström, 2017). Therefore, a successful transition to a CE approach requires collaboration, knowledge exchange and diffusion of information from different stakeholders in an SME's value chain (Rizos et al., 2016). SMEs' problems are further compounded as the nature of such information is often confidential, preventing the broader dissemination and development of CE business models (Van Buren et al., 2016). Furthermore, the costs (Rizos et al., 2016), technical knowledge, and skills barriers (Shi, Peng, Liu & Zhong, 2008) make it harder for SMEs. Finally, at a macro-level, lack of government aid and legal compliance costs and limited support for environmental initiatives (Rizos et al., 2016), coupled with several institutional voids in emerging markets, such as lack of unified platforms for promoting the CE concepts, further discourages adoption of such innovations (Geng & Doberstein, 2008). Furthermore, in the absence of close collaborations among all parties in an SME's value chain, suppliers are generally reluctant to engage in such innovative initiatives, and as a result, organizational inertia takes over (Nilakant & Ramanarayan, 2006; Rizos et al., 2016). On the other end, as consumers are not fully aware of the benefits of CE, there is no substantial pressure for SMEs to develop CE business models (Geng & Doberstein, 2008).

The above suggests multifaceted, complex, and myriad challenges to CE adoption by SMEs in an emerging market context, which warrant further exploration of how SMEs manage change (Nilakant & Ramanarayan, 2006) from a linear approach one that focuses on

CE principles. Therefore, this paper contributes to the literature on the 'human side' of CE adoption by employing the theoretical lens of change management (Burnes, 2004; Jabbour et al., 2019; Kotter, 2007; Nilakant & Ramanarayan, 2006; Yang et al., 2021) and noting the importance of leadership (Moktadir et al., 2020; Saini & Agarwal, 2020) in the adoption of CE principles in an emerging market context, such as India. Such an approach is timely and relevant as a move from linear to a circular economy is a significant paradigm shift for businesses, including SMEs and those operating in emerging markets. As an effective change management program, it is critical to understand the barriers and enablers for adopting CE by SMEs in emerging markets.

This research employs a multi-case qualitative case study design of interviewing senior leaders and owners of SMEs regarding their experiences of the barriers they face in adopting nature CE approaches. In addition to SME's interviews, we interviewed innovative CE market intermediaries, sustainability and CE managers of large organizations, who were required to educate and incentivize CE adoption of their value chain members. By analyzing the barriers and opportunities from both sides of the coin, we develop a novel conceptual model that encapsulates the nature of CE activities, its extent, and contextually grounded factors from an emerging market in the context of SMEs' adoption of CE. We structure the paper as follows. First, we offer a review of literature on change management and CE, the current debates and the challenges and opportunities, especially for SMEs from emerging markets, are discussed. Next, we present the research methodology employed, followed by analysis and findings from this research. Finally, we discuss our study's implications for theory and practice, identifying its limitations and directions for future research.

2. Literature review

2.1 CE literature: Debates, challenges and applications

The literature on CE and its conceptualization, definition, operant business models, its barriers and enablers identify many similarities with concepts from the literature on sustainability, innovation and new economic pathways to a CE (Govindan & Hasanagic, 2018; Guldmann & Huulgaard, 2020; Rizos et al., 2015). This stream of literature overlaps with the literature on effective management of significant workplace change and innovations (Burnes, 2004; Jabbour et al., 2019; Kotter, 2007; Nilakant & Ramanarayan, 2006; Yang et al., 2021). Significant disruptions have been caused by irresponsible ways society interacts with nature leading to the development of a CE concept (Geissdoerfer et al., 2017). CE's main aim is to enable enterprises' sustainable growth at the micro-, meso-, and macrosystem levels and reduce the unsustainable exploitation of natural resources, energy, and materials (Kirchherr et al., 2017). Application of the CE approach traverses areas, such as digitization, manufacturing design, remodelling, calculating greenhouse effect, waste, reuse, and remodelling (Blomsma et al., 2019; Franco, 2019; Lieder & Rashid, 2016; Rosa et al., 2019). The CE concept has proliferated across several global enterprises covering small and large-scale manufacturing industries, building industries (Benachio et al., 2020;), energy sectors, plastics (Ghisellini & Ulgiati, 2020; Mika, 2019; Ormazabal et al., 2018), textiles (Jia et al., 2020), and service sectors (Heyes et al., 2018). Govindan and Hasanagic's review (2018) categorizes CE research into five clusters: public policy and economic growth (Hazen et al., 2017; Park et al., 2010); environmental protection and climate change issues around protection of renewable resources (Hazen et al., 2017); societal issues focusing on job market growth and consumer awareness (Yuan et al., 2006); and developing efficient products.

Further, there are definitional and conceptual debates in the CE literature (Bocken et al., 2016; Kirchherr et al., 2017), ranging from concepts using an industrial ecology and cradle-to-cradle (Kalmykova et al., 2018) approach to modifying existing economic structures, materials and products (The Ellen MacArthur Foundation, 2015) for a restorative

and regenerative approach to designing products, components and materials that deliver the highest utility and value (Ellen MacArthur Foundation, 2013). Yuan et al. (2006) highlight the importance of circularity and the movement of materials in a closed-loop. There has been a debate over whether it is reasonable and realistic to expect firms to risk beyond their shareholders' interests and come up with circular business models and try to close their resource loops (Hazen, Mollenkopf & Wang, 2017). One main criticism of the CE approach is a lack of understanding of the theoretical foundations of circular business models and the financial outcomes of implementing such business models.

With the above diversity of definitions and applications, it is not surprising to see researchers using a range of methodological approaches, such as using quantitative analysis (Bassi & Dias, 2020; Dey et al., 2020; Geissdoerfer et al., 2017; Mika, 2019), Delphi techniques (Prieto-Sandoval et al., 2018), qualitative methods (Reike et al., 2018), including case study methods (Dey et al., 2020; Guldmann & Huulgaard, 2020; Honic et al., 2019; Hopkinson et al., 2018; Rizos et al., 2016), and multiple criteria decision-making methods (de Pádua Pieroni et al., 2018). However, a critical gap identified is the need for examining the relationship between entrepreneurs' social responsibility and sustainability within the CE framework and pathways to measure CE at the micro-level of each changing phase.

Several dominant approaches support the promotion of a CE. For example, researchers have proposed introducing a sustainable tax policy that provides tax exemptions for renewable resources and taxing the non-renewable resources will incentivize the change to a sustainable CE (Stahel, 2013). Another CE approach focuses on extending the product-life lifecycle of goods produced (Korhonen et al., 2018), such that it is restorative and the products can be used until their sustainability value is fully utilized (Kalmykova et al., 2018). Another approach, eco-efficiency, can be achieved by creating value by decreasing the environmental impact (Stahel, 2013). Eco-efficiency CE practices add economic value and

job creation, reduce greenhouse gas emissions, and improve resource security (The Ellen MacArthur Foundation, 2012; Korhonen et al., 2018). Finally, waste prevention has been noted as a vital purpose of the CE (Government of China, 2008), to deal with the ever-increasing exploitation and pollution resulting from linear models (Braungart, McDonough & Bollinger, 2007).

2.1.1 Challenges in adopting a CE business model

At a simplistic level, the CE focuses on the 3R principles: *reduce*, *reuse* and *recycle* (Ormazabal et al., 2018), which are delivered through five field actions, such as *take, make, distribute, use,* and *recover*. The literature is peppered with multiple 'R-frameworks' (Zhu, Geng & Lai, 2010), for example, the 3R (*reduce, reuse,* and *recycle*) and 4R (*reduce, reuse, recycle,* and *recover*) (Anastasiades, Blom, Buyle & Audenaert, 2020). Reducing refers to using less material (i.e. dematerialization) per unit of production. Reuse focuses on bringing products back into the economy after initial use. Recycling generally means processing mixed streams of post-consumer products or post-producer waste streams through usually expensive processes. Finally, recovery mostly captures energy embodied in waste through incineration (Reike, Vermeulen & Witjes, 2018). Others have focussed on implementing the 6-R framework: *repair, reduce, reuse, recycle, redesign*, and *remodelling* work for the design, implementation, and operation of a CE concept (Jia et al., 2020) or on strategy and industrial ecology for integrating resources in an eco-friendly and cost-effective manner (Rosa et al., 2019). For example, repair helps the product prolong its life (The Ellen MacArthur Foundation, 2013). Similarly, to extend the product's life cycle, remodelling and redesigning the products for an extended use value are viable approaches. Still, others have employed the **ReSOLVE** model, wherein the focus is on using ***Re****generated* materials, ***S****hared* products, ***O****ptimized* production systems, has a ***L****oop* for remanufacturing products or components and organic, ***V****irtualization* and exploration of cutting-edge and disruptive

technologies for promoting an ***E****xchange* for transferring old and non-renewable goods into advanced and renewable ones (Despeisse et al., 2017). Another 'R', 'Repurpose' appears in recent research (Coughlan et al., 2018; Morseletto, 2020; Schulz et al., 2020). This stream of research focuses on how, post the life of a product, can one repurpose the waste into use for an alternate product market. Examples of this approach can be seen in repurposing the end-of-life of notebook computers (Coughlan et al., 2018) and electronic vehicle batteries (Schulz et al., 2020). While several prescriptions and models are noted above, there is little advice on managing change and transition from a linear approach to a CE approach. This change warrants an understanding of implementing change to deploy the CE approach effectively.

2.2 Change management for implementing a CE approach

Irrespective of the variant of the adopted CE approach, the move towards a CE business model necessitates significant workplace change to the values, mindset, processes and practices (Burnes, 2004; Jabbour et al., 2019; Kotter, 2007; Nilakant & Ramanarayan, 2006; Yang et al., 2021). Firms have to change their traditional practices of the *take-make-waste* model with the *reduce-reuse-recycle-recover* practices (Milios, 2018; Prieto-Sandoval et al., 2018). The use of innovative approaches by implication triggers the need for managing change to a firm's business model, process or products (Malik & Rowley, 2015; Nilakant & Ramanarayan, 2006). New CE approaches will require a focus on recirculation of resources and energy, reducing resource demand, waste recovery techniques, and a multilevel approach to attain sustainable progress in a firm and, consequently, the society's transformation (Kristensen & Mosgaard, 2020). The attendant needs to adopt and implement CE design principles, its execution, and managing the operational issues, including performance scrutiny, employee training, and awareness, are significant changes the business will have to introduce and successfully manage (Liu et al., 2009). Such an ambitious transformation requires close coordination and collaboration between multiple stakeholders (Mathews &

Tan, 2011), reconfiguring internal resources to adapt to the changes in their operating environment (Demil & Lecocq, 2010). The literature on change management (e.g., Kotter, 2007; Nilakant & Ramanarayan, 2006) identifies three common barriers for implementing any new change initiative. These include barriers of *cognition*, which can be overcome by providing the rationale and articulating the benefits to affected employees/parties. Next, *volition or willpower* barriers can be overcome by forming a dominant coalition and mobilizing support and providing incentives to affected employees/parties. Finally, *action or procedural* barriers can be overcome by providing tools and techniques and building new capabilities through learning and development. Furthermore, a circular business model may also look daunting to the top management, as its implementation requires heavy upfront investments (Pokharel & Mutha, 2009) and overcoming inertia and redesigning existing processes to CE processes (Mitra & Datta, 2014; Nilakant & Ramanarayan, 2006). Thus, there is a critical role played by the leaders of these organizations (Moktadir et al., 2020; Saini & Agarwal, 2020) in allocating resources and setting the tone for managing change and overcoming the three commonly noted barriers above. Managing change is not only about cutting costs and focusing on efficiencies for a sustainable future (Linder & Williander, 2017), but it requires changing the mindsets of people by establishing new routines and processes (Nilakant & Ramanarayan, 2006). Moving to a new business model requires defining new customer value propositions and indicates how firms design their supply chain with partners to create and capture new value (Zott & Amit, 2010; Zott & Amit, 2013; Malik, Pereira & Budhwar, 2018). New value creation and capture for SMEs at the bottom-of-the-pyramid require appropriate investments in the governance regimes (Basu et al., 2021).

2.2.1 CE adoption and change management by SMEs in emerging economies

Given that the CE focuses on recirculation of resources and energy for a sustainable supply of resources (Ormazabal et al., 2018), the cooperation and coordination efforts for implementing

CE requires a multilevel change management approach (Nilakant & Ramanarayan, 2006). Systems-level focus on the micro- (individuals and consumers), meso-(organizational and business-to-business) and macro-levels (regions and governments), and as an integrated approach (Park et al., 2010; Yuan, Bi & Moriguichi, 2006) and focusing on overcoming the three barriers will enable sustainable change and innovations (Prieto-Sandoval et al., 2018). However, despite the CE's economic, environmental, and social benefits, SMEs are still not proactively implementing CE practices or adopting circular business models, as they have not yet been sold the idea from a business case and change management perspective (Ormazabal et al., 2018). To address this issue, SMEs need to overcome their cognitive and action barriers by seeking support networks in different sectors or regions, and share or exchange resources, build cooperation to improve their performance (Ormazabal et al., 2018).

Although the knowledge development and implementation of the CE are more widely noticeable in the developed economies and particularly in Europe, there is emerging evidence of some CE activity in Africa for introducing and implementing CE concepts (Agyemang et al., 2018). Similarly, countries such as India, Ghana, and Pakistan are witnessing an increased interest in CE adoption, such as the reuse and recycling of electronic waste products from other countries to emerging economies (Winans et al., 2017). India is a leading example among emerging markets to introduce incentives and systematic regulatory frameworks for larger enterprises to mandating a 2% tax for corporate social responsibility activities, thus overcoming some of the volitional barriers for CE adoption. There is a need for SMEs in emerging markets to reap benefits from tax rebates and even more so by creating awareness (overcoming cognitive and action barriers) among consumers and other stakeholders in its ecosystem (Jakhar, Mangla, Luthra & Kusi-Sarpong, 2019), which will improve the opportunities of moving towards circularity (Govindan & Hasanagic, 2018).

Opportunities that encourage enterprises in different sectors to engage and adopt CE

initiatives fall into two categories: internally- and externally-driven (Tukker, 2015). SMEs are enthusiastic (volitional factor) about implementing CE despite facing several challenges such as practical, technical, and legal (action barriers) advice and support (Dey et al., 2020). SME's orientation is different from large scale firms because of the competition, demand and supply issues, cash flow uncertainties, lack of business practices and skills (cognitive barriers), and a high level of employee turnover. However, as highlighted in the work of several researchers (Dey et al., 2020; Prieto-Sandoval et al., 2018; Rizos et al., 2016), there is a dearth of financial support, insufficient information management system, absence of proper technology, deficiency of technical resources, the nonexistence of financial resources, lack of consumer interest, lack of support from public institutions, lack of qualified professionals in environmental management, and lack of commitment on the organizational management (Ormazabal et al., 2016; Ritzén & Sandström, 2017; Rizos et al., 2016). The above suggests a presence of the three barriers at varying degrees to implement change.

3. Methodology

3.1. Research Design

To explore challenges faced by SMEs in adopting CE practices from a change management perspective, we adopted a qualitative case study research design. The qualitative case study method facilitates a deeper understanding of firms' efforts in adapting to a dynamically changing dynamic environment (Yin, 2009; Ozcan, Han & Graebner, 2017). Moreover, it is considered vital for generating rich insights for theory enlargement and elaboration (Eisenhardt & Graeber, 2007; see also Van Maanen, Sorensen & Mitchell, 2007; Fisher & Aguinis, 2017). Scholars prefer multiple case studies wherever empirical context, such as CE, drives strategy and industrial ecology (Mjoset, 2013). Esienhardt (1989) further suggests using multiple case studies for generalization, especially when triangulation occurs between data and theories (Snow & Anderson, 1991).

3.2. Sampling and procedure

We adopted a theoretical sampling approach to achieve literal and theoretical replication and provide contextually relevant explanations (Eisenhardt & Graebner, 2007). Yin (2003) highlights multiple observations from diverse contexts as critical and appropriate in extending theory-building efforts. Hence, we adopted a multi-pronged sampling strategy of collecting data from expert informants from diverse stakeholder groups (Eisenhardt & Graebner, 2007; Yin, 2003). These groups comprise senior SME leaders, market intermediaries whose task is to bring SMEs to embrace CE principles, and leaders of large businesses with SMEs in their value chain, and they actively engage SMEs to embrace CE and sustainability concepts. Semi-structured interview questions focused on the core concepts of workplace innovation, with a contextual focus on concepts of CE and sustainability and the presence of high-involvement work practices for managing change. For example, the questions include *how innovative is your business and what is/are the reason(s) for the nature and extent of innovative activity adopted*? The questions further explored *the nature and extent of CE adoption (exploring using the 3R framework of Reduce, Reuse and Recycle, and other concepts), the nature of the application of these innovations (e.g. does it relate to products, processes, and /or business model innovation), and if so, their success or failures?* In terms of the high-involvement work practices, in view of the changes implemented, the questions explored the extent to which employees have the *power* and *autonomy* to carry out the changes to their work schedules, the extent of *information sharing* about new practices that occurred within and across the organization, the extent to which employees *were rewarded* or undertook the *acquisition of new knowledge and skills* related to the new innovative approach of CE adoption.

Data were collected from nine organizations, including SMEs, market intermediaries and large firms supporting SMEs' value chain embracing the CE concept. In addition to in-depth

interviews, secondary documentary data and evidence, such as documents, reports, manuals and other information available through their public websites, were also analyzed. Such an approach increases the construct validity (Yin, 2003; Silverman, 2013; Farquhar, Michels & Robson, 2020) and improves theory-building efforts (Eisenhardt & Graebner, 2007; Yin, 2003). Furthermore, we employed analytical generalization to an existing theoretical stream of literature on CE to improve our study's external validity further. Fourteen in-depth interviews were undertaken of the case organizations. Details of the interviewees and the case organization can be found in Table 1.

< Insert Table 1 about here >

3.2. Data analysis

Qualitative interview data of about 86 000 words were initially analyzed using Leximancer–4.5, a software application for an unstructured, unobstructed and automatic extraction of seed concepts using non-linear dynamics, machine learning and statistical algorithms (Smith & Humphreys, 2006). The use of Leximancer is gaining prominence in premier management, marketing and innovation journals (Malik et al., 2019, 2020). It auto-generates themes and concepts in two-sentence blocks and maps their relational co-occurrence in a given textual data set. This leads to a thematic and conceptual map (see Figure 2) wherein the circles represent themes, and the dots are concepts. For example, in Figure 1, the core themes are in the order of their importance and incidence in the collective data set. Figure 2 shows the auto-generated relationships between themes and concepts. What is evident from the preliminary and automated Leximancer data analysis is that there are 13 themes (Figure 1), of which the dominant themes are in dark circles, namely, *waste, people* and *work*.

Leximancer provides auto-generated themes and concepts and maps their relational co-occurrence in a given textual data set. Thus, it provides an objective, unbiased and

hierarchical view of qualitative data and automated initial concepts and themes (Malik, Froese, & Sharma, 2020). However, the initial concepts and themes require manual validation as non-key concepts, such as tell and take (see Figure 1), is likely to pop up in the machine-generated output.

For example, the data set highlights that the top three referenced concepts are people, waste and work, showing the centrality of what the interviewees mentioned of what people at the workplace were focusing extensively on. Waste is a key focal area of the CE concept, and the reduction in waste through workplace practices and people management practices or by people formed a core discussion of the interviews undertaken. Additional concepts in Figure 1 show products, examples and problems, which, when analyzed, highlighted evidence of product-level changes and use of several approaches and examples of this change management approach, often employing a problem-solving focus.

Following the initial screening, analysis and extraction of the main concepts and themes, a theoretical coding process was followed using an abductive approach (Dubois & Gadde, 2002; Van Maanen, Sorensen & Mitchell, 2007). This process involved several iterations of going back and forth between data and theory and recombining data with the case, phenomena, and the extant literature. Thus, abduction consists of three steps, namely (i) establishment of pre-existing theoretical knowledge; (b) observation of crucial elements in the empirical phenomenon; and (c) imaginative articulation of new interpretations that resolve research questions (theory elaboration/elaboration of the conceptual framework) (Alvesson & Karreman, 2007).

We also followed Gioia, Corley and Hamilton (2013) thematic approach for coding our qualitative data into hierarchical categories. The first-order categories represent the raw codes at the first iteration of data analysis. Individual and manual exploration of the data set led to understanding their meaning concerning the task at hand. Next, we identify, using an

abductive logic, and undertaking theoretical coding of the first-order categories to identify specific second-order themes and aggregate dimensions. The second-order themes as they appear in our data structure add to the novelty of the findings in explaining the vital contextual influences and barriers facing SMEs' adoption of CE concepts. For instance, Figure 3 shows details of interrelationships between the themes of waste has interrelated concepts of a circular economy, social needs, plastics pollution, circular economy models, and management. This theme is close to 'example' and 'products', which capture the essence of action fields and proprietary activities and tools a company or firms in an industry are undertaking in India's SME sector. These other two themes, 'people' and 'work', revealed upon exploration the different activities that people working in these firms are undertaking. Further, managing people and their mindsets is central to managing change as firms apply circular economy concepts.

< Insert Figures 1, 2 and 3 about here >

Thus, each concept was explored individually along with its relational influence on other concepts. Figure 3 shows an example of how the concepts of *circular* were explored in conjunction with *different* and their interrelationships with other concepts in the data set. It became apparent from the exploration of the above data that firms were engaged in the adoption of CE concepts to varying degrees as each firm was in a different stage of adoption and maturity of using the three guiding CE principles of *reducing, recycling and reusing* (Ormazabal et al., 2018) and five field tasks of *taking, making, distributing, using*, and *recovering* (Dey et al., 2020). Furthermore, the case analysis found support for varying degrees of the new R- Repurpose (see Table 2) present in several case organizations, such as MFA, Biowaste, W-consult and Biz House 2 (Coughlan et al., 2018; Schulz et al., 2020). The data analysis showed that these firms were undergoing a significant change process, including a significant business model innovation for some more than others, who were

tinkering at the edges to do their bit for a CE concept.

A theoretically informed analysis was carried out at the next stage using the theoretical lens of managing change, business model, and CE principles (Nilakant & Ramanarayan, 2006; Malik et al., 2018). For successful implementation of any significant change initiative, the barriers of *cognition* or to appreciate the need for change, *volition* or lack of motivation and willingness to change, and finally, *action* or developing the knowledge and capabilities to deliver on the change (Nilakant & Ramanarayan, 2006). These authors highlight the importance of leaders and HR managers in articulating and managing the change process (Moktadir et al., 2020; Saini & Agarwal, 2020). SMEs in our sample faced different levels of challenges for overcoming the barriers to change. We analyze the challenges, some of which were contextually grounded in the industry and cultural aspects of the ecosystem these SMEs operate, while others were structural. We begin by providing evidence from the case analysis of the nature and extent of CE practices. Next, we discuss the challenges faced by SMEs and the extent to which they could overcome by implementing some strategies.

4. Results

4.1. Nature and extent of adoption of CE principles: 4R

There was a mixed level of cognition, volition and actions by the case organizations. Each organization's CE adoption journey varied due to differences in their leaders' beliefs, and the extent of resources and know-how each case organization could access. We present in Table 2 a summary of the presence of *reduce, reuse* and *recycle* principles. Further, another key principle of ***repurposing*** was observed in several case organizations. The influence of market intermediary and large firms was good; however, even their efforts to embed CE principles was constrained by leadership, resources and cultural issues. Below are some excerpts from the interviews to highlight how the case organizations engaged with the core CE principles.

For market intermediaries and their funding bodies, CE initiatives' uptake was voluntary and aimed at financing specific projects and educating the micro and small and medium enterprises (MSME) sector for adopting these initiatives. Similarly, the larger firms provided support, frameworks and models for their vendors (several of whom were SMEs). These two channels helped several SMEs overcome the barriers of cognition, volition and action, as these were readily made available to those who were either beneficiaries of either a national (e.g. E-Consult), a global network of market intermediaries (e.g. W-Consult) or large business houses (e.g. BizHouse 1 and 2).

> *All this funding are coming from an international organization like the Bureau of Energy Efficiency to implement any MSME project. The funding is coming through GEF, which is the Global Environment Facility (GEF). … the World Bank also has a field program financing energy efficiency, MSME sector. …what they do is that they get funding from …another donor* (**E-Consult**)

> *Absolutely. I think 80 per cent of our client base is actually SMEs. And for them, it's also a challenge that any solution that talks about substituting plastic is neither readily available nor is it cost-effective and especially not to SMEs, somebody like P&G or a Nestlé and actually do have the means to maybe incorporate recycled plastic or seaweed alternative plastic. SMEs don't really do that. So they have to look at alternative solutions. …kind of alternative solution they never had before.* (**W-Consult**)

The nature and extent of the CE principles varied at each case organization. These details are summarized in Table 2 below, and further evidence of this practice is provided in the interview quotes and integration of secondary data provided by the case organizations.

< Insert Table 2 about here >

Reduce. There was evidence of moving the use of resources indiscriminately to focusing on

sustainable use of resources. For example, at Biowaste, by using earthworms in the composting process, the SME was able to reduce the use of hazardous resources:

> *And hopefully, I'll give it to you to utilize what Vermi biofuel production methods do to reduce the hazardous waste percentage going out of the premises.*

Other firms had taken steps to reduce resource consumption and environmental impact:

> *by that, reducing the cement that you actually reduce the carbon footprint on that particular, you reduce the cementitious content* (**MFA**)

> *This is one of the issues where you would increase more awareness to your customers and your end-users as to how you can then continuously get a sustainable supply in a fashion that is segregated in a fashion that reduces your overhead.* (**Plastowaste**)

> *Because there are so many* [SMEs]*…organizations in India which are operating at a very small level, and if we could just provide them with equipment like a bailer or a conveyor, well, it helps them sort their materials faster. It helps them compress materials, which helps them reduce transportation costs and thereby reduce the overall costs associated with the project.* (**W-Consult**)

Similarly, both the prominent Indian business houses encouraged the use of alternative approaches across their value chain, including SMEs, to reduce resource usage:

> *Physical Technologies, such as 3D printing, robotics, energy storage and harvesting, modular design technology and nanotechnology, help companies reduce production and material costs and reduce environmental impact* (**BizHouse 1, Document**)

> *We are working with key fabric suppliers to reduce lead time as well as costs and improve efficiency. This helps us to procure fabric responsibly and establish long-term relationships with vendors* (**BizHouse 2, Document**)

Reuse. There was evidence of several SMEs engaging in reusing resources as they gradually embraced the CE concepts.

> *Marico, for example, makes their packs out of recycled plastic… So on those same innovations, those kinds of things, I think people will ignore that action where a lot of people will then start asking for recycled products* (**Plastowaste**).

> *Similarly, you need to backwards integration also. So we think that to produce, though, the construction material which is required for this construction activity. OK, while doing that, we have a waste product that gets generated inside. Right now, what we are doing is why can't we use that waste product as far a part of some other component in utilizing the project is running in this direction.* (**MFA**)

The market intermediaries also played a significant role in educating vendors and clients to reuse materials through their established recovery methodologies.

> *Recovery is basically a collection of plastic waste from various sources, so [it] could include the environment, it could include the municipal collection, by waste pickers …any kind of formal or informal collection which is essentially under the purview of the recovery methodology* [we employ]. (**W-Consult**)

Both the business houses encouraged SMEs to reuse resources across their value chain:

> *segregation of 'scrap' is key to ensuring purity and, therefore, the greatest value recovery.* (**BizHouse 1, Document**)

> *Enormous recycling of the like engines, the engine is aluminium …can feel very efficient. So they have a prototype, a new business line all around the country to encourage reuse and something the making sure this engine starts into …other components so that [the firm] buys all the engines that have been written off ….*
> (**BizHouse 1, Interviewee**)

Change in carton box dimension and creation of inner square liner helped retain the product's shape and presentation under excessive handling and transportation. Also, reuse of cartons has contributed to sustainable packaging efforts by reducing our carbon footprint 8 to 10 times. (**BizHouse 2, Document**)

Recycle. There was evidence in all cases of recycling waste and resources:

OK, so you're recycling then making it, making a product which then gets absorbed and then the output of the agricultural produce, …through social entrepreneurs to recycle, …sell them as organic produce and then make them more sustainable. (**Biowaste**)

So our idea was,…when whole plastic waste gets mixed with organic waste, it gets contaminated, and that's when it cannot go back into the recycling system. So …the old segregation part comes in …Is that good, clean, segregated waste can actually be turned into other recycling models and then those aggregators, they either pick up the recyclable waste. (**Plastochem**)

Market intermediaries guided the SMEs and the broader ecosystem on how best to realize value out of recycling.

But what happens is that any kind of waste which is getting generated in our facility, I mean that we try best to get economic value out of it. OK, so if it is a people waste or some kind of it, definitely they will send it to some recyclers, but they are not aware of it is not very organized. (**E-Consult**)

Both large business houses also adopted several recycling strategies across their product and materials portfolio and advised their vendors, including SMEs, to increase recycling. The use of recycling materials also gave birth to new business models that were not explored earlier. A case in point is the global auto-parts and automotive industry that are now tasked with recycling significant parts of the :

Further research to investigate recycling opportunities from post-consumer and End of Life Vehicle (ELV) were explored with a second phase research project XXX [Recycled Car, a pseudonym used]. A third phase project called YYY [Recycled Dream, a pseudonym used] is due to start working in conjunction with the recycling industry to exploit the growing source of recycled aluminium from ELV. (**BizHouse 1, Document**)

A lot of xxx [Product Name] ranges use material that is either upcycled or recycled with older fabrics. One offering includes converting vintage sarees into more contemporary, designer kurtas, jackets and pants. (**BizHouse 2, Document**)

Repurpose. There was evidence of some organizations' repurposing of their products and practices (See Column 4 of Table 2 for details).

I think plastics again there, large plastic, soft plastic, …I've spoken to a lot of recyclers …in Delhi …in Hyderabad and Pune and how they have created their own innovative processes to separate, you know, clean and then repurpose and reuse and create more products out of it. (**Plastchem 1**)

5. Multilevel conceptual framework

Despite the positive adoption and uptake of CE principles by SMEs with help from market intermediaries and larger business houses, several barriers were still present for SMEs in India to fully embrace the concept of CE. These barriers can be classified into three categories: *cognition*, *volition* and *action* barriers when viewed from a change management perspective (Nilakant & Ramanarayan, 2006). A closer prognosis of these categories shows that, in effect, barriers exist on a continuum encompassing at macro-, meso- micro-level. Below we explain each of these levels and map them with the categories of barriers identified from the extant literature on change management. Figure 4 captures these critical influences in a SMEs' decision to adopt CE and the practices through which SMEs can achieve these

changes.

< Insert Figure 4 about here >

5.1. Macro-level influences– Barriers of cognition and volition

Government Incentives and Regulatory Framework. The inability to establish the legitimacy for the need for change stemmed from the lack of established CE standards for various industries or regulations for enforcing its principles. Most activity remains voluntary or as an offshoot of corporate social responsibility (CSR) activities of Indian businesses and multinational corporations or global sustainability organizations. This invokes the barrier of cognition as SMEs do not see any legitimacy to trigger change, and most still suffer from inertia (Nilakant & Ramanarayan, 2006). In the absence of any tax incentives or regulations that promote CE activities, several SMEs saw this as a burden:

> *if the Government really wants to implement the circular economy and the waste generated, that should be recycled. ….So very small things they can do is at least on their part if they don't want to spend money on that is to reduce the taxes, GST or sales tax*. (**Plastchem 1**)

> *And we then move forward into the government system and try to formulate a standard for these types of products. So we are the first people to get into the product, then asking the Government to form a standard for that product. So this is one benchmark. Then you have licensing, which is an acknowledgement by the getting starting next year that, yes, this is a standard product…* (**MFA**)

> *So one aspect is awareness and the government support …incentives by way of tax …If companies invest …there must get a tax rebate to the extent they invest.* (**Plastchem 1**)

Customers and Stakeholders. The second significant barrier is volitional as to how an SME or any organization influences its key stakeholders, including customers, who may not yet be

ready to buy products made from reused and recycled materials. Further, other social stigmas are attached to the Indian cultural context of buying products made from recycled materials. Though this is changing, the user acceptance of new ideas is still low. The end-users tend to exhibit a high level of inertia and resistance to change.

> *You have to sell this idea that this is how it's going to happen… It's very difficult because for people to believe that this thing is going to happen unless we show them the proof and technicalities is in the which we do. OK, plus this being a new product, it did not have any standard or any certain guideline to follow. OK, so that was a challenge …The first challenge was to convince the end-user this thing really works…* (**MFA**)

5.2. Meso-level influences of cognition and volition

Training and Development and Business Case. In addition to the macro-level cognitive influences, employees and businesses need support and awareness of the key concepts.

> *So we have a team. … We believe that we send our people to them… our design training program for fresh graduates to give industry experience, not the theoretical civil engineering experience, or to get in the school or colleges…. so that is designed by the experts they have had one session…* (**MFA**)

> **…** *where the emphasis is on training the professors, on the academicians in the nearby areas, then independent consultants, technical experts. So all those stakeholders are also getting involved in such activities…for a successful project initiative….*(**E-consult**)

> *All right, so we have a lot of biotechnologist interests and soil scientists that that are there available with us at all times, so …all these different people will come into the loop and complete that training.* (**Biowaste**)

Further, developing a business case for its adoption requires articulating benefits to the SME owners for successful adoption.

So this is one area I feel like if we can establish the business case for economic industrial ecology in terms of monetary value, directly to the client or to the MSME [micro and small and medium enterprises] *or the association …, then definitely the project will go through for us. But whether that value, which they are getting maybe six rupees per kg,…whether that is good or bad, whether they can unlock, or whether they can earn more out of it, I'm not sure. …things are becoming challenging because when you talk about the buyers, these are in terms of the circular economy. …then how that will be of value to the company …how much benefit the companies are getting by utilizing the same scrap.* (**E-Consult**)

5.3. Micro-level action skills and influences

Leadership, Management, Politics and The Mafia. Leaders and managers' role in extending support, flexibility, and empowerment to employees of SMEs is vital to promote CE values.

…[The] *Chairman, who is a 75+ gentleman, is still active …So he had a vision that we need to develop such products which are completely different.* (MFA)

A related aspect of leadership is linked to the political processes of who is saying what and which audience can influence the target audience. This was particularly true of SMEs in semi-urban and rural areas where the medium and the channel through which the message is communicated have more impact than the message's content, and who influences matters a lot.

So we are trying to overcome the challenges by doing some of this workshop, bringing some association and other stakeholders who can infuse the [ideas in] *SMEs. Just to give you an example, like if I Googled a foundry cluster and put it OK,* [and] *if I go and talk to them about the implementation of energy efficiency and other aspects, maybe I will not be able to influence them to an extent. OK, but what happens is that if a local*

association or the leader of the president of the association comes and talks about energy efficiency and that left has to improve the energy efficiency, then definitely he will be getting more influence compared to me. (**E-Consult**)

Dealing with the highly unorganized waste collection and picking sector in India is further complicated by the presence of a 'Waste-Mafia', and the ability of SMEs to engage and navigate access to such sites requires strong political acumen.

And I mean, there's a lot of unorganized sectors that prevails in this industry, which means so much …mafia, so much exploitation …is hard. …So to get them into a formal process to get them and go home and find a set up is very, very challenging. …The bosses then come to work for two days and then as soon as they get their payment …they escape for seven days, they will come. So these kind of challenges are that difficult, but it takes time for them …to go blind and go their own way. And they also have to be disciplined. And they do not care about these things. (**Plastowaste**)

Developing a work culture that allows experimentation and empowerment of employees to discover innovative for applying CE concepts is critical for its successful adoption.

You know we provide resources, so though I think that you experiment, and something will come out from either a product or service or learning (**MFA**)

…the assessments would have to follow a set methodology or a process, and there would be no cutting corners around it. Yes. And of course, as you said earlier, you know, each cluster is so unique, and you need to understand the contextual factors in that particular area, and then you can make some modifications. So, there is some leeway with some degree of flexibility that is allowed …. (**E-Consult**)

5.4 Routines, rituals and recitals - Three Rs enabling the successful adoption

The analysis points to three intangible factors (routines, rituals, and recitals) that

successfully adopt the 4R CE principles. First, SMEs must develop new routines and embed these in their daily interactions in their day-to-day activities. These include activities, such as the processes, resources, knowledge sharing, or they must be viewed as these SMEs' new DNA or culture. Next, the barriers noted in our framework require constant *recitals* and changing the *rituals* by the change champions. Finally, in the Indian cultural context, especially in semi-urban and rural settings, to overcome and change the dominant mindset issues, the leaders and change champions have to work together to use recitals and local rituals and customs to communicate to their constituencies and people in their ecosystem the benefits of CE adoption in a language and approach that they understand most effectively. We found in our data the use of such practices, wherein puppet shows and local folk songs, folklore and dramas and benefit to end-users were used effectively in non-technical and straightforward layman language to bring about change in people's habits and enable faster adoption of the new CE principles and ways of working.

5.4.1 Routines. For successful adoption of CE, organizations had to establish new routines to convince the merits of new knowledge using behavioural processes:

> *Yes, I can see what we need to do,… To facilitate this … we brought all the data which was available on experimentation from all the laboratories which was related to these developmental issues …technical data [and] information, so we can evaluate* (**MFA**)

New routines helped embed CE principles to minimize waste, recycle and reuse herbs.

> *we're used to the routine, … when we do it in a systematic way, which is little away from our mindset* (**Healthco**)

4.5.2 Rituals. Sometimes, in rural and semi-urban settings, the organizations had to rely on local customs, traditions and rituals and link them with higher-order benefits.

So all these things make your well-being. But you will have spiritual well-being. Then you will get, that also contributes to your healthy state (**Healthco**)

Domestic waste was recycled by assuring township residents through local social entrepreneurs the economic and social benefits of using positive social messaging:

Yeah, people are moving towards organic products .... so we have now created something called a garden club, and we are now teaching individuals on how to know how to do …nutritional gardening [in their buildings]... (**Biowaste**)

…we have to see whether we are following Ayurveda principles …convince ourselves that the principles are followed. If we can do that, then it is perfect (**Healthco**)

4.5.3 Recitals. Sometimes engaging in local festivals and working up from grassroots levels is an effective way to overcome change and leverage elders' and local leaders' social capital for embedding change to implement holistic and sustainable CE practices.

It's it's like you have to be continuously hammering down all the time through different methods, sometimes …reasonings for how …so there was massive participation in that because we have these local groups that go for a street place, will arrange for street blues within the village itself and then, of course, …going to the festivals... trying to pass an informational protest, songs …so we chose the formal, the informal, the cultural community, all channels, whatever works …. (**Biowaste**)

We work in the nearby village, …So this message, …we have to show this model of work to the people that this is possible, for example, when we bought this land this was abandoned …so now with this, …like water harvesting …, big trees and plants have grown here. So that we can show to the people … make them believe…. that is a bigger picture. …we are going distance…. giving back to the community. (**Healthco**)

6. Discussion

This research provided in-depth insights into the workings of the critical influences on SMEs' decision to adopt CE principles and bring about changes to their current business model (Amit & Zott, 2010; Malik et al., 2018; Zott & Amit, 2013). Analyzing the problem of managing change of SMEs from the theoretical lens of managing change (Kotter, 2007; Nilakant & Ramanarayan, 2006), this study contributes by developing a multilevel theoretical framework for understanding the barriers and enablers that influence the adoption of CE in SMEs an emerging market context of India. There was evidence of the 3Rs in operation at the SMEs and case organizations analyzed (Ormazabal et al., 2018). Our conceptual model delineates multilevel barriers and enablers of the reduction, reuse, and recycling principles (Dey et al., 2020) and proposes an additional 'R' - repurposing. Like the other R's, *repurposing* is also a natural outcome of CE activities. We note several instances from case study evidence that either the product or the processes were significantly repurposed from a CE perspective (See table 2 for details). We further argue that for successful implementation of CE's five fields of action (Dey et al., 2020), SMEs and other firms alike have to overcome the three barriers of change (cognition, volition and action) and pay special attention to the role of leadership, and managerial support required for embracing change (Kotter, 2007). Our work reveals that these barriers can be overcome by establishing new *routines, recitals* and *rituals* by the leaders and change champions working closely with the locals, elders and the community for selling the change agenda. Additionally, setting up enabling new structures, providing new learning and awareness of the benefits, using a combination of technical and behavioural skills and finding a dominant coalition that can influence others in an SME's ecosystem for embedding CE approaches (Kotter, 2007; Nilakant & Ramanarayan, 2006).

7. Conclusion, implications and limitations

Overall, evidence from our empirical data shows that the CE approach can

simultaneously achieve several goals of improving resource sustainability and security, creating jobs, enhancing human capital, reducing greenhouse gas emissions, reducing resource consumption, and improving material efficiency. However, as the change from a dominant linear economy model was not sustainable, this research, employing a change management theoretical lens, analyzed the everyday barriers faced by SMEs in emerging markets in implementing CE. The findings of this study raise several theoretical and managerial implications. First, at a policy level, local, state and central Governments play a crucial role in raising general awareness about the CE's benefits and risks at society and industry levels. Second, they must develop new legislation and directives, tax and financial incentives, and support enterprises' industrial ecosystem to adopt CE business models. Third, Government should rationalize the tax systems with a focus on CE models. This should focus on taxing non-renewable resources and providing tax relief to renewable resources, such as clean energy and human labour, as a considerable step toward circularity. Finally, from an organizational perspective, the dematerialization of the economy can be achieved through stock optimization and decoupling wealth from resource consumption.

Several managerial implications also arise. First, circular business models must be developed and continually re-examined, considering the risks involved, as there are uncertainties around operational needs and future market demand. Second, as noted above, the use of new *routines*, *rituals* and *recitals* employing multiple channels, media and awareness and communication programs led by leaders and managers must be supported by appropriate training and development and awareness-building communication programs. Third, by creating a culture that supports risk-taking and empowerment, employees will be open to explore new ideas much more freely and effectively than to be bound by a policy-based and adherence focused work environment. Fourth, large corporations working with SMEs must collaborate and share their expert knowledge and resources to integrate SMEs

effectively in their CE activities. Finally, HR managers or leaders must discard and disincentivize old routines by incentivizing new ones to embed CE principles.

This exploratory research has several limitations. First, we were unable to adopt a longitudinal design which would have allowed for a more profound and temporal understanding of how the phenomenon unfolds over time. Second, the COVID-19 pandemic precluded us from gathering an in-depth, rich, and in-situ data analysis. Finally, we could not collect data from a diverse pool of respondents from each case organization, leading to a limited diversity in hierarchical levels in our data analysis. Therefore, we outline several areas for scholars to engage in future research. For example, additional research is needed on how firms can design innovative circular business models capable of handling the risks involved in moving towards circularity is warranted. The move towards circularity is complex and multifaceted, requiring cooperation from and collaboration between industry stakeholders. This paper is one of the early efforts to explore and identify how SMEs adopt CE in their everyday operations using a qualitative approach. Future research may validate our findings using an ex-post-facto quantitative design using field surveys on the SMEs' adoption of CE activities. Additional gaps identified in the literature on CE focus on contributions from enterprise supply chains involving policymakers (Franco, 2019; Reike et al., 2018) and social sustainability practices (Geissdoerfer et al., 2017), and further research is needed on how SMEs can embed a cultural change among their consumers and employees.

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Figure 1. Core auto-generated themes from Leximancer 4.5

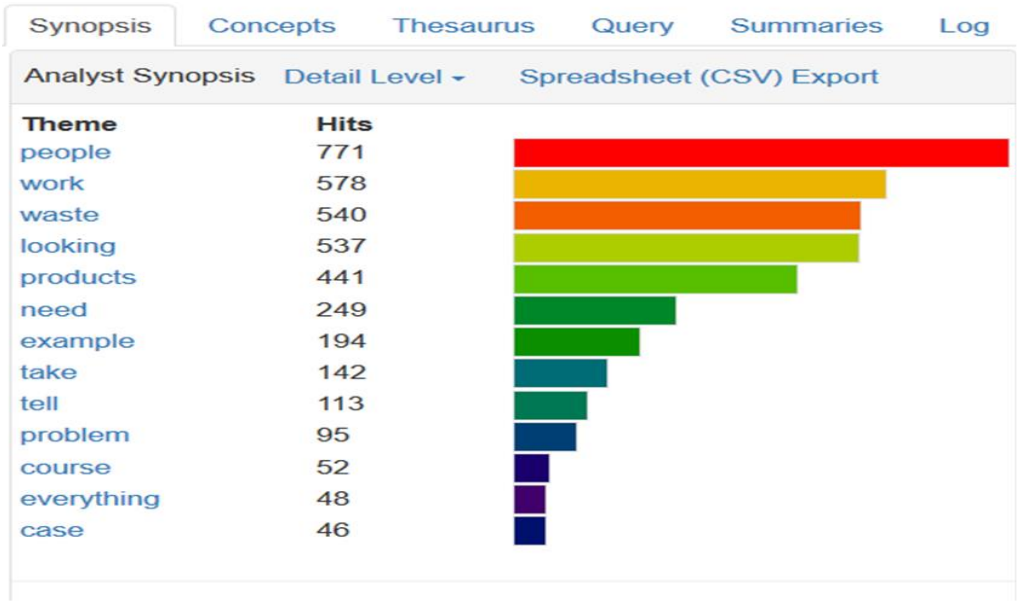

Figure 2. Auto-generated mapping of concepts and themes

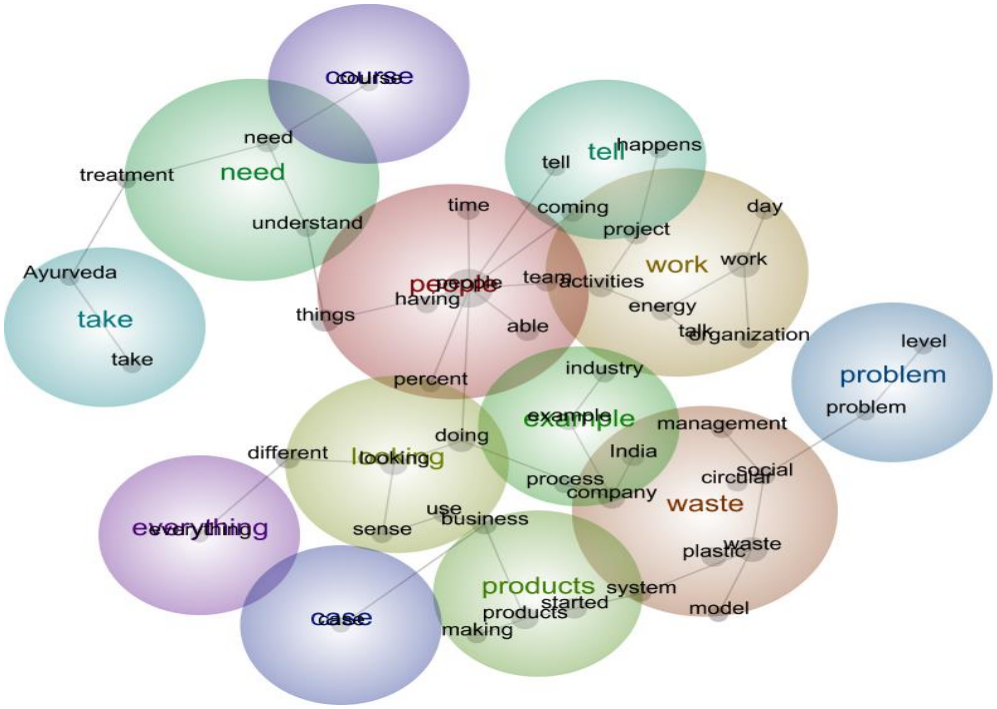

Figure 3. Mapping relational co-occurrence between 'circular' and 'different' concepts

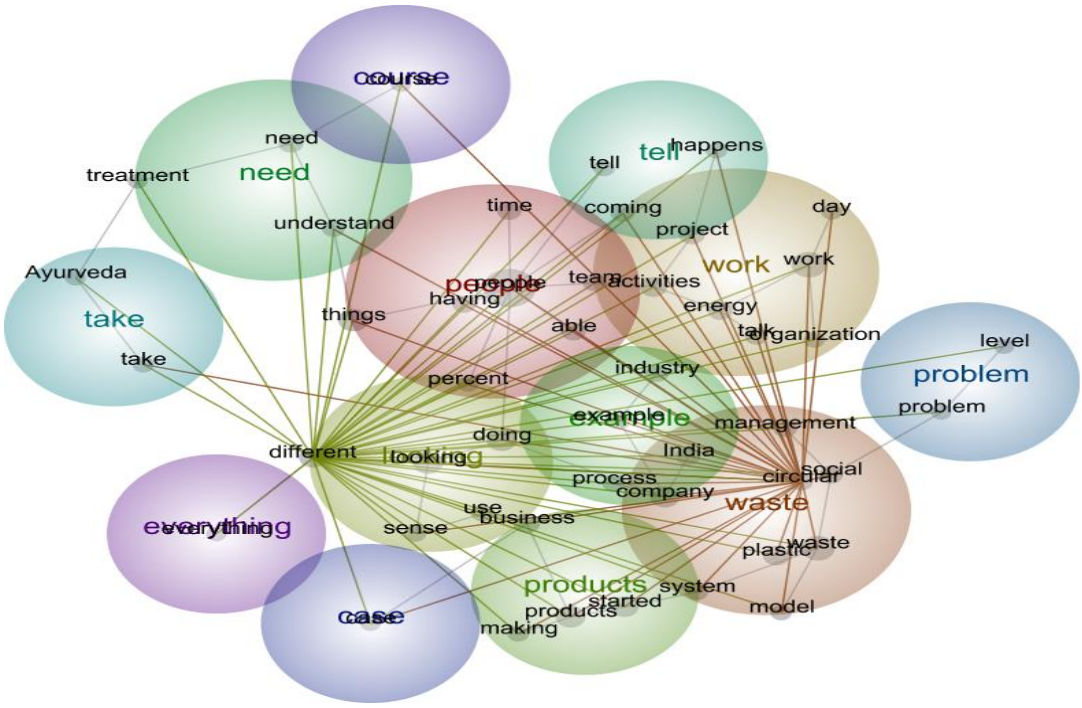

Figure 4:A 7-R conceptual framework of CE adoption by SMEs: Barriers and enablers

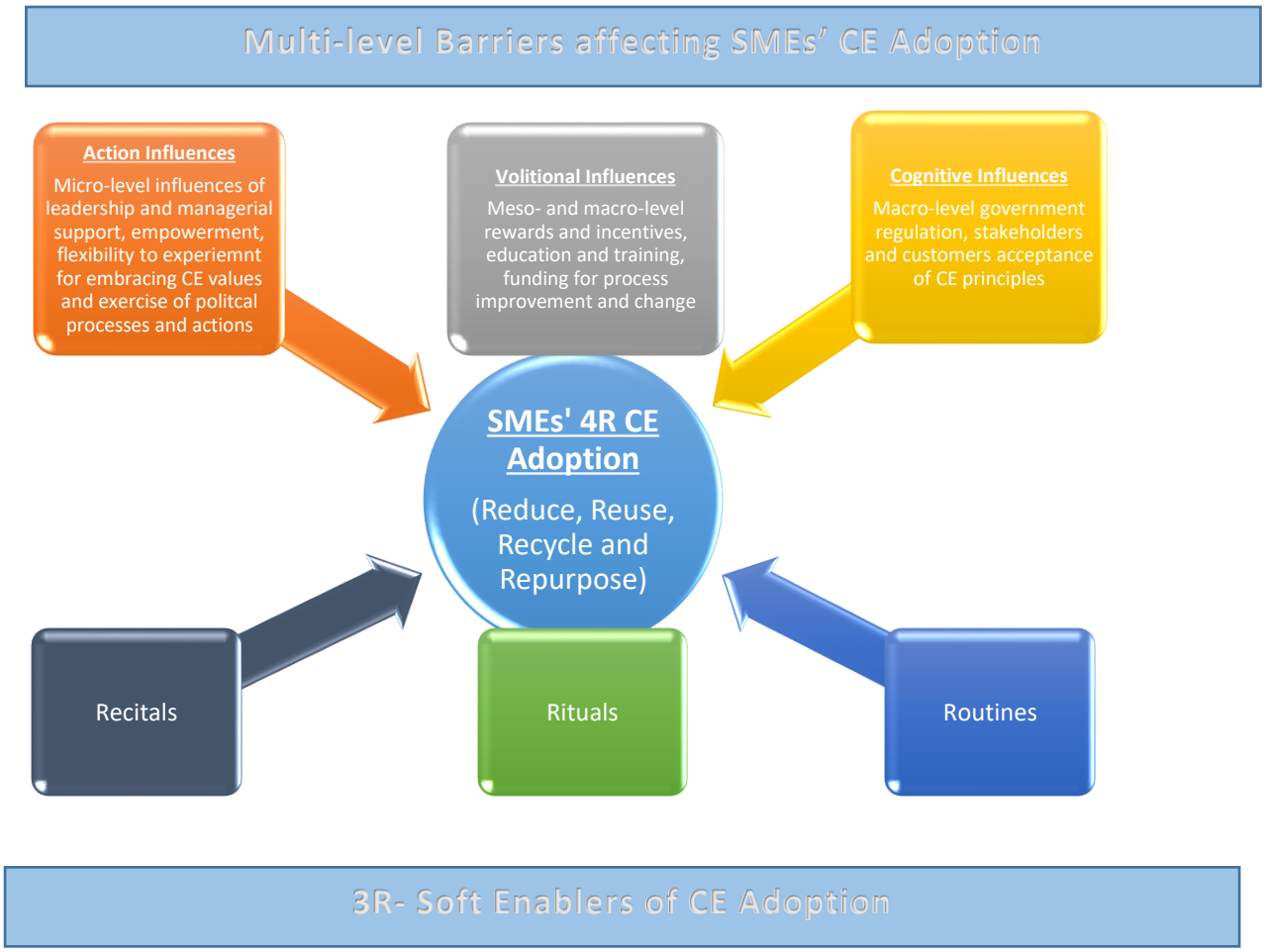

Table 1. Interviewee details and case organization details

S. No.	Case Details	Interviewee Designation, Gender & Experience	Case Organisation's Details and Focus Areas
1	Micro-Fine Additives (MFA)	HR Manager, M, 15+ & Head of MFA, M, 30+	As part of a cement facility, MFA employs 70 people on innovative R&D products catering to cement, real estate and construction industries. It developed innovative MFA products to enhance cementitious cement properties for large infrastructural and even domestic projects.
2	Plastic Chem 1	1- CEO, M, 20+	SME is focusing on injection moulding and plastics granule manufacturer of furniture products. The CEO is also part of a regional Plastic Industry Association.
3	Plastic Chem 2	1- CEO, M, 30+	An SME engaged in plastics granules' production catering to a range of producers of plastic bags and plastic pipe manufacturers.
4	Biowaste	1- Head of HR, M, 15+	Established 50 years ago, a social enterprise model employing 75 people, this public research-based firm specializes in developing sustainable agricultural bio-pesticides and bio-fertilizers
5	Plastowaste	1- CEO, M, 25+	An SME in the plastics waste industry it employs 300 people via its network of social enterprises, waste pickers and aggregators to recover, recycle and repurpose plastic waste to produce bags and export them to the US, UK, Europe and other markets using a mix of bio-degradable products applying CE principles.
6	E-Consult	1- Lead Project Manager, M, 10+	About 100 people provide consulting and turnkey advisory, implementation, and educational projects to reduce environmental waste and energy efficiency in the MSMEs business models.
7	W-Consult	1- Head - India Operations, F, 15+	As part of an international consultancy operating in five countries, this organization employs about 11 people. It works on behalf of MNEs from the UK, USA, Europe and Canada to gain carbon credits by working with SMEs and waste management partners in India for providing advice using its developed proprietary frameworks for supporting MSME and large firms for in recovery and recycling of complex and problematic plastic waste, e.g. multi-layered packaging plastics.
8	BizHouse 1	1- Head CE & Sustainability Operations, F, 20+	BizHouse 1 is a large, diversified, Indian-owned business with centralized CE and sustainability teams. Focus on12 thematically identified areas across its 30+ business organizations and works closely with its SME supply chain to employ its CE concepts.
9	BizHouse 2	1- Head of CE & Sustainability Operations, M, 30+	An Indian-owned business house specializing in fashion and apparel brands employs a group-wise CE and sustainability approach focusing on five sustainability attributes that contribute to the CE concept. In addition, it works closely with its supply chain to employ its CE concepts.
10	Healthco	3 physicians, M, 10, 25, 30+, Admin. Head, M, 15	Healthco is an indigenous healthcare provider focusing on Ayurveda principles of holistic well-being care and cure. Maintaining harmony with nature and focusing on sustainable care and cure model using Ayurveda principles helped this indigenous provider reduce, recycle, and reuse resources and materials in its ecosystem.

Table 2. Nature and extent of CE adoption by case organizations

Name	Reduce	Reuse	Recycle	Repurpose
Micro-Fine Additives (MFA)	It has reduced the use of other resources by substituting them with slag from the steel industry. By enhancing product longevity through additives, it reduces demand.	Reused the waste generated from the iron and steel industry in creating new products	Recycling end-of-life concrete and infusing it with additives	A new product developed through a proprietary and patented technology to improve cementitious properties of the cement
Plastic Chem 1	Reduced use of harmful plastic granules and efficient energy processes	Reuses plastic waste for making new plastic granules	Secures raw materials through recycled sources and develops a bio-degradable	Repurposes raw materials for creating new products
Plastic Chem 2	Reduce energy consumption through new plants and creating social awareness through industry association role	Secures waste for reuse and manufacturing of granules	-	-
Biowaste	Reduces harm and increases resource efficiency by creating bio-pesticide and bio-fertilizer products for use in farms and households	Reuse industrial and domestic bio-waste for producing composting products	All bio-waste is recycled for use by domestic and agricultural products	R&D teams developed several new repurposed products for domestic and mass-scale agricultural use
Plastowaste	Reduces resource waste through its patented and proprietary technology for sorting and segregating dry and wet waste	Produces reusable plastic and blended paper bags for overseas clients	An extensive portfolio of its packaging products are recyclable	-
E-Consult	Provides advisory service for reducing energy consumption through technical and process modifications	Implemented tools and techniques for reusing and conserving energy	Extended advisory services for recycling waste materials in an energy-efficient manner	-
W-Consult	Focuses on reducing waste, energy consumption, carbon and plastic footprint through recycling and recovery processes	Focuses on separating harmful and complex plastics and reusing them in the manufacture of construction products	Focus collectively on recovery and recycling of problematic and harmful plastic waste by using funding from global MNEs for securing plastic credits by remunerating social enterprises tasked with picking and collecting plastic waste	Several new and repurposed products and processes
BizHouse 1	Multiple projects across the business and SME value chains reduce energy and	It recovers valuable resources from raw materials, by-products	Recycled Aluminum projects for car manufacturing. Focusing on	

	resource consumption. Carefully choose sourcing energy-efficient materials, from the design stage to manufacturing stage—use of renewable energy. Sharing platforms within the group encourages resource sharing. Reduced the use of multi-layer plastics (MLP) for its products as it is hard to recycle and causes health hazards	and waste. Extending product life cycle for durability and use of repairing and reselling initiatives across the business group	circular supplies wherein a significant part of future auto components and cars will be made through recycled materials	
BizHouse 2	Reduced energy use through dependency on freshwater in the textile industry by recycling and reusing waster. Also reduced the purchase of grid electricity by 30% by investing in solar and energy efficiency programs	100% reuse of water at all sites. Reuse of packaging materials and cartons	Integrating natural fibre and polyester recycled materials in apparel manufacture. As an internal target, 10% of all textile products are recycled. Further use is evident in recycled paper tags, packaging, dyeing materials and PET bottles at the workplace.	Moved from a process-led change to a product-led change, wherein each product is assessed against the CE attributes it has and repurposing and repositioning the marketing campaign to sell these as sustainable fashion apparel despite developing them for global and domestic fashion brands
Healthco	Sustainable use of herbs. Reduced use of power and reduced costs to local villagers for their treatment	Reuse certain herbs and oil for cleaning and energy needs in cooking once the therapeutic use is done.	Several initiatives create harmony with nature by giving back more in a natural and recyclable manner	