

Katigbak, Jovito Jose P.; Villaruel, Jemimah Joanne C.

Working Paper

Assessing the Adoption of Circular Economy among Women-Led MSMEs in Metro Manila: A Pilot Study

PIDS Discussion Paper Series, No. 2023-30

Provided in Cooperation with:

Philippine Institute for Development Studies (PIDS), Philippines

Suggested Citation: Katigbak, Jovito Jose P.; Villaruel, Jemimah Joanne C. (2023) : Assessing the Adoption of Circular Economy among Women-Led MSMEs in Metro Manila: A Pilot Study, PIDS Discussion Paper Series, No. 2023-30, Philippine Institute for Development Studies (PIDS), Quezon City

This Version is available at:

<https://hdl.handle.net/10419/284629>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

DISCUSSION PAPER SERIES NO. 2023-30

Assessing the Adoption of Circular Economy among Women-Led MSMEs in Metro Manila: A Pilot Study

Jovito Jose P. Katigbak and Jemimah Joanne C. Villaruel



The PIDS Discussion Paper Series constitutes studies that are preliminary and subject to further revisions. They are being circulated in a limited number of copies only for purposes of soliciting comments and suggestions for further refinements. The studies under the Series are unedited and unreviewed. The views and opinions expressed are those of the author(s) and do not necessarily reflect those of the Institute. Not for quotation without permission from the author(s) and the Institute.

CONTACT US:

RESEARCH INFORMATION DEPARTMENT
Philippine Institute for Development Studies

18th Floor, Three Cyberpod Centris - North Tower
EDSA corner Quezon Avenue, Quezon City, Philippines

publications@pids.gov.ph
(+632) 8877-4000

<https://www.pids.gov.ph>

Assessing the Adoption of Circular Economy among Women-Led MSMEs in Metro Manila: A Pilot Study

Jovito Jose P. Katigbak
Jemimah Joanne C. Villaruel

PHILIPPINE INSTITUTE FOR DEVELOPMENT STUDIES

December 2023

Abstract

Buoyed by favorable developments at the global and regional levels, circular economy (CE) has been emerging in the Philippines due to an increasing call for the effective mainstreaming of sustainable principles and practices across various economic sectors. Often characterized as an industrial system that is regenerative or regenerative by design, CE presents guidelines that enable business-, society-, and environment-friendly economic development. This is vital for the Philippines as it seeks to address waste management issues and reduce carbon emissions through the advancement of Sustainable Development Goal 12: Sustainable Consumption and Production. Notably, the government has enacted and implemented several laws, policies, and regulations to steer the country towards cleaner production. The private sector and external partners are similarly promoting CE through their respective programs, projects, and activities.

Notwithstanding the current initiatives, there is a need to focus national thrust and efforts towards the micro, small, and medium enterprises (MSMEs) as they comprise over 99 percent of all businesses in the Philippines. This is especially true for women-led MSMEs as they composed around 60 percent of business name registrations in 2019. Hence, this pilot study sought to assess the level of CE adoption among WMSMEs in Metro Manila through a survey questionnaire, which garnered 58 responses. It found that there is a low level of awareness regarding CE principles and CE-related government programs among the respondents and lack of demand for circular goods/services by the customers. These translate to misalignment between CE principles and their firm's strategy and business model. The results also show that majority of the WMSMEs in Metro Manila still practice linear methods as evidenced by non-use of renewable resources, lack of resource recovery strategies and post-sales services, and absence of ecodesign. The respondents exhibited somewhat positive performance in waste management. In addition, WMSMEs do not engage in CE-oriented partnerships and collaborations with their co-enterprises and customers.

Accordingly, the Philippine government may consider a multi-level approach in mainstreaming CE among (W)MSMEs. Micro level initiatives may include advocacies on CE, training programs for MSMEs, provision of incentives and business support schemes. At the meso level, smart regulation and mini eco-parks may be explored. Lastly, the development of a national framework and monitoring mechanism may be critical undertakings at the macro level.

Keywords: circular economy, Philippine Development, Sustainable Development Goals, SMEs, women-led MSMEs

Table of Contents

1. Introduction	1
2. Review of Related Literature	4
3. Conceptual Framework of the Study	14
4. Methodology	15
5. Data Presentation and Analysis	16
6. Conclusion and Recommendations.....	26
7. References	28

List of Figures

Figure 1. The Butterfly Diagram of the Circular Economy.....	5
Figure 2. Benefits of Circular Economy according to UNCTAD	6
Figure 3. PAP4SCP Strategic Framework.....	10
Figure 4. Conceptual Framework	14
Figure 5. Age of Respondents.....	17
Figure 6. Primary Products/Services of Respondents	17
Figure 7. Level of Understanding by WMSMEs Regarding CE	18
Figure 8. Level of Understanding by WMSMEs Regarding CE	19
Figure 9. Awareness of WMSMEs concerning CE-related Government Programs.....	20
Figure 10. Familiarity with the Benefits of CE	20
Figure 11. Alignment of Business Strategy and Vision with CE Principles.....	21
Figure 12. Significance of CE Adoption for Business Sustainability and Success.....	21
Figure 13. Post-Sales Services related to CE	22
Figure 14. Level of Knowledge about Sustainable Materials Sourcing and Procurement	23
Figure 15. CE-related Patents by WMSMEs	25
Figure 16. Involvement of WMSMEs in Industrial Clusters	25

Assessing the Adoption of Circular Economy among Women-Led MSMEs in Metro Manila: A Pilot Study

Jovito Jose P. Katigbak¹ and Jemimah Joanne C. Villaruel²

1. Introduction

The Asia-Pacific Economic Cooperation (APEC) forum has urged member economies to support the realization of a balanced, resilient, and sustainable economic recovery through three primary frameworks, namely, APEC Putrajaya Vision 2040, the Aotearoa Plan of Action, and the Moving towards Economic Recovery and Resilience Report (APEC Secretariat 2022). In particular, the Putrajaya Vision envisages an open, dynamic, resilient, and peaceful Asia-Pacific community by 2040, which will be achieved via trade and investment, innovation and digitalization, and strong, balanced, secure, sustainable, and inclusive growth. On the last economic driver, APEC leaders pledged to

“ensure that the Asia-Pacific region is resilient to shocks, crises, pandemics and other emergencies, we will foster quality growth that brings palpable benefits and greater health and wellbeing to all, including MSMEs, women and others with untapped economic potential...We will promote economic policies, cooperation and growth which support global efforts to comprehensively address all environmental challenges, including climate change, extreme weather and natural disasters, for a sustainable planet” (APEC Secretariat 2022, p.5).

Consequently, the Aotearoa Plan of Action was developed to operationalize the principles of the Putrajaya Vision 2040. It lays out individual and collective action goals for each economic driver and are subject to review for progress evaluation. To illustrate, member economies are enjoined to partake in the following: “advancing gender equality and the economic empowerment of women”; “building on APEC’s work on supporting MSME’s and women’s economic empowerment”; and “advance APEC’s circular economy work” (APEC n.d.). Lastly, the 2020 report by the APEC Business Advisory Council (ABAC) underscored the need for investors’ and lenders’ support in facilitating the transition of businesses towards more sustainable practices (APEC Secretariat 2022).

Thailand, as the 2022 host of the APEC forum, promoted the bio-circular-green (BCG) economy model, which promotes a balanced, resilient, inclusive, and sustainable growth in the post-coronavirus disease (COVID)-19 era (APEC 2022a). Accordingly, the Steering Committee on ECOTECH Policy Dialogue on Understanding the BCG Economy Model in February 2022 featured exchanges on the experiences and practices of member economies concerning BCG application in three key areas, namely, agriculture and food systems, energy efficiency and resilience, and resource management and the creative economy (APEC 2022b). Other APEC

¹ Foreign Affairs Research Chief, Center for International Relations and Strategic Studies, Foreign Service Institute, Department of Foreign Affairs (jovito.katigbak@fsi.gov.ph)

² Foreign Affairs Research Chief, Center for International Relations and Strategic Studies, Foreign Service Institute, Department of Foreign Affairs (jemimah.villaruel@fsi.gov.ph)

economies such as China, Indonesia, Japan, Malaysia, Singapore, and South Korea have likewise formulated and implemented their respective circular economy (CE)-related frameworks and policies to capitalize on such approach.

In Southeast Asia, the Association of Southeast Asian Nations (ASEAN) has similarly mainstreamed circular economy among firms and organizations by adopting the Framework for Circular Economy for the ASEAN Economic Community in October 2021 (ASEAN Secretariat 2021). It serves as the regional bloc's guiding document towards the realization of its strategic goals of resilient economies, resource efficiency, and sustainable and inclusive growth. The Framework identifies five strategic priorities, namely: (i) standard harmonization and mutual recognition of circular products and services; (ii) trade openness and trade facilitation in circular goods and services; (iii) enhanced role of innovation, digitalization, and emerging/green technologies; (iv) competitive sustainable finance and innovative ESG investments; and (v) efficient use of energy and other resources (ASEAN Secretariat 2021). To actualize the cited objectives, ASEAN is currently developing the Work Programme to Support the Implementation of the Framework.

As a party to both APEC and ASEAN, the Philippine government is thus expected to fulfill its commitments, especially on promoting CE at the domestic level. Correspondingly, it has enacted several laws and implemented projects related to CE but is yet to develop a consolidated CE-oriented framework. The promotion of CE within firms and enterprises in the country is indeed a much-needed endeavor given the increasing shift towards sustainable production and consumption at both regional and international levels. Hence, this paper attempts to assess the adoption of CE principles and practices among women-led micro, small, and medium enterprises (MSMEs) in Metro Manila.

1.1. Statement of the Problem

The Philippines produces at least 61,000 million metric tons of waste daily, with plastic waste comprising 24 percent of the total (Cariaso 2023). Of this latter figure, only 28 percent are recycled while about 800,000 metric tons of plastics are discarded annually. Further, businesses, on daily basis, generate 163 million plastic sachet packets, 48 million shopping bags, and 45 million thin-film bags. These are disposed in landfills and dumpsites (33 percent) or leaked into open environment and oceans (35 percent) (Cariaso 2023). These may result in negative impacts on the socio-economic conditions of individuals and households. At the global level, the extraction, manufacturing, delivery, and disposal of goods represent around 60 percent of the greenhouse gas (GHG) emissions, while plastic production uses 99.5 percent of fossil fuels. As a signatory to the Paris Agreement and several sustainable development-oriented treaties, the Philippines is expected to significantly reduce its GHG emissions and positively contribute to climate change mitigation.

Notably, micro-, small-, and medium-sized enterprises (MSMEs) comprise 99.5 percent of the total businesses in the country and the Department of Trade and Industry's 2019 List of Establishments shows that women-owned/run enterprises comprise around 60 percent of business name registrations (new and renewal) (DTI 2019). The promotion of circular economy in the private sector thus substantially hinges on the quality and nature of uptake by local MSMEs. This

study therefore seeks to address the primary query: “*How has the women-led MSMEs in Metro Manila adopted circular economy into their operations and practices?*”

Further, this research aims to answer the following questions:

- 1) What is the circular economy (CE)?;
- 2) What are the CE-related laws, policies, and frameworks in the Philippines?;
- 3) What is the quality and nature of circular economy adoption among women-led MSMEs in Metro Manila?; and
- 4) What are the policy options and considerations for the Philippine government in supporting CE adoption among women-led MSMEs in Metro Manila?

1.2. Objectives of the Study

This study attempts to overarchingly assess the adoption of circular economy (CE) principles and practices by women-led MSMEs (WMSMEs) in Metro Manila. Moreover, it seeks to attain the following objectives:

- 1) Characterize the CE;
- 2) Review the laws, policies, and frameworks related to CE in the Philippines;
- 3) Describe the quality and level of CE adoption among WMSMEs in Metro Manila; and
- 4) Outline policy considerations and options for the Philippine government to effectively mainstream and support the uptake of CE among WMSMEs in Metro Manila.

The findings of the study are significant in two aspects: (i) knowledge; and (ii) policy. First, the researchers aim to contribute to the current body of literature relating to circular economy (CE) in the Philippines. Although there are several studies examining laws, policies, and frameworks at the domestic level, there is a lack of research on the adoption of CE principles among MSMEs, especially women-led, in Metro Manila. It likewise incorporates a gender perspective to provide a more nuanced understanding of CE uptake among women-led MSMEs (WMSMEs) locally. In addition, its exploratory nature underlines opportunities for future research. Lastly, the study attempts to highlight the policy gaps concerning circular economy promotion among WMSMEs in the Philippines. The results may serve as valuable inputs to concerned government agencies (e.g., DTI, DENR, etc.) at the national level, as well as to other APEC member economies and APEC (as an organization) at the regional level.

1.3. Scope and Limitations

Policymakers use the terms “women-owned”/“women-led” business and “woman entrepreneur” interchangeably due to the lack of an universally-agreed definition. This paper hence defines “WMSME” as female entrepreneurs who are owners, co-owners, or managers with the ability to undertake key operational and financial decisions for their respective businesses. This definition is developed by the Asian Development Bank (ADB) (2018). Concerning geographical scope, this research covers WMSMEs that are in the National Capital Region, both unregistered and registered with the Department of Trade and Industry or the Securities and Exchange Commission.

2. Review of Related Literature

This section contains three (3) sub-sections, namely: (i) characterizing the circular economy; (ii) CE adoption among SMEs: cases and experiences; and (iii) overview of the legal and policy landscape of CE in the Philippines.

2.1. Characterizing the circular economy

The concept of circular economy (CE) is substantially shaped by two schools of thought – one focusing on materials flow through an economy, and the other relating to the economic conditions catalyzing such flow (Ekins et al. 2019). Both these strands stem from the modern environmental movement in the 1960s and 1970s. The first conceptual stream primarily draws from the industrial ecology concept, which sought to modify industrial production processes in accordance with the natural system characterized by a cyclical or closed loop system (Ekins et al. 2019). Froesch and Gallopoulos (1989) then used the term ‘industrial ecosystem’ and noted that *“in such a system the consumption of energy and materials is optimized, waste generation is minimized and the effluents of one process...serve as the raw material for another process. The industrial ecosystem would function as an analogue of biological ecosystems”* (p.144).

The second school of thought is founded on Kenneth Boulding’s 1966 essay entitled “The economics of the coming spaceship Earth”, which distinguished open from closed systems. He referred to the world economy as an ‘econosphere’ catering to open systems, or those that receives inputs and produces outputs in three forms: matter, energy, and information. To add, Boulding (1966) posited that the concept of entropy may be applied in these three classes by generally recycling all outputs from consumption to become inputs for production, hence preserving the volume of total capital stock and fostering a closed system.

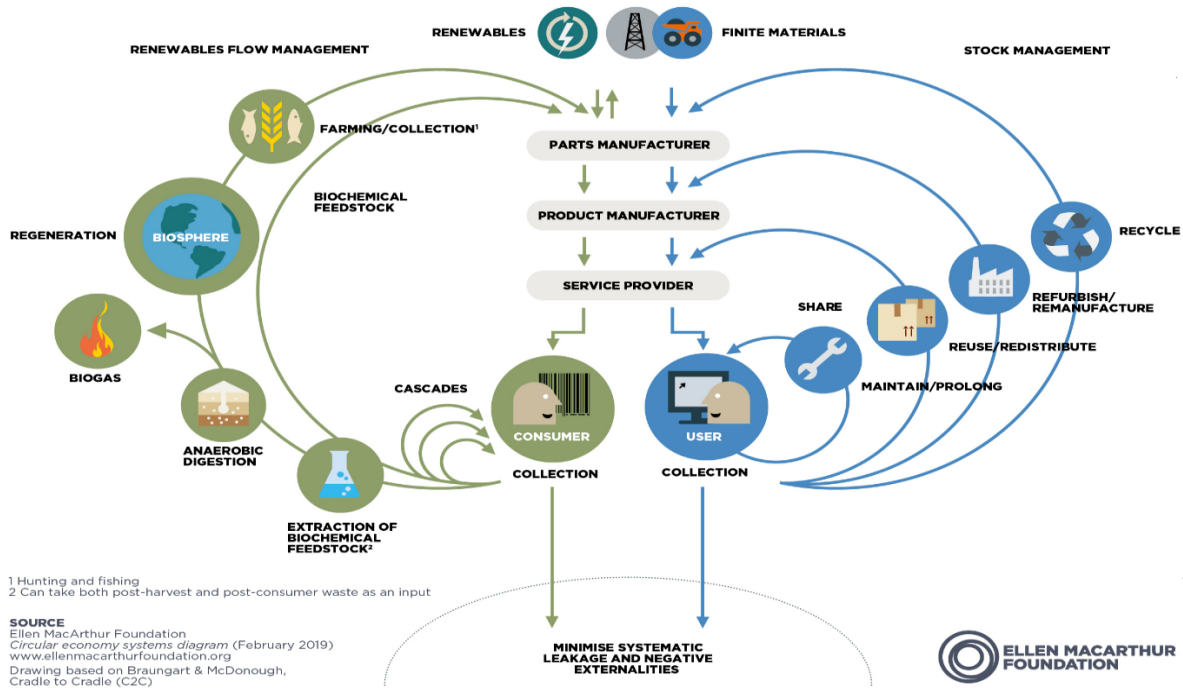
Perhaps it was Stahel (1982, p.74) who provided an early definition of CE as a “spiral-loop system that minimizes matter, energy-flow and environmental deterioration without restricting economic growth or social and technical progress.” The system has four loops: (i) reuse; (ii) repair; (iii) reconditioning; and (iv) recycling. Pearce and Turner (1990) then reiterated Boulding’s claim and noted that the Earth is a “closed economic system: one in which the economy and environment are not characterised by linear interlinkages, but by a circular relationship. Everything is an input into everything else” (p.37). They likewise emphasized that the environment can only absorb a certain volume of wastes (i.e., assimilative capacity) harmlessly and that renewable resources are preferable than exhaustible resources, since the latter do not deplete the total capital stock.

The Ellen MacArthur Foundation (EMF) provided a more comprehensive description of the CE through its butterfly diagram, which is comprised of the biological cycle and the technical cycle (see Figure 1). The former loop features the reincorporation of nutrients from biodegradable materials to the biosphere, while the latter loop promotes the reuse, repair, remanufacture, and recycling of materials and products. EMF (2013, p.7) thus defines CE as:

“an industrial system that is restorative or regenerative by intention and design...It replaces the ‘end-of-life’ concept with restoration, shifts towards the use of renewable

energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste through the superior design of materials, products, systems, and, within this, business models.”

Figure 1. The Butterfly Diagram of the Circular Economy



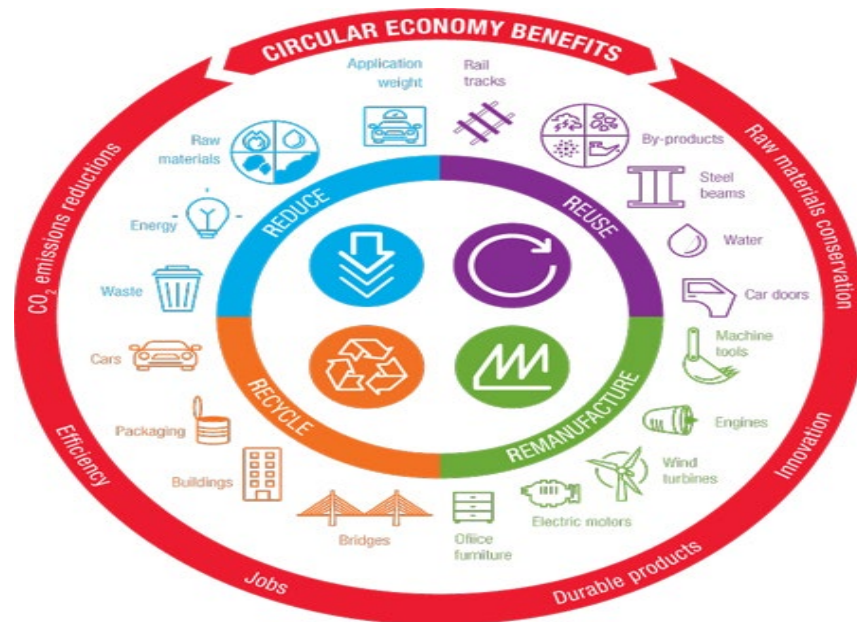
Source: Taken from <https://ellenmacarthurfoundation.org/circular-economy-diagram>

In essence, CE seeks to mainstream a regenerative and restorative system design by “*redirecting energy and material flows from a linear to a circular direction, transforming waste into productive inputs, reducing pollution, greenhouse gases and their impacts on health and environment*” (Schroder 2020, p.10). Accordingly, building a CE entails systems thinking approaches that encompass modified value systems, creative policies to internalize externalized costs, and novel means of production, distribution, consumption, and investment (Stahel, 2016). CE similarly offers a set of principles that enable business-, society-, and environment-friendly economic development (UNCTAD no date). Figure 2 illustrates the benefits of adopting a circular economy approach according to the United Nations Committee on Trade and Development (UNCTAD).

The advancement of CE has also been linked, directly or indirectly, to the achievement of numerous 2030 Sustainable Development Goals (SDGs). Specifically, “*The strongest relationships and synergies between CE practices and SDG targets lie within SDG 6 (Clean Water and Sanitation), SDG 7 (Affordable and Clean Energy), SDG 8 (Decent Work and Economic Growth), SDG 12 (Sustainable Consumption and Production), and SDG 15 (Life on Land) having high scores both for direct and indirect contributions. SDG 1 (No Poverty) and SDG 2 (Zero Hunger) and SDG 14 (Life Below Water) are impacted by CE practices mostly indirectly.*”

(Schroder et al. 2018, p.81). The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (2019) cites CE as a viable method to foster more sustainable economic and financial systems.

Figure 2. Benefits of Circular Economy according to UNCTAD



Source: Taken from <https://unctad.org/topic/trade-and-environment/circular-economy>

In terms of the drivers of CE adoption in supply chains, Govindan and Hasanagic (2018) analyzed numerous studies and identified five (5) clusters, namely: (i) policy and economy; (ii) health; (iii) environmental protection; (iv) society; and (v) product development. Conversely, there are eight (8) clusters of issues impeding the application of CE, which are the following: (i) governmental; (ii) economic; (iii) technological; (iv) knowledge and skill; (v) management; (vi) CE framework; (vii) culture and social; and (viii) market. Table 1 summarizes and briefly describes each cluster.

Table 1. Drivers of and Barriers to Circular Economy

Drivers of CE		
Cluster	Scope	Source/s
Policy and economy	Laws to promote cleaner production, consumption, and end of life management; recycling and manufacturing activities to promote sustainable revenue creation	External and internal
Health	Advancement of public and animal health	External
Environmental protection	Initiatives concerning climate change, modern agriculture, and preservation of renewable resources	External
Society	Matters related to population growth, urbanization, employment generation, and consumer awareness	External and internal

Product development	Enhancement of product quality, efficiency of materials, and energy use in supply chains	Internal
Barriers to CE		
Cluster	Scope	Source/s
Governmental issues	Ineffective recycling policies; unclear regulations that are not properly coordinated and implemented; incompatible extant environmental laws; lack of uniform system for performance assessment	Internal and external
Economic issues	Weak economic incentives for CE adoption; high short-term, upfront investment, and production costs coupled with low short-term gains; inaccurate product pricing	External and internal
Technological issues	Technological limitations in tracking recycled materials; difficulty in managing product quality through its life cycle and those made from recovered materials; design challenges; and effective and safe return of materials to biosphere	Internal
Knowledge and skill issues	Lack of reliable information to the enterprises; lack of public awareness and sense of urgency; inadequate skills of employees in CE; lack of customer knowledge about refurbishment	Internal
Management issues	Poor leadership and management; outdated organizational structure; prioritization of other issues	Internal
CE framework issues	Lack of CE-related business models and frameworks; access to other favorable solutions than recycling	External
Culture and social issues	Lack of enthusiasm by industries towards CE; erroneous consumer perceptions about refurbished products; low level of excitement in new products (newness)	Internal
Market issues	Ineffective take back programs by companies; ownership mentality of consumers rather than 'access to service'; absence of standards on refurbishment products; resources and labor needed for remanufacturing	Internal and external

Source: Author's compilation from Govindan and Hasaganic (2018)

2.2. CE adoption among SMEs: cases and experiences

Prieto-Sandoval et al. (2018) note that circular economy (CE) has been implemented at the macro, meso, and micro levels. Macro refers to provinces, cities, regions, and national governments while meso pertains to economic agents in industrial clusters (Geng et al. 2012). Sohal et al. (2022) highlighted that most developed countries emphasize the procurement of green materials while

developing nations are challenged by lack of funding awareness, unclear policy frameworks, local conditions, and availability of resources for businesses (Kamal et al. 2022; Bhattacharya et al. 2022).

The micro level encompasses customers and firms and several studies have examined the perspective of SMEs regarding CE adoption (Park et al. 2010). Geng et al. (2009) cited several barriers to CE uptake including inadequate environmental policies, low level of expertise, and insufficient knowledge on safe technology production and consumption practices. More recently, Marrucci et al. (2022) emphasized culture as the most vital aspect of circular business models while others identified commitment and acceptance of change as the crucial elements in effectively applying CE (Mishra et al. 2022; Mathivathanan et al. 2022). Notably, many SMEs are risk averse towards CE transition due to low cost savings, uncertain financial returns, firm sustainability, low level of environmental awareness, and weak regulatory pressures. (Bhattacharya and Kalakbandi 2022; Austin and Rahman 2022; Barreiro-Gen and Lozano 2020; Zhang et al. 2022).

On barriers to implementing CE, Hartley et al. (2020) mentioned the lack of cooperation between executive and legislative bodies in developing relevant policies, SMEs' access to capital (Bhattacharya et al. 2022), complex administrative procedures (Paletta et al. 2019), and traditional mindset, especially among family-owned businesses (Luthra et al. 2022). Governments may hence provide guidance and support in infrastructure development, environmental policies, legislative reforms, enforcement of new sustainable standards and methods, advocacies, and production-focused incentives for SMEs (Sohal and De Vass 2022; Zhu et al. 2022). D'Agostin et al. (2020) underscored the recent shift in customer preferences and their higher level of environmental awareness, which can be leveraged by SMEs in integrating CE principles into their processes and in the production of CE-related commodities. Partnerships and collaborations, innovative thinking, and the use of emerging technologies may likewise be vital in advancing CE among SMEs (Bag and Pretorius 2022; Neri et al. 2023).

There are also studies focusing on the actual experiences of SMEs concerning CE adoption. In Europe, Bassi and Dias (2019) posit that firm size, total turnover, percentage of turnover devoted to research and development (R&D), and type of activity are determinants of CE uptake. Their top practices are: (1) minimizing waste by recycling or reusing waste or selling it to another enterprise; (2) re-planning energy usage to minimize consumption; (3) redesigning products and services to minimize the use of materials or using recycled material; (4) re-planning water utilization to maximize re-usage; and (5) renewable energy use.

Further, Dey et al. (2022) revealed that the design of products, processes, and facilities positively contributes to CE adoption and sustainability performance of SMEs in Greece, France, Spain, and the United Kingdom, while the recovery function has a negligible impact. This is because the design function is primarily shaped by the customers while recovery is driven by the SMEs, who are mainly economic-oriented. Policymakers can therefore advance CE through policy reforms, advocacies and training programs targeting stakeholders, financial support for SMEs, benchmarking performance relative to climate action frameworks, and regular monitoring (Dey et al. 2022).

Ormazabal et al. (2018) similarly found that Spanish SMEs are less ready to integrate CE principles into their operations and believe that CE does not automatically result in greater profits and market sustainability. The low demand and investment in CE-related technologies and technical know-how by SMEs is due to their limited resources, insufficient time, short-term vision, and lack of support from public institutions. Garrido-Prada et al. (2021) affirmed that SMEs' awareness of CE-related government programs, availability of CE-related information, and external sources of finance lead to more implementation of CE activities. Conversely, cumbersome legal, regulatory, and administrative procedures adversely affect CE adoption among SMEs.

In Asia, China is recognized as a leader in CE mainstreaming. To illustrate, it has been implementing a CE promotion law since 2009 and oversees the simultaneous application of CE at three levels – macro, meso, and micro (Ogunmakinde 2019). Su et al. (2013) argued that product collection, processing, storage, distribution systems, and inclusive networks at the macro level is paramount to fostering sustainable production, consumption systems, and energy saving. At the meso level, industrial symbiosis may be anchored on environmentally friendly designs that guarantee resource efficiency, life cycle thinking, and ‘upgradability’ of products. Moreover, eco-industrial parks may be established to cultivate reuse and recycling of resources and infrastructure. At the micro level, firms are expected to incorporate eco-design to achieve cleaner production and reduced energy consumption throughout the life cycle of commodities.

Min et al. (2021) then employed a systematic review to determine impediments and enablers of CE adoption among Chinese SMEs. They discovered that both factors can be primarily categorized into two, namely, internal and external. Internal barriers include inadequacy in several areas such as time, capital and investment, technology and technical expertise, human resources, and creativity. External obstacles encompass lack of government support, cumbersome administrative processes, market structure, funding mechanisms, public awareness, complex regulations and unclear standards, and legislation pressures on SMEs (Min et al. 2021). Conversely, internal enablers are strategic partnerships between SMEs and large corporations, industrial clusters, stakeholder participation, business model and organizational innovation, SME reputation, and profitability. External enablers include government incentives, CE laws and regulations, public awareness, media coverage, community requirements, and status of environmental preservation (Min et al. 2021).

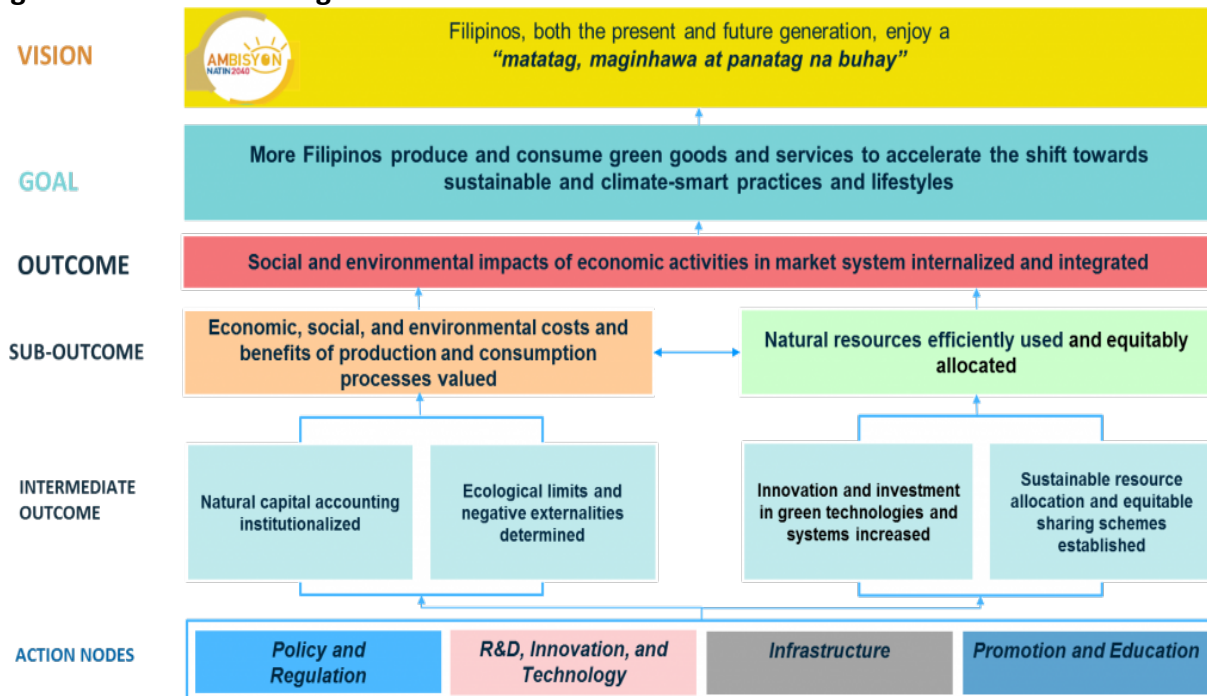
Japan is another model in CE advancement at the domestic level. It enacted a ‘resource efficient’ law as early as 1991 and stressed the significance of a whole-of-society approach towards the optimal use of non-renewable resources (Ogunmakinde 2019). Benton and Hazell (2015) highlighted the indispensable role of the public in embodying CE practices through separation of recyclables, timely payment of recycling fees, and exercise of their consumer rights. Specific programs of the Japanese government include development of education courses on environmental awareness, establishment of recycling laboratories in schools, creation of trading markets for circular goods, provision of incentives and waste recycling stations, and support for greater collaboration among stakeholders. Interestingly, Rovanto and Finne (2022) interviewed four Japanese MSMEs in the textile industry and discovered that the latter have intrinsic motivation in CE adoption but struggled to find support. Hence, they used a masked approach which is evidenced by using creative ways of producing and selling recycled items to better associate with peers and customers that are not interested in CE.

In the Philippine context, Gue et. al. (2020) surveyed 17 respondents from the manufacturing, food services, electricity services, water services, construction, academic services, retail and trade, and health services and found that there are varying perceptions regarding drivers of CE adoption. Nevertheless, all industries view economic attractiveness and consumer demand as causal drivers, while company culture is cited as an effect driver. The formulation of circular business models with high economic gains may thus be explored. In addition, they stressed that the diversity in perceptions merits unique responses from the government. The industry sector may concentrate on enhanced marketing strategies and innovative product designs while the government may provide monetary incentives for CE adoption. For the services sector, awards and certifications may be given to sustainable business practices to encourage uptake among MSMEs.

2.3. Overview of the legal and policy landscape of CE in the Philippines

The Philippine government launched in 2019 the Philippine Action Plan for Sustainable Consumption and Production (PAP4SCP) to mainstream Sustainable Development Goal 12 and effectively address the country’s waste problem (see Figure 3). PAP4SCP is anchored on the Ambisyon Natin 2040 and aims to encourage “more Filipinos to produce and consume green goods and services to accelerate the shift towards sustainable and climate smart practices and lifestyles” (NEDA 2020, par. 2). It ultimately seeks to internalize and integrate the environmental and social impacts of economic activities in market system by initiating projects, programs, and activities (PPAs) in four action nodes, namely: (i) policy and regulation; (ii) research and innovation, innovation, and technology; (iii) infrastructure; and (iv) promotion and education. Further, the PPAs falls under sub- and intermediate outcomes and are categorized into short-term (2020-2022), medium-term (2022-2030), and long-term (2030-2040) (NEDA, 2020).

Figure 3. PAP4SCP Strategic Framework



Source: Taken from <https://sdg.neda.gov.ph/philippine-action-plan-for-sustainable-consumption-and-production-pap4scp/>

Aside from PAP4SCP, there are a variety of Philippine laws and regulations encompassing waste management, clean air, green jobs, renewable energy, among others. The private sector and civil society organizations have also launched their respective initiatives that contribute to fostering circular economy locally. Notably, the Ellen MacArthur Foundation (2015) identified six types of policy intervention that policymakers may pursue in transitioning to a circular economy. These are: (1) education, information, and awareness; (2) collaboration platforms; (3) business support schemes; (4) public procurement and infrastructure; (5) regulatory frameworks; and (6) fiscal frameworks. Table 2 lists the Philippine laws, policies, and programs related to CE and classifies them according to the type of policy intervention.

On advocacy-related activities, the Philippine Center for Environmental Protection and Sustainable Development Inc. (PCEPSDI), a non-government organization, has been an active coordinator and facilitator of the National Ecolabelling Programme - Green Choice Philippines (NELP-GCP) which seeks to catalyze behavioral change among Filipinos towards sustainable consumption and production (PCEPSDI no date). It is a voluntary, third-party program that develops criteria for environmental-friendly goods and services, which may be used by consumers and organizations in selecting products (PCEPSDI no date). To add, PCEPSDI also organizes the Kalikasan Green Productivity, Green Purchasing Towards Green Philippines (KGP3), which is a biennial advocacy event involving business and industry stakeholders to exchange insights and experiences on their respective sustainability initiatives and best practices (PCEPSDI no date).

The Philippine Green Pages (PGP) then serves as the “first and only eco-resource publication for finding the best green business, products and services offered in the market” (PCEPSDI no date, par.1), while the Sustainable Diner Project (SDP) aims to raise awareness about food waste production and sustainable dining options and practices across sectors (PCEPSDI no date). In the academe, tertiary institutions such as De La Salle University and University of the Philippines Los Banos offer lifecycle analysis (LCA) and related courses to interested learners.

There are also collaboration platforms that cultivate partnerships between and among government agencies, the private sector, and civil society organizations. For instance, the Global Green Growth Institute (GGGI) has worked with the Climate Change Commission (CCC) of the Philippines since 2015 to capacitate several towns in pursuing economic growth while mainstreaming green programs simultaneously (GGGI 2020). The Department of Trade and Industry (DTI) has likewise tapped GGGI to advance green practices among micro-, small-, and medium-sized enterprises (MSMEs) in the food processing sector (Arcenas et al. 2019). Another notable initiative is Zero Waste to Nature Ambisyon (ZWTN 2030) launched by the Philippine Alliance for Recycling and Materials Sustainability (PARMS), which is a multi-stakeholder coalition composed of businesses from the fast-moving consumer goods (FMCG) sector (PARMS no date). Pilipinas Shell and Ayala Land Inc. have undertaken their respective eco-brick projects.

To support the transition of businesses towards CE, the Mother Earth Foundation, a non-government organization, is facilitating training programs for enterprises while the European Union SWITCH-Asia Programme promotes the reduction of carbon emissions among hotels through the Zero Carbon Resorts Program (Schroder 2020). Businesses can similarly access funding for sustainable projects and initiatives through the Carbon Finance Support Facility of the Landbank of the Philippines. In 2016, the Philippine Green Jobs Act was enacted to train and

certify potential workers in environmentally beneficial sectors and to support the nation’s transition to a green economy (Official Gazette 2016).

Regarding public procurement, Executive Order No. 301 mandated the development of green procurement program for all agencies and sub-offices under the executive branch of the government (Arcenas et al. 2019). The Philippine Green Public Procurement Roadmap currently guides the public sector in procuring goods and services with reduced environmental impacts throughout their life cycle. The Philippine Green Building Code then outlines a set of standards that seek to optimize the efficiency of building performance through sound resource management and site sustainability. At the local level, PCEPSI is supporting the local government unit (LGU) of Quezon City in the implementation of its Green Public Procurement (GPP) Program (Schroder 2020).

Lastly, several regulatory frameworks are presently in place, namely, the Philippine Environment Code of 1977, Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990, Philippine Clean Air Act of 1999, Ecological Solid Waste Management Act of 2000, Renewable Energy Act of 2008, and the Organic Agriculture Act of 2010 (Schroder 2020; Arcenas et al. 2019). The Department of Environment and Natural Resources (DENR) is enforcing the National Plan of Action for the Reduction of Marine Litter and the recently passed Extended Producer’s Responsibility (EPR) Act of 2022. The EPR law covers plastic packaging wastes and mandates large enterprises, micro-, small-, and medium-sized enterprises (franchisees), and other entities and enterprises determined by the DENR to meet certain plastic neutrality targets from 31 December 2023 onwards (Philippine Information Agency 2023). Local ordinances such as regulation on single-use plastic are likewise observed in several localities. For its part, the Department of Science and Technology (DOST) is tasked to mainstream the Sustainable Science and Technology for Solid Waste Management Road Map.

Table 2. Philippine Laws, Policies, and Programs related to Circular Economy

Policy intervention	Example/s	Implementing party
Education, information, and awareness	NELP-GCP; KGP3; PGP; SDP	PCEPSI; World Wide Fund for Nature- Philippines (for SDP)
	LCA courses	Academe (e.g., De La Salle University, University of the Philippines Los Banos)
Collaboration platforms	Ecotown Scale-Up Project; Promotion of green practices among MSMEs in food processing industry	GGGI and CCC; GGGI and DTI
	Zero Waste to Nature Ambisyon 2030	Philippine Alliance for Recycling and Materials Sustainability
	Eco-brick projects	Pilipinas Shell; Ayala Land Inc.
Business support schemes	Training programs	Mother Earth Foundation
	Zero Carbon Resorts Program	EU SWITCH-Asia Programme
	Carbon Finance Support Facility	Landbank of the Philippines

Fiscal frameworks	RA No. 10771 or The Philippine Green Jobs Act of 2016	Philippine Congress (Legislative branch)
Public procurement and infrastructure	Executive Order No. 301 s. 2004	President Gloria Macapagal-Arroyo (Executive branch)
	The Philippine Green Public Procurement Roadmap: Advancing GPP until 2022 and beyond	Government Procurement Policy Board - Technical Support Office (GPPB-TSO)
	GPP Program of Quezon City LGU	PCEPSI
Regulatory Frameworks	PD No. 1152 or The Philippine Environment Code of 1977	President Ferdinand E. Marcos Sr. (Executive branch)
	RA No. 6969 or The Toxic Substances and Hazardous and Nuclear Wastes Control Act of 1990; RA No. 8749 or The Philippine Clean Air Act of 1999; RA No. 9003 or The Ecological Solid Waste Management Act of 2000; RA No. 9513 or The Renewable Energy Act of 2008; RA No. 10068 or the Organic Agriculture Act of 2010	Philippine Congress (Legislative branch)
	National Plan of Action for the Reduction of Marine Litter Extended Producer's Responsibility Act	Department of Environment and Natural Resources
	PAP4SCP	National Economic Development Authority
	Sustainable Science and Technology for Solid Waste Management Road Map	DOST
	Local ordinances (e.g., regulation on plastic bags)	Local government units (e.g., Quezon City)

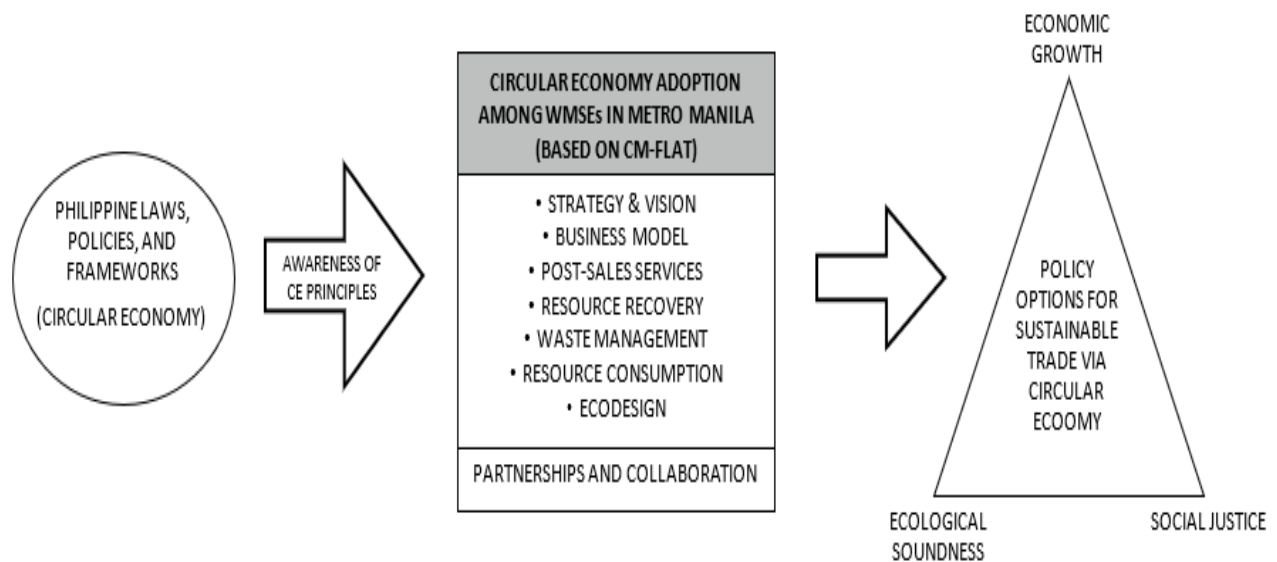
Sources: Arcenas et al. (2019); Schroder (2020); Bueta (2022)

Notwithstanding these initiatives, approaches to waste management issues in the country can be described as “piecemeal”, “ad hoc”, and “reactive to the flavor of the times” (Bueta 2022). For instance, only one measure (i.e., EPR Act) out of 415 circular economy-related bills and resolutions have successfully hurdled the Philippine Congress. Thus, the enactment into law of House Bill 7609 or the Philippine Circular Economy Act is a welcome development since it seeks to: (i) develop green markets through measures advancing circular economy and sustainable consumption and production; (ii) advance permaculture for both rural and urban development; (iii) and foster a just, inclusive, and sustainable green recovery from the pandemic. Moreover, the Philippine government may review the formulation and implementation of a national framework on CE to facilitate the harmonization of existing dispersed initiatives and programs.

3. Conceptual Framework of the Study

This paper utilizes a framework that combines three distinct yet interrelated variables (see Figure 4). The first variable represents the circular economy (CE)-related laws, regulations, and frameworks in the Philippines. These measures aim to mainstream CE and jumpstart the transition to CE by businesses. Hence, they are perceived as possible catalysts and instruments of CE adoption among local firms. The awareness level of women-led MSMEs (WMSMEs) regarding CE is cited as a moderating variable due to its ability to impact the nature and depth of uptake by the WMSMEs.

Figure 4. Conceptual Framework



Source: Developed by authors.

The experience of WMSMEs in Metro Manila in integrating CE principles and practices into their business operations is assessed through the Circular and Maturity Firm Level Assessment Tool developed by Sacco et. al. (2021). More specifically, the circularity level is ascertained via their activities in seven areas, namely, strategy and vision, business model, post-sales services, resource recovery, waste management, resource consumption, and ecodesign (Sacco et. al. 2021). A section on partnerships and collaborations for CE was added to gauge the WMSMEs’ interest and actual initiatives with external partners, co-firms, and customers. The seven areas are operationalized in the succeeding paragraphs.

First, strategy and vision refers to the alignment of and embeddedness of CE principles into their business practices and strategy. Second, business model focuses on the percentage of revenues allotted by WMSMEs for specific business models such as leasing or renting, pay-per-use, sharing, sale of second-hand products, and dematerialization. These were determined through goods or services conveyed to the consumers with a corresponding payment depending on the cited models. Third, post-sales services pertains to services offered and undertaken by enterprises after the selling and use phases by customers. Fourth, resource recovery assesses the extent of the

company's activities in recovering industrial solid, liquid, and gaseous wastes for reuse, recycling, and energy recovery purposes. Fifth, waste management peruses the knowledge of WMSMEs about local recycling and waste management facilities in Metro Manila as well as the outcomes of the implementation of their waste reduction strategies. Next, resource consumption is ascertained through the businesses' use of energy and materials and their corresponding management strategies. Lastly, ecodesign is examined through the development of CE-supportive products and packaging by WMSMEs.

The findings are then analyzed to formulate policy options and considerations for the Philippine government in advancing CE, and ultimately sustainable trade. It is the proponents' hope that the pursuit of these recommendations may contribute to meeting the country's duties in three areas, particularly, advancing economic growth, ensuring social justice, and promoting ecological soundness – which are the hallmarks of sustainable development.

4. Methodology

This pilot study employed a mixed-methods approach to gather, characterize, and analyze data. The first method seeks to ascertain the extent of the issue by highlighting the “qualities of entities and on processes and meanings that are not experimentally examined or measured (if measured at all) in terms of quantity, amount, intensity, or frequency” (Denzin and Lincoln 2000, p.8). This will be done by collecting and describing non-numerical data such as profile of women-led MSMEs (WMSMEs) and their awareness regarding circular economy (CE) adoption (McIntyre 2005; Creswell 2009). The last method approach focuses on the accurate measurements and numerical analysis of data gathered via surveys, questionnaires, or polls (Babbie 2010). They were attained through a questionnaire containing pertinent queries on the status and nature of CE adoption among WMSMEs.

The proponent gathered data from primary sources. More specifically, survey forms will be disseminated to WMSMEs situated within Metro Manila (both registered and unregistered) using both online (i.e., Google Forms) and offline (physical distribution) platforms. Metro Manila, also known as the National Capital Region, is subdivided into 17 local government units (LGUs) comprising 16 cities and one (1) municipality. These are Caloocan, Malabon, Navotas, Valenzuela, Quezon City, Marikina, Pasig, Taguig, Makati, Manila, Mandaluyong, San Juan, Pasay, Parañaque, Las Piñas, Muntinlupa, and Pateros (lone municipality).

The Department of Trade and Industry (n.d.) reports that there are 201,080 businesses established in Metro Manila as of 2021, which are categorized into micro, small, medium, and large. Due to the lack of gender-disaggregated data on MSMEs, the proponents reached out to around 250-300 WMSMEs but only 58 responded and completed the questionnaire. Call for interested participants was likewise shared via network partners (e.g., DTI, PTTC, WomenPhil, PCWE, etc.) to expand the original directory. The online survey questionnaire, through Google Forms, was made available from August 15 to October 1, 2023.

The questionnaire was mainly based on the Circular and Maturity Firm Level Assessment Tool (CM-FLAT) developed by Sacco et. al. (2021). It contains 45 questions which are classified into three major groups: (i) general information (four questions); (ii) circularity performance of

companies (15 questions); and (iii) maturity performance (26 questions). Since this paper only attempts to ascertain the level of circular economy adoption among WMSMEs, the questionnaire only featured queries on circularity-related indicators and was modified in accordance with the domestic context (see Appendix 1). It contained a total of 78 items which are categorized into 11 major sections, namely: (1) profile of the business owner; (2) general business information; (3) awareness of circular economy principles and practices; (4) strategy and vision; (5) business model; (6) post-sales services; (7) resource recovery; (8) waste management; (9) resource consumption; (10) ecodesign; and (11) partnership and collaboration for circular economy.

The dataset generated through the questionnaire was utilized for a descriptive analysis to effectively identify common themes and CE-related experiences of WMSMEs in Metro Manila. Specific attributes were outlined to characterize the conditions that created them, actions undertaken by actors, and the outcomes of those actions. The authors formulated a synthesis of the profile of WMSMEs and their level of awareness regarding CE principles and practices. Another synthesis was created to summarize the state of CE uptake in terms of several business-related processes and operations. Lastly, the authors briefly described the perspective of WMSMEs regarding linkages and synergies necessary for CE.

5. Data Presentation and Analysis

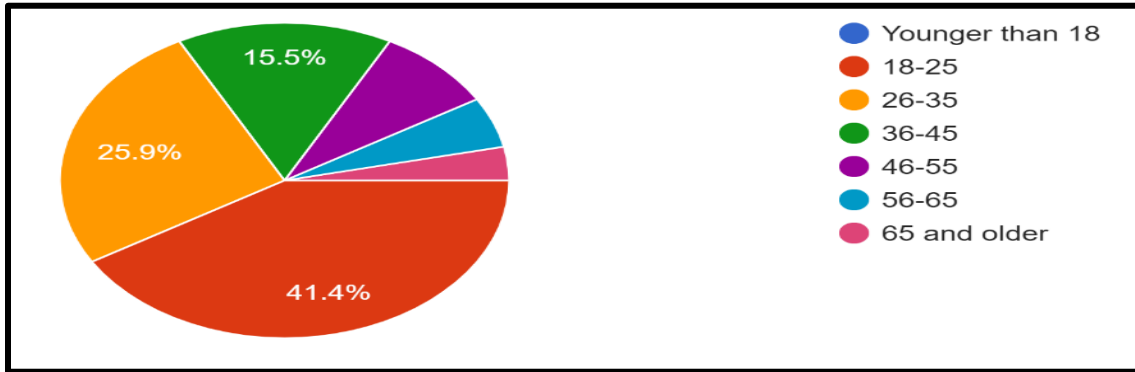
This section discusses the experiences and perspectives of women-led micro, small, and medium enterprises (WMSMEs) in Metro Manila regarding circular economy (CE) adoption. It is segmented into four parts: (i) profile of the respondents and businesses; (ii) awareness of CE principles; (iii) current level of circularity; and (iv) partnerships and collaboration for CE.

5.1. Profile of Respondents and Businesses

The Philippines uses asset size and employment as the two criteria in operationally defining micro, small, and medium enterprises (MSMEs). On one hand, the SME Development Council classifies firms based on asset size: micro (PhP3,000,000 and below); small (PhP3,000,001 - 15,000,000); and medium (PhP15,000,000 - PhP100,000,000). On the other hand, the Philippine Statistics Authority (PSA) categorizes businesses based on employment: micro (less than 10); small (10-99); and medium (200 or more employees). Using the PSA definition due to greater accuracy in determining the number of employees, 93.1 percent of the survey participants are micro enterprises and the remaining 3.4 percent are small and medium firms, respectively.

Further, majority of the respondents (67.3 percent) are aged 18-35 years old, while the 29.3 percent are 36-65 years old, and the remaining 3.4 percent are 65 and older (Figure 5). Around 81 percent of them are highly-educated who possess baccalaureate and/or post-baccalaureate degrees, with the remaining 19 percent having primary, secondary, or vocational diplomas.

Figure 5. Age of Respondents



Source: Authors

In terms of sectoral distribution, 43.1 percent are in the other services sector, followed by accommodation and food service (25.9 percent), wholesale and retail trade; repair of motor vehicles and motorcycles (13.8 percent), and arts, entertainment, and recreation (13.8 percent). This is notable since the 2022 List of Establishments of the PSA identifies wholesale and retail trade, repair of motor vehicles and motorcycles, accommodation and food service, manufacturing, and other industry sectors as the primary industries of MSMEs. Food, clothing, and printing services (Figure 6) are the main products/services sold by the WMSMEs. The inclusion of Korean-related items (e.g., KPOP, photocards) is similarly remarkable.

Figure 6. Primary Products/Services of Respondents



Source: Authors

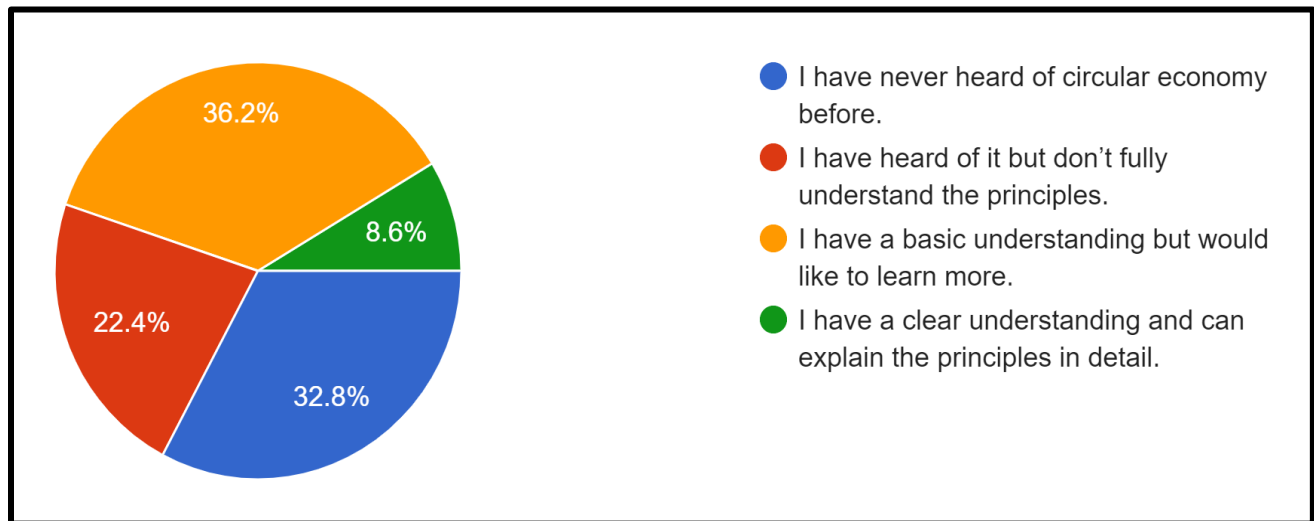
The top locations of the respondents are Manila City (20.7 percent), Quezon City (19 percent), Caloocan City (10.3 percent), Makati City (8.6 percent), and Taguig City (8.6 percent). There were no participants from San Juan City, Navotas City, Pateros City, and Valenzuela City. 87.9 percent of the firms cater directly to consumers while the 12.1 percent transact with other businesses.

Indeed, the emergence of e-commerce has empowered MSMEs, including WMSMEs, to reach a wider audience and instantaneously conduct business transactions across market segments (Bacasmás et al. 2022). This was accelerated during the COVID-19 pandemic.

5.2. Awareness of CE Principles

Results show that majority of the surveyed WMSMEs have different levels of understanding of CE principles: 36.2 percent have a basic understanding and are interested to learn more about the topic; 22.4 percent have heard of it but lack a full understanding; and only 8.6 percent have a clear understanding (Figure 7). They belong in the wholesale and retail trade and repair of motor vehicles and motorcycles, accommodation and food service activities, other service activities, and arts, entertainment, and recreation. This seems to be encouraging as the government continually mainstreams sustainable practices at both the firm and national levels through laws, regulations, and activities implemented by DENR, DTI, CCC, and NEDA. The role of the private sector (e.g., Ayala, Shell, PARMS), external partners (e.g., EU, WWF, GGGI), and civil society organizations (e.g., Mother Earth Foundation) collectively is also significant in increasing CE awareness among businesses, especially MSMEs. Nevertheless, much work is to be done as 32.8 percent of the respondents don't have an idea of CE. They come from the wholesale and retail trade and repair of motor vehicles and motorcycles, accommodation and food service activities, other service activities, arts, entertainment, and recreation, and electricity, gas, steam, and air conditioning supply. Garrido-Prada et al. (2021) cited availability of CE-related information as an enabler towards more implementation of CE activities.

Figure 7. Level of Understanding by WMSMEs Regarding CE

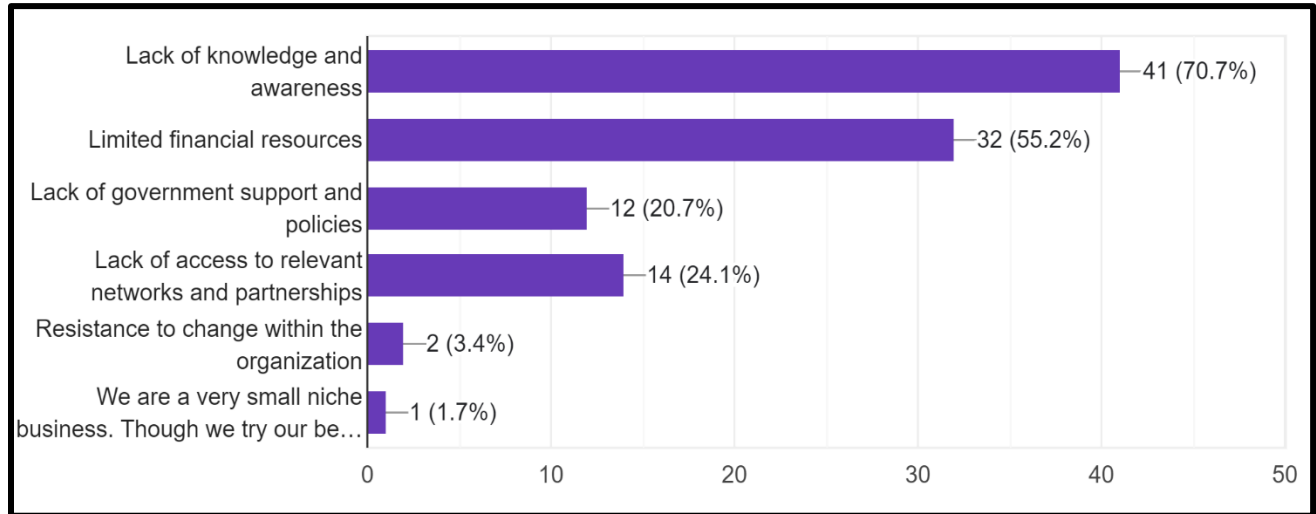


Source: Authors

Further, WMSMEs mentioned lack of knowledge and awareness, limited financial resources, lack of government support and policies, lack of access to relevant networks and partnerships, and resistance to change as the primary obstacles to CE adoption (Figure 8). One firm cited their size as the main determinant to CE uptake. These are in accordance with the previous studies (Geng et al. 2009; Bhattacharya and Kalakbandi 2022; Zhang et al. 2022; Ormazabal et al. 2018). Interestingly, they did not cite low cost savings returns (Austin and Rahman 2022), uncertain

financial returns Barreiro-Gen and Lozano 2020) and complex administrative procedures (Paletta et al. 2019) as impediments to CE adoption.

Figure 8. Level of Understanding by WMSMEs Regarding CE

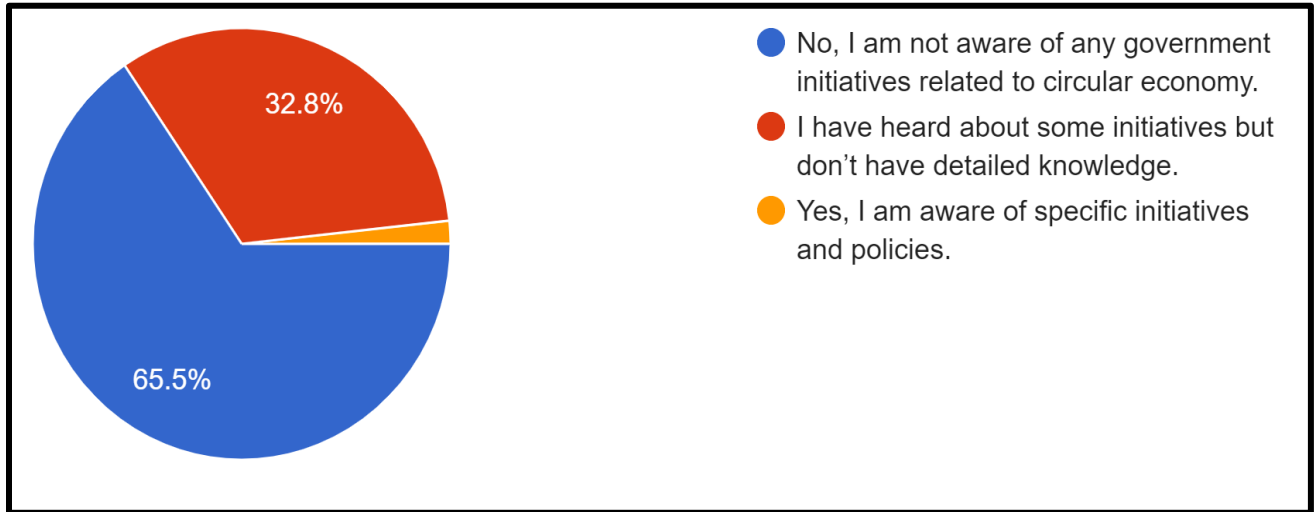


Source: Authors

In terms of awareness of government initiatives and policies, 65.5 percent of the respondents stated that they are unaware of state-led programs while 32.8 percent have heard about certain projects with little knowledge (Figure 9). Only 1 enterprise (1.7 percent) claimed that it is aware of specific government initiatives. This is despite the enforcement of several initiatives at the local level. Particularly, Marikina City is implementing its Food Waste Truck Program which collects kitchen wastes from restaurants and food stalls. The latter is then used as fertilizer for the city’s urban garden. It also has an eco-savers program and mandates business establishment owners to attend an annual waste management seminar before the issuance of business permits (DENR 2019). Makati City also conducts regular seminars for barangays and promotes recyclable trading activities through the Baratilyo ng Basura sa Barangay and weekend waste market programs (DENR 2019). In Quezon City, households are obliged to observe a “No Segregation, No Collection” policy and individuals are encouraged to participate in the ecosavers program and waste markets.

Consequently, 43.1 percent shared that they did not receive any government support and 27.6 percent described government guidance as poor. An average rating was given by 24.1 percent of the respondents, while 5.2 percent gave a good rating. No respondent characterized government support as excellent.

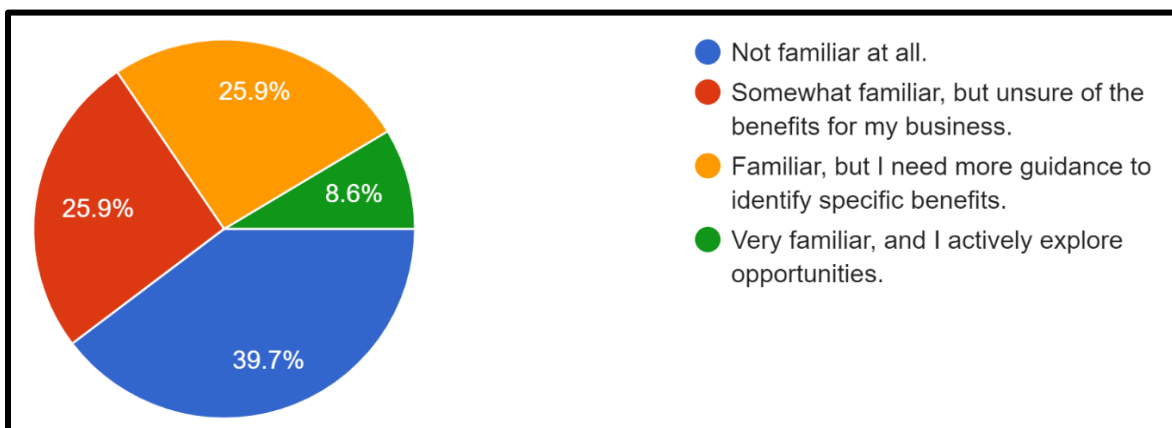
Figure 9. Awareness of WMSMEs concerning CE-related Government Programs



Source: Authors

Internally, 70.7 percent confirmed that they have not conducted any assessment or evaluation to identify potential CE applications while 13.8 percent occasionally do. 10.3 percent intend to undertake an assessment soon while a minute 5.2 percent regularly observes such. Perhaps this is shaped by the low level of familiarity by MSMEs concerning the potential benefits of CE adoption. Accordingly, Figure 10 shows that 39.7 percent of the respondents are totally unaware of the gains presented by CE, followed by firms that are somewhat aware (25.9 percent), insufficiently aware (25.9 percent), and totally aware (8.6 percent). In addition, 44.8 percent of surveyed WMSMEs revealed that there is no customer demand for CE practices and only 5.2 percent shared that there is high demand for circular products and processes. Gue et al. (2019) and Dey et al. (2022) mentioned customer demand as a driver towards greater CE uptake among SMEs.

Figure 10. Familiarity with the Benefits of CE

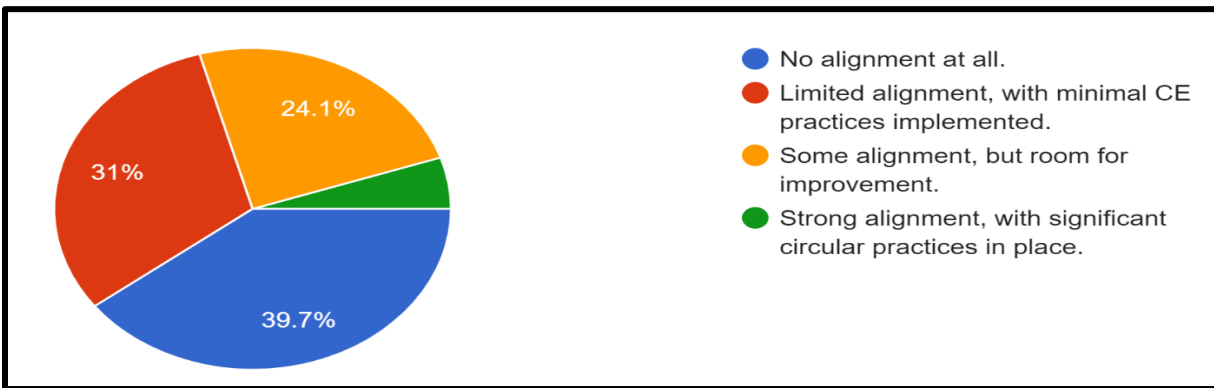


Source: Authors

5.3. Current Level of Circularity

The survey likewise assessed the actual state of CE adoption among WMSMEs through seven facets, which are tackled briefly in the succeeding paragraphs. Under strategy and vision, a combined 70.7 percent of enterprises believe that there is little to no alignment between their business and CE principles. Around 24.1 percent acknowledge there is some alignment while only 5.2 percent recognize their practices as strongly aligned with CE principles (Figure 11). This results in absence of CE components in the strategy of many firms (51.7 percent) as well as the absence of knowledge sharing platforms and activities (41.4 percent of firms).

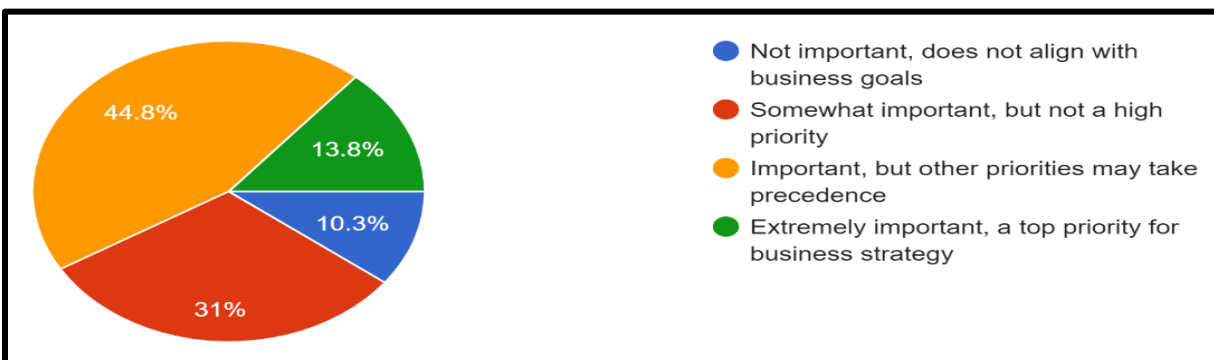
Figure 11. Alignment of Business Strategy and Vision with CE Principles



Source: Authors

When asked about the importance of CE adoption for sustainability and success of their business, 44.8 percent affirm that it is vital but other priorities may take precedence (Figure 12). 31 percent then identified CE uptake as somewhat important but not a high priority. Only 13.8 percent admit that it is extremely important and should be a top priority for business strategy, while 10.3 percent claimed that CE is not important. This is supported by the findings of Ormazabal et al. (2018) that SMEs have short-term vision and by Dey et al. (2022) that SMEs are mainly driven by economic growth. It is thus crucial that owners and/or managers of WMSMEs possess a CE-oriented mindset and actively seek ways to incorporate circular principles into their operations and practices.

Figure 12. Significance of CE Adoption for Business Sustainability and Success

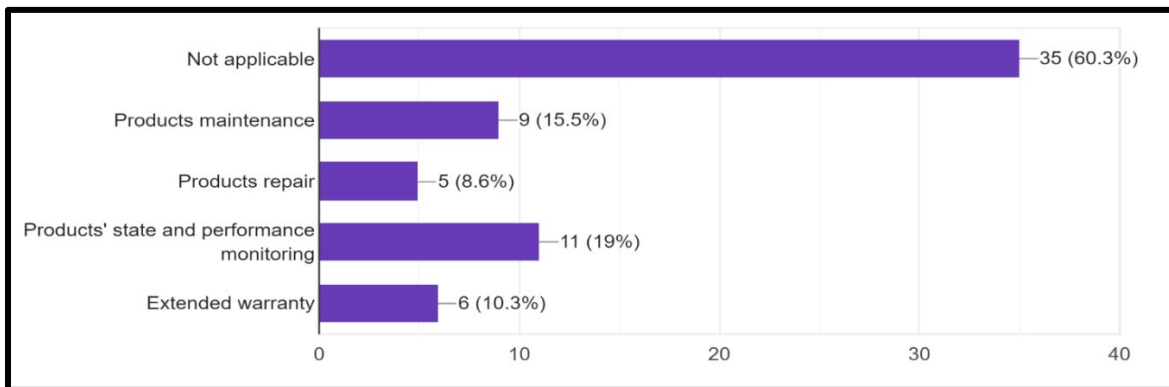


Source: Authors

Circularity is likewise low in the business models of WMSMEs. Particularly, 72.4 percent of respondents do not engage in sharing activities, 67.2 percent do not dematerialize (e.g., transform good/service into its digital counterpart), 58.6 percent do not rent or lease, and 56.9 percent do not utilize pay-per-use goods and services. These demonstrate that there is little momentum among WMSMEs to introduce circular models into their businesses. They seem to partake more in the sale of second-hand products (48.3 percent) due to the latter’s convenience and profit-generation potential.

For post-sales services, Figure 13 depicts that 60.3 percent of respondents stated that it is not applicable to their business. The primary service afforded by customers related to the products’ state and performance (19 percent), maintenance (15.5 percent), extended warranty (10.3 percent), and repair (8.6 percent). Moreover, 69 percent do not take back products from customers after the use phase. Only 20.7 percent do so and opt to resell, reuse, or repurpose the returned products.

Figure 13. Post-Sales Services related to CE



Source: Authors

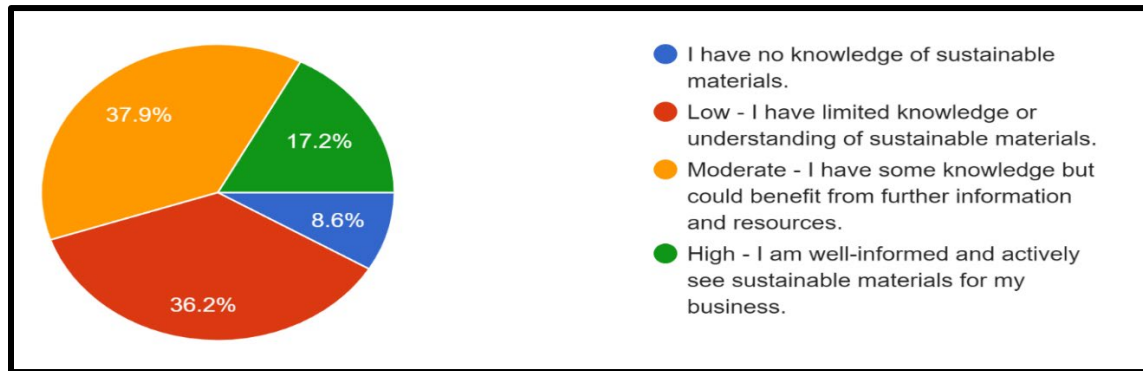
The Aling Tindera network launched by the Plastic Credit Exchange (PCEX) may entice WMSMEs to actively take back plastic waste and sell them for extra income (BusinessMirror 2020). The program engages women-owned sari-sari stores through providing them with a container that will serve as an aggregation hub and storage for post-consumer plastic wastes. The collected wastes are then bought by partner companies and processed via environment-friendly technologies. The cities of Manila and San Juan have already welcomed the entry of the waste-to-cash initiative into their localities.

Results are similarly discouraging in resource recovery. Specifically, 92.3 percent of respondents directly dispose their liquid waste, 90.4 percent discard their gaseous waste, and 75.8 percent dispose their solid waste. This signifies that majority of the firms still utilize a linear approach. It is also critical to underscore that majority of MSMEs, including women-led, do not have the appropriate technical know-how and technology necessary for the effective mainstreaming of CE (Min et al. 2021). Conversely, recovered solid, industrial, and gaseous wastes by WMSMEs are reused, recycled, or utilized for energy production purposes.

In addition, 37.9 percent of respondents have moderate knowledge about sustainable materials sourcing and procurement and 36.2 percent have limited knowledge. 17.2 percent of the WMSMEs

have a high level of knowledge while 8.6 percent admitted that they have no knowledge regarding sustainable materials (Figure 14).

Figure 14. Level of Knowledge about Sustainable Materials Sourcing and Procurement



Source: Authors

On resource consumption, an overwhelming number of WMSMEs (89.7 percent) do not use renewable energy sources (e.g., solar, wind, geothermal) nor implement energy management strategies (80.3 percent). Interestingly, a much higher number of firms (48.1 percent) implement material consumption management strategies. A total of 69.3 percent is somewhat aware of local recycling and waste management facilities. This may perhaps be attributed to the increase in the number of materials recovery facilities (MRFs), which has serviced more than 13,000 barangays in 2018 from just over 2,000 in 2008 (DENR, 2019). Local government units have established MRFs in schools, malls, and other commercial establishments and tapped local junkshops as a vital part of their respective solid waste management systems. In Quezon City, households follow a “macro and micro cell-based collection system” and are supported by over 91,000 waste pickers who collect recoverable materials and sell them to local junk shops (Domingo and Manejar 2021).

Majority of WMSMEs (67.2 percent) also have little to no knowledge, experience, and application of ecodesign/circular design practices. 13.8 percent share that environmental issues are part of the product development process and 6.9 percent of the respondents note that ecodesign/circular design is part of every product management phase and starts to influence other processes inside the organization. Another 6.9 percent stated that they have implemented their first pilot projects on ecodesign/circular design and the remaining 5.2 percent are active in developing products and new business models with improved environmental and economic performance to meet customer demands, akin to the findings of Dey et al. (2022). Notably, WMSMEs can learn from a handful of businesses that have incorporated circular practices into their products and services (Table 3).

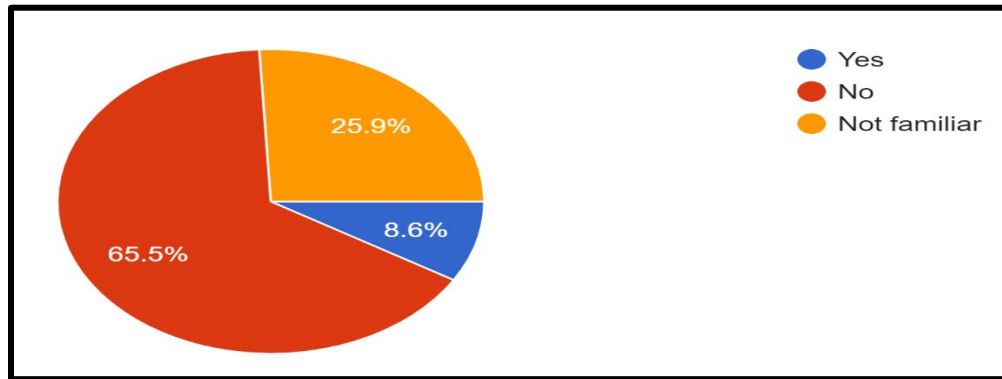
Table 3. Selected businesses with circular products/services

Business name	Industry	Circular product/service
Rags2Riches	Fashion	Bags and purses made from scrap fabric and detailed with indigenous textiles
Craftcha	Fashion, clothing	Bags, pants, blankets, pillowcases, skirts, shorts, pajamas, eco-bags, and rugs/animal beds are 99 percent made from repurposed materials, including not only katsa but also scrap textiles and denim.
Forth Co.	Fashion, clothing	Conducts upcycling and styling workshops and provides practical tips to plan sustainable wardrobes Feature partner brands such as teeforel (sells thrifted and repurposed pieces for women), Muni Studios (utilizes environmentally-sustainable fabrics and promotes ethical manufacturing), and Thread Story (transforms reclaimed fabric into clothing made by home-based mothers)
Green Space	Food	Developed Soilmate, a subscriber-based app that enables enterprises to practice Bokashi composting and access a centralized food waste collection system.
Waste4Good	Food, agriculture	Turns bio-waste into organic fertilizer
EcoNest Philippines	Packaging	Offer ecopackaging, composting, and recycling solutions to firms
Green Trident	Waste management	Collects, sorts, and processes paper, plastic, metals, small appliances, and electronic wastes
Bambike	Recreation, sports	Socio-ecological enterprise that hand-makes bamboo bicycles
Reef Picks	Jewelry, accessories	Empowers fisherfolks and local artisans through eco-friendly products such as bamboo toothbrushes, handcrafted soaps in plastic-free packaging, colorful seaglass jewelry, and paper ribbons

Sources: <https://www.cnnphilippines.com/life/style/2019/10/4/sustainable-fashion-brands.html>;
<https://wwf.org.ph/resource-center/story-archives-2020/soilmate-an-it-solution/>; <https://news.abs-cbn.com/ancx/culture/spotlight/10/24/23/pinays-invention-turns-bio-waste-into-organic-fertilizer>;
<https://www.econestph.com/>; <https://www.bambike.com/>;
<https://www.facebook.com/reefpicks/>

The use of ecodesign among WMSMEs in Metro Manila is grounded on the desire to reduce material intensity and energy intensity during production and use phases, facilitate easy repair/assembly/disassembly, promote the use of standard components, and increase the use of shared, reused, or recycled packaging. Lastly, 91.4 percent of respondents revealed that they are neither familiar nor have patent/s related to circular economy (Figure 15).

Figure 15. CE-related Patents by WMSMEs



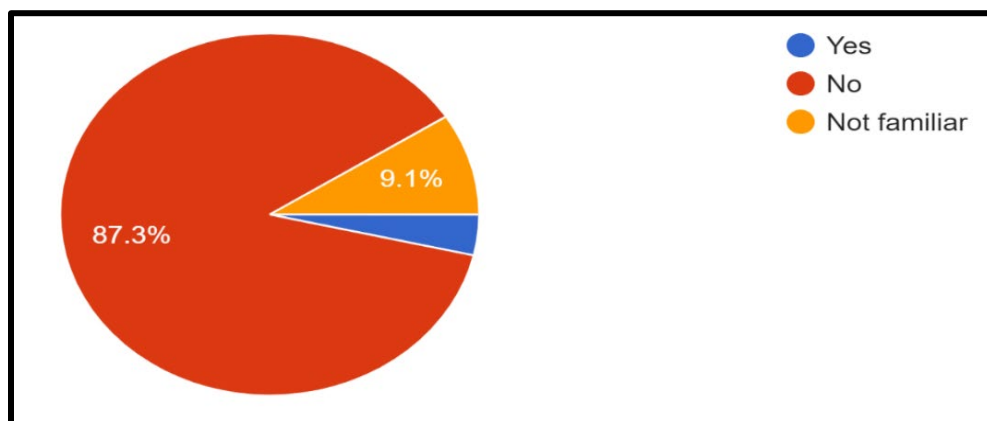
Source: Authors

5.4. Partnerships and Collaboration for CE

The Japanese experience demonstrates the indispensable role of synergies and a whole-of-society approach in effectively advancing CE (Ogunmakinde 2019). For Bag and Pretorius (2022), partnerships, innovative thinking, and the use of emerging technologies may be vital in mainstreaming CE among SMEs. Min et al. (2021) identified strategic partnerships between SMEs and large corporations as an enabler for CE adoption. Despite these benefits, 81 percent of WMSMEs in Metro Manila are not active in collaborating with external partners. They likewise exclaimed (8.6 percent) that companies still operate in silos.

Figure 16 reflects that 87.3 percent are not involved in industrial cluster of companies with shared assets and this may be due to absence of formal establishment of collaboration and little to no synergy due to barriers between entities, according to 89.7 percent of respondents. Majority of WMSMEs (70.7 percent) are not active in collaborating with customers for CE promotion.

Figure 16. Involvement of WMSMEs in Industrial Clusters



Source: Authors

6. Conclusion and Recommendations

Indeed, the country's move toward the circular economy is steered by no less than President Ferdinand R. Marcos, Jr. as exclaimed in his 2023 State of the Nation Address:

“We have adopted the concept of the “circular economy”, using nature as our model... this new system requires the participation of all sectors of society, up to each individual citizen, for it to succeed. Only a whole-of-government and whole-of-society approach will enable us to do all of these.

Collaboration is the key: between and among government offices; between government and the private sector; between industries and the academe; between government and international partners. And most importantly, collaboration between and among our populace” (Rappler, 2023).

Further, the Philippine Development Plan 2023-2028 cites the promotion of CE as essential in achieving outcome 2 or an improved environmental quality under the strategy framework to establish livable communities (NEDA, 2023). The local government units are hence expected to comply with the Ecological Solid Waste Management Act. The DENR is tasked to implement the Expanded Producer's Responsibility Act and the National Action Plan on Marine Litter and the NEDA shall oversee the realization of the Philippine Action Plan for Sustainable Consumption and Production. The private sector, external partners, and civil society organizations likewise contribute to mainstreaming CE through various policy interventions such as education, information, and awareness, collaboration platforms, business support schemes, public procurement and infrastructure, regulatory frameworks, and fiscal frameworks.

Notwithstanding these efforts, this study found that there is low level of awareness regarding CE principles among women-led MSMEs in Metro Manila. It then translates to a low level of circularity which was ascertained through strategy and vision, business model, post-sales services, resource recovery, waste management, resource consumption, and ecodesign. Moreover, WMSMEs tend to work in isolation and shun collaboration and partnerships with external parties, co-enterprises, or customers in the advancement of CE.

Correspondingly, the European, Japanese, and Chinese cases illustrate that the effective mainstreaming of CE adoption entail the buy-in and participation of all stakeholders. For its part, the Philippine government will play a leading role in the pursuit of sustainable trade en route to the successful attainment of national (i.e., PDP, EPR Act), regional (i.e., ASEAN, APEC), and international (i.e., SDGs 2030) objectives. Hence, it may consider the adoption of a multilevel system of governance by categorizing programs, projects, and activities into micro (consumers and enterprises), meso (economic agents in eco-industrial parks/industrial symbiosis), and macro (city/regional/national) levels. China's ‘experimentation under hierarchy’ model may be examined. The proposed policy actions and options are further explained below:

- a. At the micro level, the DENR and DTI can focus on education campaigns and advocacies to raise the current level of awareness about CE principles. It may build on extant programs such as the National Ecolabelling Programme - Green Choice Philippines, Kalikasan Green

Productivity, Green Purchasing Towards Green Philippines, Philippine Green Pages, and the Sustainable Diner Project and may link with the Mother Earth Foundation to expand CE-related trainings for WMSMEs across various sectors. The Philippine Trade Training Center, in collaboration with the academe and expert practitioners, may develop course/s and/or modules on CE intended for WMSMEs. The objective is to familiarize firms with the basics of CE so that they can effectively streamline it to their strategies, business models, and waste management.

In addition, the government may provide incentives and business support schemes to WMSMEs to address the latter's limited financial resources, concern regarding low cost savings, and the traditional mindset withholding them from CE uptake. DENR and/or DOST may then issue awards and certifications recognizing sustainable business practices, which may encourage greater CE adoption among MSMEs (Gue et al. 2020).

Moreover, the promotion of CE among the public, wider MSMEs, and the informal sector may be pursued through digital technologies and social media platforms. It is paramount that there is a heightened level of awareness among these groups due to their substantial contribution in terms of non-circular economic activities. They are likewise not covered by extant policies and regulations given their economies of scale and non-registration, specifically the informal sector. Using online platforms may thus be instrumental in disseminating simple, relevant, and factual CE-related information to a wider audience. The literature, including this study, have highlighted the substantial influence of customers in catalyzing and sustaining CE adoption among MSMEs, especially in ecodesign and post-sales services.

- b. At the meso level, smart regulation may be incorporated to nurture partnerships among the public sector agencies, businesses, and commercial or non-commercial third parties. Given numerous actors' existing programs and activities, it would benefit the government to simplify burdensome regulations and advance the principles of subsidiarity and proportionality through regular "check-ins" and consultations with the cited actors. This may similarly enhance confidence and synergy among the key stakeholders. Existing government- and private sector-led mechanisms such as the ecotown scale-up project, Zero Waste to Nature Ambisyon, and eco-brick projects may serve as models in fostering partnerships and collaboration between and among MSMEs and large corporations. The establishment of mini eco-parks may be explored to facilitate sharing of CE-related facilities, technologies, and technical know-how. These parks may be situated across economic centers in the Philippines and host firms in similar and interlinked industries.
- c. At the macro level, the government may prioritize the formulation and implementation of a national framework on CE to facilitate the harmonization of existing dispersed initiatives and programs. Several bills such as HB7609 are already in the Philippine Congress and their eventual passing into law will provide an overarching, cohesive strategy to collectively steer the nation towards greater CE uptake, especially among MSMEs. If done

correctly, this move may effectively cluster CE-related initiatives and promote better coordination between and among actors simultaneously pursuing various tailor-made solutions.

The government should determine the most beneficial timeframe for a national plan (e.g., 5-year, 6-year, 10-year). This is critical in ensuring that the overarching strategy towards CE is agile and can account for both expected and unforeseen changes in the internal and external environments.

Another equally important endeavor is the development of a CE monitoring framework to track the government's progress in mainstreaming CE principles among firms and households. It should contain Philippine-specific CE indicators to accurately examine the (non-) achievement of nationally agreed targets and objectives. Hence, the proposed National Natural Capital Accounting or Environment and National Resource Accounting and Assessment Plan may play a vital role.

7. References

- ASEAN Secretariat. (2021). Framework for Circular Economy for the ASEAN Economic Community. https://asean.org/wp-content/uploads/2021/10/Framework-for-Circular-Economy-for-the-AEC_Final.pdf (accessed March 25, 2023).
- Asia-Pacific Economic Cooperation (APEC). (2022a). Statement by Prime Minister of Thailand on APEC. February 10. <https://www.apec.org/press/news-releases/2022/statement-by-prime-minister-of-thailand-on-apec-hosting-year> (accessed on September 3, 2022).
- APEC. (2022b). The First APEC Senior Officials' Meeting (SOM1): "Policy Dialogue on Understanding the BCG Economy" to Promote Balanced, Sustainable and Inclusive Development in APEC. February 2022. <https://www.apec2022.go.th/som1-bcg-economy-eng/> (accessed on September 25, 2022).
- APEC. n.d.. Strong, Balanced, Secure, Sustainable and Inclusive Growth. <https://aotearoaplanofaction.apec.org/strong-balanced-secure-sustainable-and-inclusive-growth.html> (accessed on November 3, 2022).
- APEC Secretariat. (2022). Understanding the Bio-Circular-Green (BCG) Economy Model. [https://www.apec.org/docs/default-source/publications/2022/8/understanding-the-bio-circular-green-\(bcg\)-economy-model/222_sce_understanding-the-bio-circular-green-economy-model.pdf?sfvrsn=2c33f891_2](https://www.apec.org/docs/default-source/publications/2022/8/understanding-the-bio-circular-green-(bcg)-economy-model/222_sce_understanding-the-bio-circular-green-economy-model.pdf?sfvrsn=2c33f891_2) (accessed on September 10, 2022).

- Arcenas, A., Gatlabaya, L., Supetran, A., Antonio, A., Cuyno, J.A. and Delfino, D. (2019). Towards the Attainment of Sustainable Consumption and Production in the Philippines: A Desk Review of Trends and Issues. Asian Development Bank. https://www.adb.org/sites/default/files/project-documents/50158/50158-001-tacr-en_0.pdf (accessed January 14, 2023).
- Asian Development Bank. (2018). Emerging Lessons on Women’s Entrepreneurship in Asia and the Pacific. <https://www.adb.org/sites/default/files/publication/459551/womenentrepreneurship-lessons-asia-pacific.pdf> (accessed November 20, 2022)
- Austin, A. and Rahman, I.U. (2022). “A triple helix of market failures: financing the 3Rs of the circular economy in European SMEs”, *Journal of Cleaner Production*, Vol. 361, 132284, doi: 10.1016/j.jclepro.2022.132284.
- Babbie, E. (2010). *The Practice of Social Research*. 12th ed. Belmont, CA: Wadsworth Cengage.
- Bacamas, J.A., J.C. Carlos, and J.J. Katigbak. (2022). E-commerce adoption and its impact on the performance of women-led MSMEs in Metro Manila: An ex-ante study for RCEP. PIDS Discussion Paper Series 2022-03. Quezon City, Philippines: Philippine Institute for Development Studies. <https://pidswebs.pids.gov.ph/CDN/PUBLICATIONS/pidsdps2203.pdf> (accessed on September 1, 2022).
- Bag, S. and Pretorius, J.H.C. (2022). “Relationships between industry 4.0, sustainable manufacturing and circular economy: proposal of a research framework”, *International Journal of Organizational Analysis*, Vol. 30 No. 4, pp. 864-898.
- Barreiro-Gen, M. and Lozano, R. (2020). “How circular is the circular economy? Analysing the implementation of circular economy in organisations”, *Business Strategy and the Environment*, Vol. 29 No. 8, pp. 3484-3494, doi: 10.1002/bse.2590.
- Bassi, F., & Dias, J. G. (2019). The use of circular economy practices in SMEs across the EU. *Resources, Conservation and Recycling*, 146, 523-533.
- Benton, D. and Hazell, J. (2015). *The Circular Economy in Japan*. <https://www.the-ies.org/analysis/circular-economy-japan> (accessed on March 15, 2023).
- Bhattacharya, S. and Kalakbandi, V.K. (2022). “Barriers to circular supply chain: the case of unorganized tire rethreading in India”, *The International Journal of Logistics Management*, Vol. 34 No. 3, doi: 10.1108/IJLM-04-2022-0162.
- Bhattacharya, S., Ajwani-Ramchandani, R., Jha, S.K., Jabbour, C.J.C. and Venkatesh, V.G. (2022). “Prologue for the virtual special issue on social circular consumption-exploring the role of the bottom of pyramid”, *Cleaner and Responsible Consumption*, Vol. 8, 100098.

- Boulding, K. (1966). The Economics of the Coming Spaceship Earth. In Jarrett, H. Ed. Environmental Quality in a Growing Economy. Resources for the Future/John Hopkins University Press: Baltimore, 3- 14.
- Denzin, N. and Lincoln, Y. 2000. Handbook of Qualitative Research. 2nd edition. Thousand Oaks, CA: Sage.
- Bueta, G. (2022). Circular Economy Policy Initiatives and Experiences in the Philippines: Lessons for Asia and the Pacific and Beyond. In Prospects for Transitioning from a Linear to Circular Economy in Developing Asia. Asian Development Bank. <https://www.adb.org/sites/default/files/publication/774936/adbi-transitioning-linear-circular-economy-developing-asia-web.pdf> (accessed April 15, 2023).
- BusinessMirror. (2020, August 5). Plastic Credit Exchange launches ‘Aling Tindera’ waste-to-cash program with the City of Manila. <https://businessmirror.com.ph/2020/08/05/plastic-credit-exchange-launches-aling-tindera-waste-to-cash-program-with-the-city-of-manila/> (accessed November 10, 2023).
- Cariaso, B. (2023, August 6). Philippines produces 61,000 million metric tons of waste daily. PhilStar Global. <https://www.philstar.com/headlines/2023/08/06/2286595/philippines-produces-61000-million-metric-tons-waste-daily> (accessed on August 28, 2023).
- Department of Environment and Natural Resources. (2019). National Solid Waste Management Status Report (2008-2018). <https://emb.gov.ph/wp-content/uploads/2019/08/National-Solid-Waste-Management-Status-Report-2008-2018.pdf> (accessed on November 8, 2023).
- Department of Foreign Affairs and Trade Australia. (no date). Indo-Pacific Economic Framework. <https://www.dfat.gov.au/trade/organisations/wto-g20-oecd-apec/indo-pacific-economic-framework> (accessed on November 7, 2022).
- Department of Trade and Industry. (2019). 2019 Philippine MSME Statistics in Brief. <https://dtiwebfiles.s3-ap-southeast-1.amazonaws.com/BSMED/MSME+2019+Statistics/2019+Philippine+MSME+Statistics+in+Brief.pdf> (accessed on December 15, 2022).
- Dey, P.K., Malesios, C., Chowdhury, S., Saha, K., Budhwar, P. and De, D. (2022). “Adoption of circular economy practices in small and medium-sized enterprises: evidence from Europe”, International Journal of Production Economics, Vol. 248, 108496.
- Doming, S.N. and Manejar, A.J. (2021). “An Analysis of Regulatory Policies on Solid Waste Management in the Philippines: Ways Forward”, PIDS Discussion Paper Series No. 2021-02. Quezon City, Philippines: Philippine Institute for Development Studies.
- D’Agostin, A., de Medeiros, J.F., Vidor, G., Zulpo, M. and Moretto, C.F. (2020). “Drivers and barriers for the adoption of use-oriented product-service systems: a study with young consumers in medium and small cities”, Sustainable Production and Consumption, Vol. 21, pp. 92-103, doi: 10.1016/j.spc.2019.11.002.

- Ellen MacArthur Foundation (EMF). (2013). *Towards The Circular Economy*, Vol.1, (Ellen MacArthur Foundation), Cowes, Isle of Wight.
- EMF. (2015). *Growth Within: a circular economy vision for a competitive Europe*. <https://ellenmacarthurfoundation.org/growth-within-a-circular-economy-vision-for-a-competitive-europe> (accessed on September 2, 2022).
- Ekins, P., Domenech, T., Drummond, P., Bleischwitz, R., Hughes, N. and Lotti, L. (2019). *The Circular Economy: What, Why, How and Where*. Background paper for an OECD/EC Workshop on 5 July 2019 within the workshop series “Managing environmental and energy transitions for regions and cities”, Paris.
- Frosch, R.A. and N. Gallopoulos. (1989). *Strategies for manufacturing*. *Scientific American* Vol. 261 No.3, 144-152.
- Garrido-Prada, P., Lenihan, H., Doran, J., Rammer, C., & Perez-Alaniz, M. (2021). *Driving the circular economy through public environmental and energy R&D: Evidence from SMEs in the European Union*. *Ecological Economics*, 182, 106884.
- Geng, Y., Zhu, Q., Doberstein, B. and Fujita, T. (2009), “Implementing China’s circular economy concept at the regional level: a review of progress in Dalian, China”, *Waste Management*, Vol. 29 No. 2, pp. 996-1002, doi: 10.1016/j.wasman.2008.06.036.
- Geng, Y., Fu, J., Sarkis, J., & Xue, B. (2012). *Towards a national circular economy indicator system in China: an evaluation and critical analysis*. *Journal of Cleaner Production*, 23, 216–224. <https://doi.org/10.1016/j.jclepro.2011.07.005>
- Global Green Growth Institute. (2018). *Ecotown Scale-Up Project: Climate Resilient Green Growth Planning at the Provincial Level*. <https://gggi.org/wp-content/uploads/2020/12/Project-Completion-Report-CRGG-Main-Report.pdf> (accessed December 2, 2023).
- Govindan, K. and M. Hasaganic. (2017). *A systematic review on drivers, barriers, and practices towards circular economy: a supply chain perspective*. *International Journal of Production Research* Vol. 56 No. 1-2, 278-311.
- Gue, I.H.V., M.A.B. Promentilla, R.R. Tan, and A. Ubando. (2020). *A systematic review on drivers, barriers, and practices towards circular economy: a supply chain perspective*. *Journal of Cleaner Production* Vol 276, 1-9.
- Hartley, K., van Santen, R. and Kirchherr, J. (2020), “Policies for transitioning towards a circular economy: expectations from the European Union (EU)”, *Resources, Conservation and Recycling*, Vol. 155, 104634, doi: 10.1016/j.resconrec.2019.104634.

- Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). (2019). Global assessment report on biodiversity and ecosystem services of the Intergovernmental Science- Policy Platform on Biodiversity and Ecosystem Services. E. S. Brondizio, J. Settele, S. Díaz, and H. T. Ngo (editors). IPBES Secretariat, Bonn, Germany.
- Kamal, M.M., Mamat, R., Mangla, S.K., Kumar, P., Despoudi, S., Dora, M. and Tjahjono, B. (2022). Immediate return in circular economy: business to consumer product return information sharing framework to support sustainable manufacturing in small and medium enterprises, *Journal of Business Research*, Vol. 151, pp. 379-396.
- Luthra, S., Mangla, S.K., Sarkis, J. and Tseng, M.L. (2022), “Resources melioration and the circular economy: sustainability potentials for mineral, mining and extraction sector in emerging economies”, *Resources Policy*, Vol. 77, 102652, doi: 10.1016/j.resourpol.2022.102652.
- Mathivathanan, D., Mathiyazhagan, K., Khorana, S., Rana, N.P. and Arora, B. (2022), “Drivers of circular economy for small and medium enterprises: case study on the Indian state of Tamil Nadu”, *Journal of Business Research*, Vol. 149, pp. 997-1015, doi: 10.1016/j.jbusres.2022.06.007.
- Marrucci, L., Iannone, F., Daddi, T. and Iraldo, F. (2022), “Antecedents of absorptive capacity in the development of circular economy business models of small and medium enterprises”, *Business Strategy and the Environment*, Vol. 31 No. 1, pp. 532-544.
- Min, Z., Sawang, S. and Kivits, R.A. (2021), “Proposing circular economy ecosystem for Chinese SMEs: a systematic review”, *International Journal of Environmental Research and Public Health*, Vol. 18, p. 2395, doi: 10.3390/ijerph18052395.
- Mishra, R., Singh, R.K. and Govindan, K. (2022), “Barriers to the adoption of circular economy practices in micro, small and medium enterprises: instrument development, measurement and validation”, *Journal of Cleaner Production*, Vol. 351, 131389, doi: 10.1016/j.jclepro.2022.131389.
- National Economic Development Authority (NEDA). (2020). PHILIPPINE ACTION PLAN FOR SUSTAINABLE CONSUMPTION AND PRODUCTION (PAP4SCP). January 29. <https://sdg.neda.gov.ph/philippine-action-plan-for-sustainable-consumption-and-production-pap4scp/> (accessed on September 14, 2022).
- NEDA. (2023). Philippine Development Plan 2023-2028. <https://pdp.neda.gov.ph/philippine-development-plan-2023-2028/> (accessed August 12, 2023).

- Neri, A., Negri, M., Cagno, E., Franz o, S., Kumar, V., Lampertico, T. and Bassani, C.A. (2023). “The role of digital technologies in supporting the implementation of circular economy practices by industrial small and medium enterprises”, *Business Strategy and the Environment*, pp. 1-26, doi: 10.1002/bse.3388.
- Office of the United States Trade Representative (USTR). (2022). The Indo-Pacific Economic Framework for Prosperity: Biden-Harris Administration’s Negotiating Goals for the Connected Economy (Trade) Pillar. September 23. <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2022/september/indo-pacific-economic-framework-prosperity-biden-harris-administrations-negotiating-goals-connected> (accessed on November 20, 2022).
- Official Gazette of the Philippines. (2016). Republic Act No. 10771. <https://www.officialgazette.gov.ph/2016/04/29/republic-act-no-10771/> (accessed on February 2, 2023).
- Ogunmakinde, O. E. (2019). A review of circular economy development models in China, Germany and Japan. *Recycling*, 4(3), 27.
- Ormazabal, M., Prieto-Sandoval, V., Puga-Leal, R., & Jaca, C. (2018). Circular Economy in Spanish SMEs: Challenges and Opportunities. *Journal of Cleaner Production*, 185, 157–167. <https://doi.org/10.1016/j.jclepro.2018.03.031>
- Paletta, A., Leal Filho, W., Balogun, A.-L., Foschi, E. and Bonoli, A. (2019). “Barriers and challenges to plastics valorisation in the context of a circular economy: case studies from Italy”, *Journal of Cleaner Production*, Vol. 241, 118149, doi: 10.1016/j.jclepro.2019.118149.
- Park, J., Sarkis, J., & Wu, Z. (2010). Creating integrated business and environmental value within the context of China's circular economy and ecological modernization. *Journal of Cleaner Production*, 18, 1494–1501. <https://doi.org/10.1016/j.jclepro.2010.06.001>
- Philippine Alliance for Recycling and Materials Sustainability. (no date). OUR ROADMAP. <https://www.parms.com.ph/our-roadmap> (accessed February 12, 2023).
- Philippine Center for Environmental Protection and Sustainable Development Inc. (PCEPSDI) (no date). About Green Choice Philippines. <https://pcepsdi.org.ph/programme/green-choice-philippines/about-green-choice-philippines/> (accessed January 12, 2023).
- PCEPSDI. (no date). About Kalikasan GP3. <https://pcepsdi.org.ph/programme/kalikasan-gp3/about-kalikasan-gp3/> (accessed January 15, 2023).
- PCEPSDI (no date). About Philippine Green Pages. <https://pcepsdi.org.ph/programme/philippine-green-pages/about-philippine-green-pages/> (accessed January 13, 2023).

- PCEPSDI (no date). The Sustainable Diner: A Key Ingredient for Sustainable Tourism. <https://pcepsdi.org.ph/projects/the-sustainable-diner-a-key-ingredient-to-sustainable-tourism/> (accessed January 14, 2023).
- Philippine Information Agency (2023, January 27). DENR issues IRR for Extended Producer Responsibility Act of 2022. <https://pia.gov.ph/news/2023/01/27/denr-issues-irr-for-extended-producer-responsibility-act-of-2022> (accessed March 13, 2023).
- Pearce, D. and R. Turner. (1990). *Economics of Natural Resources and the Environment*. Harvester Wheatsheaf, Hemel Hempstead, Herts., UK.
- Prieto-Sandoval, V., Ormazabal, M., Jaca, C., & Viles, E. (2018). Key elements in assessing circular economy implementation in small and medium-sized enterprises. *Business Strategy and the Environment*, 27(8), 1525-1534.
- Rappler. (2023, July 24). FULL TEXT: President Marcos' State of the Nation Address 2023. <https://www.rappler.com/nation/sona-2023-full-text-transcript-speech-president-marcos-jr/> (accessed July 30, 2023).
- Rovanto, S., & Finne, M. (2023). What motivates entrepreneurs into circular economy action? Evidence from Japan and Finland. *Journal of Business Ethics*, 184(1), 71-91.
- Sacco, P., C. Vinante, Y. Borgianni, and G. Orzes. (2021). Circular Economy at the Firm Level: A New Tool for Assessing Maturity and Circularity. *Sustainability* Vol. 13 No. 9, 5288. <https://doi.org/10.3390/su13095288>
- Schroder, P. (2020). Supporting Implementation of Environment-Related Sustainable Development Goals in Asia and the Pacific: Circular Economy in the Philippines Consultant's Report. Asian Development Bank and National Economic Development Authority. <https://www.adb.org/projects/documents/phi-50158-001-tacr-0> (accessed on September 12, 2022).
- Schroder, P., K. Anggraeni and U. Weber. (2018). The Relevance of Circular Economy Practices to the Sustainable Development Goals. *Journal of Industrial Ecology* Vol. 23 No. 1, 77-95. Available at <https://doi.org/10.1111/jiec.12732>.
- Sohal, A. and De Vass, T. (2022), "Australian SME's experience in transitioning to circular economy", *Journal of Business Research*, Vol. 142, pp. 594-604, doi: 10.1016/j.jbusres.2021.12.070.
- Sohal, A., Nand, A.A., Goyal, P. and Bhattacharya, A. (2022), "Developing a circular economy: an examination of SME's role in India", *Journal of Business Research*, Vol. 142, pp. 435-447, doi: 10.1016/j.jbusres.2021.12.072.

- Stahel, W. (1982), 'Product-Life Factor', An Inquiry into the Nature of Sustainable Societies: The Role of the Private Sector (Series: 1982 Mitchell Prize Papers), <http://www.product-life.org/en/major-publications/the-product-life-factor> (accessed on October 5, 2023).
- Stahel, W. (2016). The circular economy. *Nature* Vol. 531, 435–438. Available at: [doi:10.1038/531435a](https://doi.org/10.1038/531435a) (accessed on September 2, 2022).
- Su, B., Heshmati, A., Geng, Y., & Yu, X. (2013). A review of the circular economy in China: moving from rhetoric to implementation. *Journal of cleaner production*, 42, 215-227.
- United Nations Conference on Trade and Development. (no date). Circular Economy. <https://unctad.org/topic/trade-and-environment/circular-economy> (accessed on October 2, 2022).
- USTR. no date. Indo-Pacific Economic Framework for Prosperity (IPEF). <https://ustr.gov/trade-agreements/agreements-under-negotiation/indo-pacific-economic-framework-prosperity-ipef> (accessed on November 10, 2022).
- Vinante, C, P. Sacco, G. Orzes, and Y. Borgianni. (2021). Circular Economy Metrics: Literature Review and Company-Level Classification Framework. *Journal of Clean Production* Vol. 228, 125090.
- Zhang, Z., Zhu, H., Zhou, Z. and Zou, K. (2022). "How does innovation matter for sustainable performance? Evidence from small and medium-sized enterprises", *Journal of Business Research*, Vol. 153, pp. 251-265, doi: 10.3390/su15076273.
- Zhu, B., Nguyen, M., Siri, N.S. and Malik, A. (2022). "Towards a transformative model of circular economy for SMEs", *Journal of Business Research*, Vol. 144, pp. 545-555, doi: 10.1007/s10997-022-09653-6.