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India's Transition to a Circular Economy Towards Fulfilling Agenda 2030: A Critical Review

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Abstract: Globally, economies are experiencing a paradigm shift from linear production practices (make-use-dispose) towards circular economy (CE) pathways as critical development strategies to achieve Agenda 2030. In the context of the progressive shift to CE, we critically review extant literature to comprehend the trends and constraints concerning adopting CE practices. Our review reveals burgeoning literature encompassing a gamut of CE practices prevalent in multiple domains globally. We also discuss the emergent trends and patterns in adopting CE across sectors in India. Our study also confirms that implementing the transition to CE with ad hoc policies or as a tactical response to external or internal stimuli is unsustainable; instead, it necessitates organisational agility and strategic collaboration among stakeholders. We also identify consumer perceptions and economic feasibility as the most significant criteria determining the institutionalisation of CE. Further, responding to calls for investigation of CE in small and medium enterprises, we present a conceptual framework that can enable a non-disruptive transition towards CE. We contribute to existing explorations into the overlap of CE and Sustainable Development Goals (SDGs) by conceptualising a direct (SDG12) and indirect (SDGs 2, 6, 8, and 13) link between the three major stakeholders of CE (society, environment, and economy. This framework discusses the interlinkages of the above objectives and underscores the need for collaborative efforts from all stakeholders toward a sustainable circular economy. When practices align with these objectives, firms can successfully manage low environmental impacts while enhancing their economic relevance and social responsibility.

Keywords: Circular Economy; SDG; Strategic Enablers; ReSOLVE; CE Policies

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1. Introduction

Economic sectors, particularly those using critical natural resources, are adopting wide-ranging policies and practices as part of the global imperative to transition to a circular economy (CE). The case for wide-scale adoption of CE approaches and practices globally and locally emanates from the UN SDG Agenda 2030. The United Nations Industrial Development Organisation (UNIDO) considers CE "a new way of creating value, and ultimately prosperity, through extending product lifespan and relocating waste from the end of the supply chain to the beginning—in effect, using resources more efficiently by using them more than once." CE principles represent a paradigm shift from the linear economy by minimizing or mitigating the adverse environmental consequences of development activities, reducing resource waste, and achieving efficiency throughout the product life cycle. Generally, CE provides a unique method for creating value through innovative consumption and production activities and investing in sustainable practices. CE entails extending the product's life through design modifications, better servicing, and minimising waste by recycling or reusing resources. Material recovery and resource use efficiency are aided by reusing, recycling, or re-manufacturing waste materials and products. Thus, CE practices also offer sustainable solutions to the global waste management crisis and help considerably reduce or even mitigate greenhouse gas (GHG) emissions.

Though the phrase 'circular economy' was first used in the early 1990s debates over international development grand schemes, it received global acceptance only after the UN SDG Agenda 2030 was

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declared. Understandably, most advanced economies have probably moved further in this direction through the enactment of statutes and stricter compliance with extended producer responsibility (EPR) regulations. These efforts have also made many countries and companies shift their financial responsibilities and commitments toward dealing with the complex problems of waste management, especially electronic waste.

Technically, the core principles of CE encompass a wide range of sectors and activities, dividing them into several production and consumption patterns that mutually reinforce each other. They are (a) sustainable procurement, i.e., designing and implementing responsible purchasing policies; (b) eco-design, i.e., minimizing environmental effects throughout the lifecycle of a product and service; (c) industrial and territorial ecology, i.e., achieving eco-industrial synergies by turning scrap from one company into raw material for another company; (d) economic functionality fostering a shared economy; (e) responsible consumption, aligning rational choices with social and ecological considerations; (f) augmenting the product's life through reuse, repurposing, and repair; and (g) recycling, i.e., treating and recovering materials from the waste collected.

However, CE is still in its formative stages of evolution, leading to ambiguities regarding the widespread promotion and adoption of CE practices worldwide, particularly in emerging economies such as India. Therefore, the lack of authentic information or data significantly constrains measuring the effects of adopting CE practices, particularly in developing economies. Nevertheless, several indicators indirectly help assess the performance of CE in various sectors for a reduction in CO_2, energy intensity, resource recovery from industrial activities, recycling of solid wastes, and wastewater, shift to renewable energy systems, etc. These existing measures can be used as indicator variables to measure circularity across economic and business sectors. For instance, the European Union (EU) proposes several indicators to measure the performance of activities in various areas that could potentially contribute to circular economy (CE). These broadly relate to areas such as (a) sustainable resource management; (b) societal behaviour; and (c) business operations.

First, amongst the three broad activities, the indicators of sustainable resource management relate to the track record of EU nations in transitioning to a circular economy by reducing resource utilisation, thus augmenting resource conservation and mitigating environmental pressures locally and globally. Second, the indicators that reflect societal behaviour pertain to the engagement of citizens in circular economy activities, which includes innovative consumption patterns such as the willingness to pay for, share, and participate in product-service systems, as well as the acceptance of durable products and re-use. In other words, societal behaviour highlights the significance of altering one's mindset or adopting new attitudes towards improved resource management and reducing harmful environmental effects. Third, businesses tend to perform as engines of CE transition and circularity in their operations, as indicated by eco-innovation activities such as changing and/or adopting innovative business models involving CE principles. Here, the major CE concerns are the life-cycle of materials used, the types of materials used, the quality, and the product's environmental and health standards of the products.

According to the perspectives described, a strong CE action plan plays a crucial role in achieving the UN SDG Agenda, it focuses on reducing resource demands, thereby enhancing resource security and reducing local and global environmental pressures.

1.1. Objectives, Data and Methods

Given the previously discussed conceptual background, it is pertinent to investigate the understanding and adoption of CE practices in various sectors both globally and locally, particularly in India. Hence, this paper critically reviews the global research on CE to determine the direction in which industry sectors and businesses will adopt CE practices and the barriers that constrain the shift to CE. The paper then examines the evolutionary trends in India regarding the CE transition. The paper also examines gaps in adopting CE practices and possible reasons for their non-adoption. The paper proposes a conceptual framework to establish an effective institutional mechanism for CE implementation in countries like India, serving as a sustainable pathway towards achieving the SDG agenda.

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We present CE practices and assess the promotion, adoption, and impact of CE in the global and regional contexts of developed and emerging market economies, especially India. Our literature review is based on journal articles from Scopus, Google Scholar, and Web of Science data sources, further segregated by country and major sectors.

1.2. Methodology, Data and Approach

We study the extant literature to gather insights on the present state of CE practices globally. As evident from the sample of articles listed in Appendix 1, the research on CE explores various angles, such as industry, geographic locations, the impact on global socio-economic programs, etc. We assess CE practices at a country level and their linkages to sustainable business activities. Subsequently, we develop a conceptual framework to facilitate a CE transition in India, taking into account the impact on the achievement of specific SDGs from a long-term perspective. In the current study, we conducted the literature review in five stages, which we detail below.

We have sourced articles from different databases, viz., Scopus, Google Scholar, and the Web of Science, to explore and discuss the types and varieties of CE practices adopted across countries and sectors. The keywords used to search articles were "circular economy" and "circular economy practices". We gathered articles that included the aforementioned phrases in their title, abstract, and keywords, and then analysed them based on their focus on the global adoption of circular economy practices across sectors.

We have analysed sector- and region-specific CE practices, particularly in India, by reviewing journals mostly listed in the 1st quartile in Scopus. By doing this, we intended to cover research articles that have significantly contributed to the emerging area of circularity in terms of theoretical and practical applications. We limited the criteria for article selection to journal articles published in English. Figure 1 presents the framework for selecting articles from the Scopus database.\

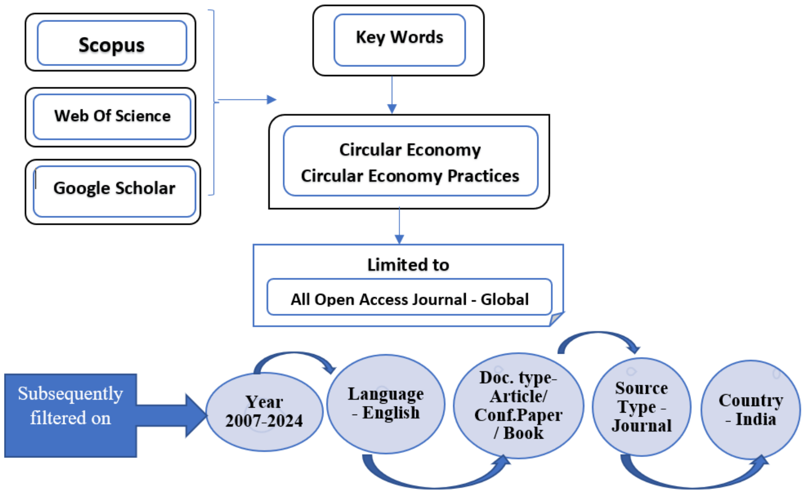

Figure 1. Selection process of papers in an Indian context.

The paper is structured into five sections. Section 2 delves into the current global literature on the emergence of CE and examines the diverse types of CE practices that countries are adopting. Section 3 presents an analysis of sector-specific CE practices with particular reference to India. Section 4 presents a framework for assessment of the impact of CE, followed by a conclusion and policy recommendations in Section 5.

2:. Emergence of Circular Economy: A Global Perspective

The CE concept, as discussed, is somewhat amorphous and awaiting an easily comprehended and appropriately encompassing definition[1]. According to a report by the Ellen MacArthur Foundation [2], CE is most commonly defined as "an industrial economy that is restorative and regenerative by intention and design."[3] Recognizing that the supply of almost all resources is finite, businesses globally have sought to maximize resource utility by minimizing waste and employing cheaper or alternative materials. However, it is a reasonable argument that such an approach could impact product quality and also may, as a consequence, increase costs. In this context, firms have recognized CE as the most feasible method to ensure the optimal commercial viability of resources. Though CE as a business paradigm is relatively new, it has precursors in firms' adoption of cleaner production strategies [4], strategies to reuse [5], remanufacture [6], and recycle [7]. Moreover, CE also encompasses waste management strategies, including hazardous waste [8].

The apparent scope of CE appears to align well with the 12th UN Sustainable Development Goal (SDG), i.e., "responsible consumption and production", thus bringing both producers and consumers into the ambit of CE's scope. Elkington posits that this compels businesses to give due consideration to the triple bottom line of sustainability [9]. Current evidence indicates that the majority of CE research focuses on the production sphere, perhaps due to the expectation that CE will rationalise the pace of resource usage [10]. According to Ghiselini [11], researchers have conducted CE research at three levels: micro, which involves individual firms; meso, which involves networks of firms; and macro, which encompasses regions, countries, and international areas. Acerbi and Taisch [4] investigate how circular manufacturing (CM) facilitates CE and find that most interrogations look at the micro-level while the macro-level remains the least researched. Contextually, they observe that multiple settings have investigated the economic and environmental aspects of CE, but the social impact of CE has received less research. While Human Resource Management (HRM) fosters the application and development of CE, its contribution remains under-researched[12]. While Green HRM practices (GHRM) contribute to the sustainability of the CE, the development of the two streams (CE and GHRM) appears to have occurred independently, and the relationship between them remains inadequately studied [12]. Subramanian & Suresh have expressed a similar opinion [13]. This is in contrast to other aspects of CE such as economics [14], technology [15], managing resources [16], and operations management [17].

Though a relatively nascent concept, CE has generated a significant body of literature that explicates it conceptually[1], discusses its prevalence and practice across domains [18], focuses on certain aspects such as assessment methods [19], consumption of products generated from a CE [20], and innovations [21]. Extant literature also provides evidence of CE in various segments, such as manufacturing [4], human resources [12], construction [22], and the urban water sector [23]. While identifying factors that catalyse and hinder CE implementation, also indicate certain 'ambivalent factors' that could serve as either a catalyst or an inhibitor[24]. This last set of factors is context-dependent and includes regulatory interventions, firm-level culture, and resource availability. The evident necessity for business models distinct from the current linear models (take-make-dispose practices) has prompted researchers [25] to explore alternative business models [26] [27] [28] [29].

Researchers have conducted CE research using qualitative, quantitative, and mixed methods [24]. Among country-level research, China and the European Union (EU) dominate the literature [23]. Interestingly, it would seem that current research on CE does not consistently base itself on established theories. Instead, each study applies a "theory" from the literature review and its relevance to CE [24]. However, the literature is not entirely devoid of theoretical perspectives driving research. Some scholars have employed the perspectives of institutional theory [30]; theory of planned behaviour (TPB) [31]; combination of stakeholder theory and resource-based view [12] to frame their research. This implies that CE studies are, more often than not, extremely contextual. However, due to its intrinsic connection to sustainability, we cannot treat CE solely based on geography or socio-cultural boundaries. Closed loops and other aspects of CE necessitate interlinking practices across geographies and industries.

Our review suggests that successful CE is a top-down process, starting with macro policies that empower stakeholders at the meso level to ensure appropriate implementation at the micro level. Extant research suggests that it is reasonable to expect legislation to be conducive and inimical to transitioning [32]; [33]; [34]. Regulations could be conducive to CE by proposing that energy prices reflect their potential environmental damage [35]. However, despite a favourable regulatory regime inadequate technology could still impede the metamorphosis of business designs and processes [36]. In the same context, the digital technology can also enable CE in usage-focused business models, besides helping to mitigate the drawbacks of usage-focused business models [37]. The studies demonstrate how digital technologies help achieve three value drivers of CE, viz., extending lifespan, closing the loop, and increasing resource usage efficiency. Cooper and Hammond [38] posit that the more business designs facilitate the recycling of products, the greater the possibility that consumers will make the effort to recycle the products they use. Along similar lines, Khan et al. [39] study business designs that enable upgradability and conclude that they are conducive to CE. However, changing business designs requires cooperation and collaboration between diverse and dispersed stakeholders. This is not always easy. For example, research shows an absence of cooperation and holistic perspectives in value chains [40] [41].

The above review demonstrates the integral role of social actors, i.e., organizational personnel and customers/consumers, in successfully establishing CE. After all, the best policies are laid waste if they remain on paper or if implementation is subverted to achieve suboptimal or self-serving results. Similarly, a CE may not be successful if the end users, i.e., customers, do not play their part. In this regard, Ranta et al. [42] find that consumers prefer new products to recycled ones. Urbinati et al. [43] suggest that a taxonomy of CE business models depends on appropriately addressing customer habits, preferences, and perceptions before transitioning to CE business models. Therefore, it is evident that while technological innovations and processes significantly contribute to CE, the critical determining factor is careful consideration of its social dimensions. Jabbour et al. [12] note that the lack of attention to the role of GHRM practices in CE strategies has hampered the micro-level application of CE practices. Juxtaposing this observation alongside the social impact of CE remains under-researched, arguably CE research on social aspects at a macro level needs more attention [4]. This would not only entail enacting policies that incentivise the adoption of a CE both at the meso and micro level but would presumably, also involve macro-level interventions that explicate the rationale and benefits of a CE to social stakeholders. Similarly, treaties and agreements at an international level could overcome technological limitations.

Emerging countries like India should adopt a CE approach by collaborating with advanced economies to achieve sustainable waste management [2]. Strengthening research and development (R&D) capabilities, digital enablement, streamlining guidelines on extended producer responsibility (EPR), anti-dumping measures, stringent environment statutes, and increased application of green technologies in recycling wastes are successful enablers of sustainably managing wastes from electrical and electronic equipment (WEEE) [44].

From the literature presented above and other studies on CE, it is evident that the literature covers various aspects of applying CE practices in a broad spectrum of activities, such as agri-waste and agri-food systems management; bioeconomy and biomass energy; industrial sectors, including construction, electronics manufacturing, coal, and petroleum refining; household waste and municipal (urban) solid waste management; e-waste and plastic waste management; urban water and wastewater; circular cities, etc.

3. Working of Circular Economy in India: A Sectoral View

The CE is envisioned as a critical pathway to attain the SDGs. The multi-stakeholder framework of CE, which advocates for a collaborative approach to conservation, efficiency, and recycling of resources, is very conducive towards collaborative consumption. The objectives of many developing countries' circular economy policies and efforts include the development of recycling infrastructure, fostering innovations, and promoting sustainable business models, particularly in sustainable product design. In this context, the remainder of this section delves into the current state and level of implementation of circular economy practices in both developed and emerging markets, with a specific focus on India.

Emerging economies such as India, with their potential to reconfigure supply networks and establish themselves as global manufacturing powerhouses, are likely to witness higher levels of material consumption due to rapid urbanisation, population growth, expanding industrialisation, and economic mobility. Although CE is a widely used approach in most developed countries, in India the knowledge about CE and its implementation is in its nascency [45]. India recovers and recycles just 20% of its raw material usage. India's traditional "take-make-waste" linear economic system seriously harms the environment and impedes its efforts to restructure its economy to achieve the SDGs. This can be efficiently managed only by shifting towards a circular approach and optimises resource utilisation. For India to achieve its development goals without jeopardizing its resources, shifting its economy toward circularity is crucial. Recognising innovation ecosystems and the circular economy is crucial for systemic transformation in business and industry, promoting eco-innovation and advancing sustainable development [46]. The CE paradigm is gaining traction in India because of the country's commitment to meeting the goals set by the 2030 Sustainable Development Agenda.

Due to rapid industrialisation, the country is facing massive waste management challenges. By generating 0.30 kg to 0.45 kg per capita daily, urban India alone produces approximately 0.15 million tonnes of MSW daily as of 2022. While waste generation is estimated at 165 million tonnes by 2031, it may reach 436 million tonnes by 2050 [47]. Recycling is a crucial component of the CE model, which enables closing the loop at the end of the product life cycle.

The proliferation of electronic and electrical gadgets, and the rapid expansion of information technology and globalisation, have witnessed explosive growth in emerging nations. With an estimated 3.23 million tonnes of electronic debris produced in 2019, India has risen to third place in the world's e-waste production [48]. Kumar et al. [44] predict India will produce 0.72 million tonnes of electronic waste annually by 2030. Due to supply chain constraints in managing e-waste, only one-third of the electronic and electric waste is currently processed by formal recyclers in India [48], while informal collectors of e-waste manage a significant proportion of e-waste. Nevertheless, informal e-waste processing is a major threat to sustainable environmental management in countries like India [48]. E-waste recovery and collection processes need to be streamlined in both formal and informal ways to ensure the sustenance of the e-waste industry in India. Focusing on developing policies for an efficient recycling system in India for products like end-of-life solar photovoltaic panels is critical for a sustainable circular-based economy [49].

Adopting modern business models based on CE principles effectively reduces CO2 emissions in emerging economies. The concept of CE has emerged out of mounting awareness about environmental concerns, legislation, and impact assessments. However, many internal and external factors, such as ineffective implementation of CE regulations, lack of financial and economic incentives, insufficient institutional support to promote CE practices, poor technical knowledge and skills, and a lack of CE mindset, affect the CE readiness of firms in developing economies [50], [51]. Stakeholder attitudes, environmental commitment, societal pressure, and incentives for a green economy significantly impact the CE preparedness of micro, small, and medium enterprises (MSMEs) in India [31].

Reducing waste and pollution with ongoing resource use, safeguarding the environment, and promoting a sustainable future for society are the main objectives of CE and crucial strategies for production and manufacturing companies in India [31]. Network-building capabilities with organisational innovation, combined with top management support as a full mediator, contribute to a sustainable competitive advantage for firms [52]. Small and medium-sized businesses (SMEs) embrace CE principles more quickly and creatively than larger companies [53]. In contrast, it is argued that the effective participation of SMEs in adopting CE practices in India is impossible as most of them are not fully organized and benefit less from government improvement programs. These firms adopt CE practices that typically are informal and disorganized, lacking a long-term strategy and vision [54]. Given the low awareness levels of CE in India, it is crucial for a sustainable future to educate students, particularly engineering students, about sustainable education and circularity models, and integrate them into the current syllabus [55].

In the following, we critically review the adoption status of CE practices across various sectors in India and potential sustainability linkages based on the existing literature. We have classified the literature according to the industry/business sectors' sectoral approaches to CE adoption in India and the range of CE practices they employ. The process entails a thorough review of previously published literature. Using "circular economy" as the search keyword, we first sourced the review articles on CE from the Scopus database. We collated 658 review articles containing circular economy in the title or abstract, and at the second level, we filtered the review articles focusing on industry and region-specific CE practices, particularly in India, by reviewing publications primarily ranked in the first quartile of Scopus. There were 10 review articles focusing on sector-specific CE practices, with a particular emphasis on India [56]; [23]; [57]; [58]; [59]; [60];[48]; [61]; [61]; [62].

Reviewing these studies reveals a dearth of review articles specifically addressing the application of CE practices in biomass-based energy production within the Indian context. Additional reviews on sustainability in this field focussing on its social, environmental, and economic aspects could provide valuable insights into the effective integration of CE principles into bio-energy production. It also becomes crucial to study the environmental aspects of key segments of waste management recovery in the Indian context, such as household waste, solid waste, and e-waste, and how they could contribute to sustainability. It is crucial for businesses seeking to align with circular economy goals and reduce their environmental impact to integrate reverse logistics. There are currently no review articles that address reverse logistics within India. Moreover, the existing review articles in the Indian context primarily concentrate on the key segments integral to the circular economy. The existing reviews lack an industry-based strategy for analysing the uptake of circular economy practices. It is also observed that the existing reviews have not provided a comprehensive analysis of CE policies within the Indian context. It is vital to critically review the key policy areas that governments and organizations can consider when promoting energy efficiency and sustainability within a circular economy. Against this backdrop, the previous studies on sectors such as bio-energy, material, and energy recovery, remanufacturing and reverse logistics, industrial sectors, energy efficiency, and sustainable businesses that play crucial roles in advancing the principles of the circular economy have been reviewed below.

3.1. CE and Bio-ENERGY SECTOR

The substitution of traditional fuel for cooking and chemical fertilisers with organic fertilisers greatly aids rural India's adoption of the circular economy [63]. The first set of 5 reviewed papers concentrates on applying circular economy principles in the bio-energy sectors, exploring the potential of biorefineries as a viable alternative to petrochemical refineries [64]. These refineries offer a variety of value-added products from agri-biomass waste, particularly biogas/compressed bio-methane (CBM) gas [57]; [65]; [63]. This offers immense opportunities for marginalized small farmers in India to contribute to the CE transition [66]. As residues from crops and livestock, previously considered useless and discarded as waste, find their way to centralised and decentralised biogas plants, rural (village) environments receive a boost in promoting CE practices, ultimately resulting in a notable decrease in greenhouse gas emissions [63].

Widespread promotion and adoption of CE guidelines in the bioenergy field by farm households can also have a positive environmental impact by reducing emissions from burning agri-waste [57]. Tayal and Das [65] investigate the biofuel production potential of sewage treatment plants (STPs), noting that the revenue from biofuel production enables the STPs to transition to a clean technology-based CE domain, thereby becoming self-sustaining entities in the long run. Härri et al. [66] note that the CE process of biomass-based energy production suffers from an institutional void, necessitating the integration of several institutional factors such as crop production, information systems, and labour marketplaces.

3.2. CE Model for Waste Management and Material and Energy Recovery

India is expected to produce approximately 22 million tonnes of marble debris and 20 million tonnes of FGD gypsum by 2040. Converting marble waste and FGD gypsum into construction materials helps achieve sustainability in the construction industry [67]. Formal waste management systems are necessary to advocate for the establishment of organised collection, recycling technology, enhanced regulatory oversight, and mobile monitoring capabilities in construction and demolition waste management [68]. In India, industries such as the renewable energy sector [69] and the healthcare sector [70] pay little attention to adopting CE principles.

A set of 12 papers that we reviewed focused on various segments of waste management, ranging from management of household wastes, municipal solid wastes (MSW), and plastic waste (PW) management, to material recovery from e-waste [71]; [72]; [73]; [74]; [75]; [76]; [48]; [70]; [77]; [78]; [79]; [80]. Kamble et al. [72] consider the CE model ideal for managing municipal garbage in India thereby closing the loop by reducing residual waste generation. They identify 30 factors for the successful application of CE, with ratings and weights for the decision-makers of each factor. Further analysis also identified nine critical success factors enabling the implementation of CE. While examining the effect of COVID-19 on the realisation of the SDGs, Sharma et al. [61] observe that CE-based waste management offers immense potential for stimulating green recovery and thereby achieving the intended SDG targets.

Fiksel et al. [74] examined case studies of CE implementation and said that adopting CE practices by rural and urban communities for managing solid and electronic waste seems to be beneficial in many ways, including improving sanitation, protecting the environment, making money and improving people's way of life, and changing people's habits to be cleaner in the community. On the other hand, a case study on informal waste pickers in the two cities in the global south, viz., Delhi (India) and Sao Paulo Municipal Area (Brazil), by [81] highlights their contributions to recycling activities, which closes the loop in the waste management cycle. In this regard, informal waste pickers tend to organize in cooperatives to tackle waste management problems. Nevertheless, a thorough examination of the living conditions, potentials, and needs of informal waste pickers in urban areas to significantly contribute to the transformation of the circular economy is crucial.

Consequent to expanding solar energy systems with end-of-life (EOL) PV panels, e-waste disposal, and management poses a new set of challenges where CE can offer sustainable solutions. In this regard, Gautam et al. [49] assess the quantum of solar panel e-waste that India produces and suggest that CE processing through recycling can help recover raw materials. They forecast that the size of solar PV-based e-waste generation may reach 2.95 billion metric tonnes by 2047 (including USD 645 trillion worth of critical metals) with a potential recovery rate of 70% by using state-of-the-art CE recycling technology.

Eco-friendly recycling of gold particles from outdated cell phones may benefit India economically, environmentally, and socially. In this regard, Chaudhary and Vrat [78], based on a system dynamics (SD) approach, propose a model of the circular flow of gold flakes in mobile phones from the manufacturing to recycling phases. The study simulates nine scenarios of system behaviour, which in turn offers useful policy insights for promoting the recycling of cell phones in India.

The studies clearly show that future strategies will shift from the linear economy (LE) model, characterized by a 'take-make-use-dispose' lifecycle, to the circularity model, based on 'reduce, reuse, and recycle' across business sectors. However, this shift calls for aligning resource management flows across the product value chain through judicious integration of reverse logistics, creative design, shared ecosystems, and innovative business models [82]. For India to transition to CE, it requires an enabling environment in terms of a legislative framework, state/government support, identifying the best practices, plans, and targets, and learning from cross-country experiences [77].

Extant and ongoing research on waste management (WM) in developed economies appears to offer immense scope for expanding the horizon of research and actions related to CE in countries like India. However, it is important to consider that WM techniques in India are less efficient due to their silo mentality [79]. This makes it imperative to further promote and adapt effective CE-integrated WM practices through community education and awareness programmes.

Priyadarshini and Abhilash [80] ascertained the link between circularity and sustainability in India by exploring the role of waste management and renewable energy together with new governmental efforts and a guiding framework that encourages the adoption of circularity concepts. Research on waste-to-energy recovery shows a lack of integration with sustainable development (SD). Despite India's commitment to achieving the SDGs, the current WM legislation for municipal, plastic, and e-waste lacks CE integration, necessitating major efforts to integrate CE principles into regulatory administration. To further support India's efforts to achieve circularity and SD, it is essential to effectively incorporate WM and RE policies into the larger CE policy framework.

3.3. CE Through Remanufacturing and Reverse Logistics

Even though consumers must accept remanufactured products as a measure to achieve circularity, a body of literature observes that customers are often hesitant to purchase such refurbished products. For instance, Singhal and Tripathy [83], surveyed 1534 respondents to study consumers' purchase intentions (PI) behaviour towards refurbished products. They employed a structural equation model (SEM) and observed that market strategy, attitude, personal advantages, product knowledge, risk perception, and subjective norms influenced customers' purchase intentions. Hence, the attitude of consumers towards remanufactured products (and thereby, CE) needs to be conditioned positively through the dissemination of product information.

Organisations and commercial entities view reverse logistics (RL) as a vital strategic differentiator for promoting CE, creating value, and achieving a sustainable environment. In this regard, Dutta et al. [84], explore how RL practices might increase the operational effectiveness of CE processes while fostering cleaner production in India. They listed obstacles hindering RL implementation, including lack of initiative and accountability of top management, and offered a practical strategy to overcome them. They also recommended important tactics businesses might use for customer education, good logistical network utilization, and effective warehousing.

3.4. CE Practices as Applied by Industrial Sectors in India

A set of ten papers explores the application of CE principles and practices across various industrial and service sectors in India, such as small and medium-sized businesses [54]; the Ayurveda industry [53]; the cement industry [26]; heavy-duty and off-road vehicles [85]; making elastic products [86]; cleaning urban wastewater [23]; extracting nutrients from wastewater [87] [88]; and other sub-sectors, like building, home energy use (domestic lighting), smart city projects [89], refrigeration, and air conditioning [90].

The skewed nature of India's industrial structure towards SME sectors presents a major obstacle to the adoption of CE practices, as the sectors are not yet fully organised and equipped for transitioning to CE. These sectors are often disadvantaged in receiving support from national and local governments and other institutional agencies, especially banks. This makes transitioning to CE a daunting task. Sohal et al. [54], explicate that the basis for promoting and adopting CE practices in SME sectors in India needs to be based on a culture that emphasises waste reduction and increasing the recycling, repairing, refurbishing, and reuse of products and materials. However, a significant portion of CE processes and practices lack a clear vision and operate in an unstructured or informal manner. Sohal et al. [54], clarify precisely how societal, technical, and environment-related factors affect CE using the sociotechnical systems (STS) framework. The paper also elaborates on key enablers and motivations that executive managers, policymakers, and business associations may use to assist SMEs in transitioning into a CE framework.

Pereira et al. [53] investigate the capacity of SMEs to evolve and adapt CE practices in the setting of emerging markets. While a vast literature focuses on larger firms operating in the developed world, their study focused on the Indian Ayurveda industry, which underscored the nuances of CE activities. Based on a systematic bibliometric analysis, they highlighted various emerging themes related to CE and suggested how SMEs in the Ayurveda sector could more actively support the CE transition by providing useful insights on the causes, catalysts, and motivations.

Kukreja et al. [26] observed that the cement industry contributes to CE through (a) the circular supply chain and (b) recovery and recycling. The industry uses waste from various industries as replacement materials and fuels. Due to its high-temperature incineration process, cement manufacturing supports environmentally sustainable waste utilization, leaving no residue; thus, it offers a backbone for waste-generating industries.

One of the few cases that helps students better understand the significance of circular economies is Prashar's [85] study of adopting CE principles in the heavy-duty and off-road industrial sectors. The study examines the impact of CE principles on decisions related to product design, planning, and control and explores the impact of circular business models on operations management decisions. The case also helps students evaluate the challenges and opportunities of remanufacturing businesses in the wider context of various industries. The implementation of Industry 4.0 technologies substantially impacts the performance of the circular economy in organisations, due to its considerable influence on green procurement and remanufacturing processes [91].

In India, there already exists a strong culture of repair and renovation incorporating the 6R principles. To achieve the SDGs, Siddiqui and Pandit [89] examine the role of CE opportunities in India's Smart City Mission (SCM) and make recommendations based on them. They have mapped out the ReSOLVE framework, which integrates CE prospects in cities, in a matrix. Despite the SCMs accelerating the transition, Siddiqui and Pandit [89] provide recommendations to implement CE principles efficiently.

A conceptual paper by Vimal et al. [86] expounds on an assessment system for product development based purely on circularity criteria with a case study of elastic product manufacturing in Gujarat (India). By functioning as a standard tool for measuring product circularity, the assessment system closes the gap. The study was deemed relevant due to the absence of a simplified approach in extant literature measuring the circularity of product development. The study also formulates a sustainable product circularity index (SPCI) using a sustainability assessment model based on five perspectives: the circular flow model, environmental sustainability, material circularity, economic sustainability, and sociological perspectives.

From economic, ecological, societal, and technological perspectives, Kakwani and Kalbar [23] present a systematic review of the growth in global adoption of CE in the urban water sector. They include 98 articles that examine the status of complying with CE in the worldwide water industry as well as various tactics for promoting and advancing CE implementation. Additionally, it examines the 6R principles in waste management, viz., reduce, reuse, recycle, reclaim, recover, and restore the six BS8001:2017 principles to make recommendations for the successful application of CE in the water sector. The paper also discusses the multi-faceted challenges in using the CE framework in India's water sector, related to technological, economic, institutional/governance, and social domains.

At the same time, the urban water sector presents immense opportunities for the implementation of CE. These opportunities include the creation of new infrastructure for wastewater treatment, the establishment of decentralised wastewater collection facilities, the reclamation of wastewater from residential sectors for use in industries and commercial areas, the recovery of resources from wastewater in the form of water, energy, and materials, the creation of regional and local jobs, and the use of reclaimed wastewater for agricultural purposes.

Lately, CE-based wastewater treatment systems have been gaining importance in India and similar countries as they provide opportunities to recover and reuse resources from wastewater during the process of clean water production. A sustainable and self-sufficient circular economy views the recovery of nutrients from waste as a progressive choice. Nutrient recovery techniques such as ion exchange, microalgae production, chemical precipitation, and fuel cells can recover nitrogen (N) and phosphorus (P) from wastewater [87]. An analysis of chemical precipitation resources revealed that 1 million litres of sewage can generate 17.3 kg of struvite daily, a phosphate fertiliser that can outperform traditional fertilizers. While promoting clean technology in India, researchers have also investigated the viability of selling biofuel made at various sewage treatment plants (STPs) as cooking fuel. The money raised in this regard would be used to pay for these facilities to advance India's circular economy transition [65].

In India, where nearly two-thirds of urban wastewater is untreated, wastewater biorefinery solutions such as nutrient recovery are essential CE to be sustainable. However, wastewater utilisation for N and P recovery has received very little attention in India. Gowd et al. [87] [88], analyse four alternative nutrient recovery strategies in the mass and energy balance context to comprehend the total process flow. According to resource estimation research, chemical precipitation can produce 17.3 kg of wastewater-derived struvite per day from 1 million litres of sewage at an 80% recovery rate. Nutrient extraction from sewage water can reduce imports by 0.38 Mt/a compared to traditional fertilizers. Using struvite from wastewater instead of conventional fertiliser reduces emissions by 663.2 kg CO2 eq/ha. The predominant WW treatment considers keeping the norms for discharging while recovering nutrients as a cutting-edge choice for a self-sufficient and sustainable circular economy. The realization of the aforementioned technologies on a large scale, however, necessitates more detailed studies from a techno-economic and ecological viewpoint.

3.5. CE Policies for Energy Efficiency and Sustainable Businesses

To promote energy efficiency, the Indian Government's Ministry of Environment, Forests, and Climate Change (MoEFCC), established the National Resource Efficiency Policy and the National Resource Efficiency Advisory Board (NREAB). The Board suggested implementing various action plans and strategies to address climate change, carbon emissions, resource recovery, and circular economy approaches across various sectors at the national level.

Goldar et al. [90] reviewed the policies adopted by top G20 nations for achieving material efficiency in the CE transition and also compared India's effectiveness with the policies and regulations in China and Germany in reducing energy use and emissions. It addressed some of the concerns about increasing material productivity in India and its potential engagement with the G20 to plan resource efficiency measures.

Energy-efficient policies in India also highlight the need to integrate CE strategies to overcome the prevalence of energy scarcity. In this regard, Sawhney [92] discusses the need to ensure universal access to clean energy through energy transition policies, which would entail drastic legal reforms to restructure the power industry and increase the usage of RE. The study also emphasizes the urgency of establishing policy regularity across industries to ensure the adoption of crucial Clean Energy (CE) policies in the advancement of clean renewable energy.

Plastic pollution is relentlessly mounting due to the lack of regulations on the treatment and recycling of plastic waste (PW) materials, especially in emerging nations like India. India generates about 15 million metric tonnes of plastic waste annually, yet its inefficient solid waste management system recycles only a fourth of it. Hence, the implementation of effective and sustainable plastic waste management, restructuring of reverse logistics optimisation, improving source-specific waste reduction and resource recovery, and the implications of extended producer responsibilities (EPR) are major concerns in India [71].

Hossain et al. [71] present a review of the current state of plastics manufacturing and trash generation in India. They scrutinize the statistics on plastic waste management (PW) and highlight several urgent issues, such as the management of reverse supply chains, the regulation of plastic waste, and their recovery in India. The review emphasising circularity and achieving the SDGs assists in the identification of workable policies for decision-makers, and research avenues in recycling and sustainable PW management in India.

CE strategies contribute to the development of sustainable business development in India, an area that requires increased promotion to effectively reduce carbon emissions. Ahmed et al. [93] report that the Paperman Foundation (also known as Paperman) adopted a viable circularity-based business model that relies on resource extension. In this case, scaling up operations enabled sustainable resource recovery from post-consumer disposable plastics, thereby reducing CO2 emissions. The paper suggests that the newly emerged CE business models help reduce emissions in developing and transitional economies, including India.

While CE practices emerge as sustainable growth strategies for the future, it is even more important to bring about radical changes in the behaviour of individuals, firms, and other stakeholders concerned about embracing circular approaches. In this regard, Singh et al. [31] conducted an earlier study on the CE readiness of small firms, which examined the application of an expanded theory of planned behaviour (ETPB) model. Supplementary elements of the model consider the incentives for a green economy and environmental commitment. The empirical validation of the ETPB model versus the original TPB model revealed that green economic incentives and environmental commitment with standard elements better describe the CE preparedness of enterprises. The study revealed that there is a positive and considerable influence of mindset, societal pressure, commitment, and economic incentives on CE preparedness. The study offers a solid foundation for developing strategic plans to promote the adoption of circularity in small manufacturing businesses.

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4. Circular Economy Pathways to SDGs

The literature depicting the correspondence between CE practices and sustainable industrial or business outcomes enables us to draw useful insights on the contributions of CE towards the achievement of UN SDG Agenda 2030. Numerous studies highlight the significant connections between circularity and sustainability, underscoring the need to formulate strategies and actions that align CE practices with specific SDG targets in India's business and economic sectors. The development of these strategies and actions necessitates a comprehensive framework (Figure 2) that combines the essential elements of an industrial or business ecosystem, which encompasses a green system, with organizational and institutional facilitators, also known as 'strategic enablers of CE'. These strategic enablers in turn help create a CE ReSOLVE business model incorporating the core CE principles of (a) Regeneration, (b) Sharing, (c) Optimisation, (d) Loop (e) Virtualisation, and (f) Exchange. Such a ReSOLVE model can be directed to achieve specific SDG targets directly (SDG 12) and indirectly (e.g., SDG2, SDG6, SDG8, and SDG13). As also observed by Nair et al. [94], we consider it more efficient to focus on selected SDGs rather than targeting all.

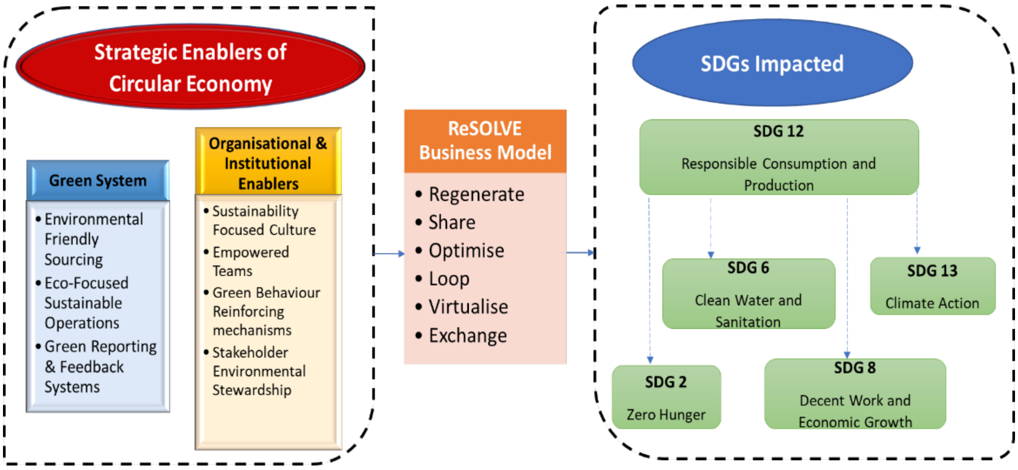

Figure 2. A Holistic Framework to facilitate transition to Circular Economy and achieve SDGs. *Source:* Authors' compilation based on Jabbour, et al., [12].

Castro et al. [95] finds that external and internal factors, in combination, influence the transition to CE. We categorise these influences as strategic enablers of a circular economy. Further, we label the external and internal factors as Green Systems and Organisational & Institutional Enablers respectively. Functioning synchronously, they provide a foundation for the ReSOLVE model and positively impact SDG 12. Green Systems comprise of:

4.1. Strategic Enablers of Circular Economy: Green Systems

We envisage green systems to comprise of the following:

(a) Environmentally Friendly Sourcing: Due to regulatory requirements and stakeholder scrutiny, firms are increasingly pressurised to ensure environmentally friendly supply chains [96]. Therefore, choosing "green" suppliers is crucial for firms aiming to establish themselves as sustainable entities. Research has well documented the positive impact of green suppliers on profitability and sustainability metrics [97] [98]. While a considerable body of research has investigated various aspects of supplier selection from a sustainability perspective [39] [99] [100], it appears skewed against developing markets. Specifically, we concur with Ghosh et al.'s [96] cognisance of the need for a modus of selecting green suppliers in developing markets and find their suggested multi-criteria decision-making (MCDM) framework appropriate to the context of the current paper. Ghosh et al. [96] situate their study in India, and their MCDM framework considers the economic-social-environmental costs and benefits of supplier actions. The geographical context of their study leads us to consider their supplier benchmarking modus a suitable starting point for organisations transitioning to CE.

(b) Eco-focussed Sustainable Operations: According to Kleindorfer et al. [101], sustainable operations involve integrating traditional efficiency measures with the environmental impact of a firm's production operations. Of the three components of sustainable operations identified by [102], logistics decisions impact the aforementioned green supplier selection directly, and production/process decisions impact indirectly. Jabbour et al. [12] recommend the ReSOLVE model for organizations that seek to transition to CE. While they map the ReSOLVE model to the Internet of Things (IoT), we opine that this may be inappropriate in the context of developing markets. Further, we extend their model and posit that an eco-friendly focus is also required to ensure a more seamless fit with green supplier selection. However, we concur that technology and information systems are expected to play a significant role. Particularly in a developing market setting, we envisage that achieving sustainable operations requires sharing information among players within the same industry. An association of industry members could maintain, for example, best CE practices, preferred sources of materials, pricing structures, sustainability programs, etc. in a database. This data could be made available to all or registered members, which would help ensure optimal synergising of sustainability operations across different firms.

Since small firms may not have the wherewithal to actively employ sustainable operations, hence, we suggest that industry federations assist them in transitioning to such operations fostering circularity. The federations could incentivise larger firms to "mentor and shepherd" the less endowed firms. According to institutional theory, we anticipate that firms will adapt their practices and processes to ensure their legitimacy as sustainable organizations.

(c) Green Reporting & Feedback Systems: Martin and Moser [103] report that disclosing green activities leads to favourable investor reactions. Indeed, they discover that managers, in response to investor reactions, would rather reveal the absence of any green investment than make no disclosure at all. This, along with the stakeholder and regulatory influences mentioned earlier, could explain the finding by KPMG that sustainability reporting has steadily increased over the years [104]. Therefore, we propose that consistent disclosures of measures taken towards achieving CE would enhance the effectiveness of the ReSOLVE model. Martin and Moser's [103] findings are based on voluntary disclosures in a developed market and therefore may not seem extendable to an emerging market with mandatory CSR disclosure. However, our position is justifiable because, firstly, compliance with mandatory disclosure requirements does not dilute the favourable disposition of investors; if the mandatory requirements are buttressed with additional (hence, voluntary) information, it could still appeal to investors. Secondly, in an increasingly globalized economy, such disclosures could be instrumental in attracting investments abroad.

Disclosures are contingent on the existence of feedback systems that provide relevant information. We suggest that industry federations/consortiums develop reporting and disclosure parameters that provide quality information to their stakeholders. This reiterates our earlier point about information systems being significant in transitioning to CE. The data available at the firm level will need to be captured separately to enable, presumably, a variety of consolidations. Furthermore, such federations/consortiums should not restrict themselves to merely monitoring the firms or becoming a repository of information. Rather, these institutions ought to be proactive in providing remedial assistance and recommending progressive directions.

4.2. Strategic Enablers of Circular Economy: Organisational and Institutional Enablers

We perceive organisational & institutional enablers to be based on an environment that facilitates:

(a) Sustainability-Focused Culture: Extant circumstances demand that to be successful, firms diligently put forth systematic efforts towards fostering an organisational culture that embraces sustainability at all levels [105]. Despite the widespread recognition of sustainability's importance and relevance, developing markets often lag in its implementation. Altering this would most likely call for cultural change. Following prior literature [105] [106], we posit that demonstrating the significance that sustainability holds for organizations is a top-down (albeit non-linear) exercise. A sustainability-focused culture ought to be visible from a firm's mission statement through to its performance management modus. This implies that recruitment, training, appraisal, and retention policies and practices unequivocally spell out the firm's commitment to sustainability. This is crucial because employee expectations have the potential to shape their attitudes, which could then infiltrate the organisational culture. Galpin et al. [105] suggest that employee engagement in the firm's sustainability programs could lead them to replicate this sentiment in their non-official social interactions as well. In that case, it is reasonable to expect that they will demonstrate this in an official milieu, which could have a favourable impact on green supplier selection and also encourage the transition to CE.

(b) Empowered Teams: Teams empowered to initiate and implement sustainability and CE measures should supplement the integration of sustainability and CE aspirations into the organisational culture. If human resource (HR) policies are driven by the ethos of sustainability, it is reasonable to expect that employees will place trust in their ability to not only continue existing programs but also take the initiative to institute new measures aligned with sustainability and CE. In the absence of empowered teams, despite the best intentions, an organisation is liable to significantly trail best practices. Corporate history is replete with examples of best-in-class companies falling behind the competition due to an inability to match metamorphosing circumstances. A transition to CE requires constant examination of the status quo as well as systems that accommodate multiple paths of communication flows. This implies an agile organisation with an appetite for innovative and adaptive mindsets. Empowered teams form such an organisation and are arguably best suited to achieve CE with a focus on sustainability.

(c) Green Behaviour Reinforcing Mechanisms: While this may seem like an extension or even repetition of the previous two cornerstones of organizational and institutional enablers, we intend it to imply a much wider scope. Here, the emphasis is not just on employee behaviour; rather, we envision an organization that rewards and reinforces green behaviour throughout its value chain. This includes the supply chain. Thus, we bat for organisations that recognise and, probably, reward stakeholders' measures towards CE. Once the corporate culture and team dynamics discussed earlier materialise, it is conceivable that inter-organisational collaborations will occur and that there will be spillovers of learning and experience. At this point, we argue that, as long as the long-term viability of the firm is not jeopardised, leadership ought not to be overly constrained by thoughts of porous confidentiality and potential weakening of tactical positioning. Martin and Moser [103] state that the pecuniary cost of investing in sustainability always exceeds the pecuniary benefit, but not necessarily the societal benefit. Considering the umbilical link between sustainability and CE, it is reasonable to extend the ambit of Martin and Moser's [103] statement to include CE.

(d) Stakeholder Environmental Stewardship: Our conception of environmental stewardship aligns with that of Bennett et al. [107], as they consider the influence of stakeholders on an organization's social impact (which we extend to include the impact of sustainability programs). We advocate the use of Bacq and Eddleston's [108] framework as a template for policy developers and practitioners. The interdisciplinary scope of this framework, which incorporates evidence from studies in environmental stewardship, management, and governance, motivates our choice. Any organisation can likely adapt Bacq and Eddleston's [108] framework, acknowledging that the context (socio-economic, politico-cultural, and environmental) shapes the stakeholders whose motivations and abilities align with the organization's sustainability goals. We are aware that small firms may not have the wherewithal to actively employ sustainable operations and hence suggest that larger firms could assist them in transitioning to such operations. These larger firms could include such assistance in their CSR projects. Martin and Moser [103] use CSR disclosures to reach their conclusions, supporting our proposal to classify larger firms' efforts to help smaller firms transition to CE as CSR.

As is evident from Figure 2, we have focused on the meso and micro levels. We posit that the Green System gains relevance at a meso-level (i.e., industry/sectoral), while the organisational and institutional enablers are more relevant at a micro-level. Arguably, measures at the micro-level are facilitated by conducive measures at the meso-level. Our framework thus brings to the fore the need for collaborative partnerships between stakeholders. At a macro level, the Government of India (GoI) has launched many programmes aimed at integrating CE principles into the mainstream commercial milieu of the country. For example, the GoI announced a new scheme entailing the construction of 200 compressed biogas (CBG) production plants and 300 community-based facilities, specifically to promote CE. While we acknowledge Harris et al.'s [109] representation of macro considerations in Figure 2, it detracts from our core argument that, when it comes to MSMEs, the approach of "individual players" matters more than national policies and regulatory mechanisms. The preceding narrative suggests that a shift in consumer mindsets and the availability of commercially viable recycling facilities could catalyse the entrenchment of a circular economy in India.

5. Conclusions

Globally, industrial and business practices are undergoing a paradigm shift away from the linear production approach toward circular economy pathways as an essential strategy for achieving the 2030 agenda. The current paper reviews the extant literature on CE to determine prevalent practices, future directions, and potential hurdles concerning the adoption of CE practices. Our review reveals the rapidly expanding scope of the burgeoning literature covering various aspects of circular practices in the global context. In addition, the paper also reviews emerging trends in the adoption of CE across sectors in India. Our analysis demonstrates that advances in the circular economy and its wider promotion will increase the capacity of rural and urban sectors to significantly contribute to economic growth while minimizing their ecological footprints and creating positive environmental externalities.

The Indian government has launched several programs and initiatives to promote a circular economy, such as sustainable water management (Namami Ganga, etc.) and environmental cleanliness, focusing on environmental cleanliness, minimising waste, and promoting source-based waste segregation (Swacch Bharat Abhiyan, etc.). The government has also launched various schemes to promote the utilisation of renewable energy sources and energy efficiency, which are essential elements of the circular economy. Reportedly, with the effective implementation of CE practices across sectors, India could lower its release of greenhouse gases by 45% by the year 2030. It is also estimated that India’s adoption of CE would generate $624 billion in benefits annually by 2050 [110]. Despite India’s commitment to achieving the SDGs, the penetration and scaling up of CE principles require significant efforts, as the existing environmental management activities are sector-specific and have a narrow focus. However, wider promotion and upscaling of CE practices leading to sustainable development outcomes across all economic and industrial sectors in India call for the formulation of consistent and comprehensive CE policies.

The private sector in India has also taken steps toward implementing circular economy methods in their operations. Several companies have launched initiatives to reduce waste and promote resource efficiency. For example, major steel manufacturers have launched firm-specific programs to recycle steel scrap and reduce waste generation (e.g., Tata Steel). Similarly, some automobile manufacturers in India have launched initiatives that promote the use of electric vehicles and reduce emissions (e.g., Mahindra & Mahindra). Furthermore, Indian civil society and non-governmental organisations are dynamically promoting the CE concept. For example, the Centre for Environment Education (CEE) is working to promote waste segregation and composting in schools and communities.

Despite the abundance of pan-India policies and incentives, our review of existing research indicates that industry/firm-specific efforts and consumer support play a crucial role in achieving CE in India. Taking cognisance of that, we propose a framework that underscores the need for collaborative partnerships between stakeholders. The framework delineates those factors that play out at an industry/sectoral level and those that play out at firm-specific levels. Furthermore, the framework identifies specific SDGs that the implementation of the framework could positively impact. Nevertheless, the framework proposed by us would need critical empirical validations through the development and measurement of CE indicators based on industrial and business sectors, considering the organisational structure and contexts within which small, medium, and large businesses operate. Therefore, we propose this as a new research area aimed at validating the impacts of adopting CE principles and practices across Indian business sectors and developing policies and recommendations for a sustainable transition to CE.

Our study is not without limitations. Inter alia, we have not elaborated on macro-level measures that are necessary for switching to CE processes. In the absence of policies and incentives, firm-level initiatives are likely to be sporadic and opportunistic at best. Thus, further research is recommended to determine appropriate policies and their implementation focusing on sustainable development and their effectiveness in making a smoother CE transition in India aligning with global trends.

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Appendix A

Appendix A associated with this article can be found in the online version

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