Circular Economy and Sustainability
https://doi.org/10.1007/s43615-023-00318-6

ORIGINAL PAPER

Aiding Circular Business Transitions in Southeast Asian Small and Medium sized Enterprises (SMEs) Through Identifying Barriers and Enablers—a Case Study of Thailand based SMEs

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Received: 8 February 2023 / Accepted: 15 October 2023

Abstract
The economic system has long relied on a linear model which depends on the excessive use of natural resources, putting enormous pressure on the ecosystem. In the last several decades, the demand for and extraction of resources has been further driven by a radical change in technology, continued population growth, and diversification of products and services. The linear economy proves to be an inefficient model due to the loss of materials to landfills and the under-utilization of products. In addition, unsustainable waste generation and management create additional costs and harm the environment and society. Materials consumption worldwide is estimated to increase eightfold in the twenty-first century and a triple amount of resources will be needed to meet global demand by the end of 2050 [1]. Therefore, it is becoming urgent that resource management must be improved to enhance equitable economic growth while retaining environmentally friendly practices. The purpose of this paper is to explore the concept of circular economy in the contemporary setting of Asia and the need and distinctive advantages for businesses to shift to circular and more sustainable forms of production. This paper aims to highlight key barriers and enablers for Southeast Asian SMEs to transition to circular practices and provides key recommendations for the regulatory bodies and Southeast Asian SMEs. It presents key findings from literature research, online regional surveys for Thailand and Southeast Asia, and Thailand-based workshops. The paper will focus on policies; institutional, economic, and financial enablers; and information, skills, and competencies as key enablers.

Keywords Circular economy · Small- and medium-sized enterprises · Southeast Asia · Barriers to transitions · Enablers to transition

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Published online: 25 November 2023

Introduction

Industrialization and economic growth led to emerging industries focusing on enhancing profits by increasing the labor force to maximize production rates. As the population grew, specifically in Southeast Asia, the consumption rate also increased. This prompted competing companies to find faster and cheaper ways to produce commodities.

This model, however, only included the cost of production and marketed inputs and not the cost of externalities like environmental damage or overexploitation of resources. As the scale of production increased, the concerns about the depletion of natural resources, with consequent challenges in supply, brought increased attention to the way the available resources should be managed. The current linear "take-make-dispose" model of economic growth is making it increasingly difficult to meet society's needs now and in the future.

This linear production model has multiple negative effects, including over-extraction of natural resources, waste, population, and other environmental impacts, that are threatening the stability of the economies and the integrity of natural ecosystems that are essential for humanity's survival. The world is facing a profound challenge to change the linearity of material flows and shift towards more sustainable resources and circular supply chains. Sustainable production and consumption practices should be given priority to have harmonious human–environment growth.

By 2050, it is anticipated that the global population will reach around 9 billion, with the middle-class population growing exponentially. For example, in developing Asian countries like Thailand, the annual GDP has grown from 5993.3 USD in 2016 to 7817.01 USD in 2019 [1]. The growth shows that consumption per capita (needs and wants) is likely to rise as income rises in countries like Thailand, where economic growth increased the per capita consumption from 2697.6 USD in 2016 to 2985.4 USD in 2019 [2]. In addition, rapid urbanization leads to higher migration to the cities, which leads to increased demand for consumer products [3].

As a result, the need for materials consumption will increase, putting pressure on the global supply chain and, invariably, the environment. Hence, it is crucial to ensure that sustainable practices are applied in the whole value chain [4] and further implement a circular economy (CE).

Regulatory bodies from around the world are engaging in concrete efforts to build more sustainable "circular" societies to shift the policy framework from an eco-destructive and resource-exhausting society to a resource-conserving and environmentally friendly society. CE efforts are gaining popularity in SE-Asia; however, the implementation seems, in the preliminary stages, mainly focused on waste management rather than adding value to the existing product.

The transition towards a CE is challenging, as only 9% of all the goods and/or products produced are a part of the global circular economy loop in one or the other way [5]. Furthermore, as the circularity gap (2020) report points out, CE trends appear to be declining globally with circularity being 9.1% in 2018 reduced to 8.6% in 2020 [5]. This emphasizes the need for stronger collective efforts, especially in the resource-intensive manufacturing sector.

"According to Asian Development Bank, as of 2020, there are about 71 million micro-, small- and medium-sized enterprises (MSMEs) in Southeast Asia today that employ over 67% of the working population and account for about 97% of all businesses in the region" [6]. Given the dominance of small and medium-sized enterprises (SMEs) in the Southeast Asian (SE-Asian) market, this paper provides a baseline on-ground situational

analysis for the needed successful circular business model transition by highlighting the barriers and enablers faced by SMEs in Asia. Small- and medium-sized enterprises (SMEs) are broadly defined as non-subsidiary, independent firms which employ fewer people than a given number of employees or lesser than a certain capita or profit level. For example, In Indonesia, micro-enterprises are the ones with assets less than 50 million or sales less than 300 million USD, small enterprises are the ones with assets worth 50–500 million USD or sales worth 300 million to 2.5 billion USD, and medium-sized enterprises are the ones with assets worth 500 million to 10 billion USD or sales worth 2.5 billion to 50 billion USD [7].

The purpose of this paper is to highlight the need and distinctive advantages for businesses to shift to a circular economy and more sustainable form of production. This paper aims to highlight the most pressing barriers and challenges faced by the private sector in the region that hinder them from moving towards sustainable production and adoption of circular economy business models. In addition, we will proceed to identify the key enablers to alleviate these barriers and support the adoption and deployment of the circular economy. The paper will focus on policies; institutional, economic, and financial enablers; and information, skills, and competencies as key enablers and is divided in the following sections: benefits of implementing circular strategies, barriers to circular transitions, enablers to circular transitions, and recommendations.

Methodology

Research Objectives

The research questions for this study were as follows:

1. What are the benefits of adopting circular practices in SMEs?
2. What are the barriers to circular transitions for SMEs?
3. What are the enablers for circular transitions for SMEs?

Data Collection

To address these questions, data was collected via a literature review, online surveys, and an in-person multi-stakeholder 2-day workshop with Thailand-based SME development stakeholders. The workshop was held in person in partnership with SEED, which is a global partnership between the United Nations Environment Program, the United Nations Development Program, and the International Union for Conservation of Nature that provides support to upcoming entrepreneurs through enterprise support programs, in Bangkok in 2021. Due to COVID-19 restrictions, the participant number was limited to 40 people. The workshop was conducted in the form of breakout group sessions, each of which had about 12 participants, including representatives of academia, international organizations, and the Thai government.

For the online surveys, a stakeholder mapping was done for the online surveys and the survey had a mixture of multiple-choice as well as open-ended questions and was distributed via Google Forms to select contacts. Two surveys were conducted: one in Thai, which was distributed to Thai private sector personnel, and the other in English, distributed to contacts in Thailand as well as in other Southeast Asian countries.

The literature review was carried out using query search using two search engines, Google Scholar and Scopus, to search topics like the status of the circular economy, barriers to transition, and drivers to transition. The search was focused on Southeast Asian SMEs. A rapid literature review was carried out where the search results were shortlisted by abstracts and shortlisted results were read in detail. A total of 48 papers from Google Scholar and 112 papers from Scopus were shortlisted for full analysis.

Analysis Techniques

For the in-person workshop, over the span of 2 days, the workshop participants discussed their opinions on the key research questions for the project. These opinions were documented and used to support or refute the conclusions collected from the literature review and online surveys in this report.

For the online surveys, the Thai version of the survey was done as the researchers were based in Thailand and were able to reach out to more contacts through their network. Additionally, since the workshop participants were mostly Thailand-based, the survey results would strengthen the responses received during the workshop through comparative analysis. The Thai survey had 17 respondents and the English survey had 33 respondents; about 24% were from Thailand, followed by Indonesia at 21% and Singapore at 17%. The online survey was targeted at respondents from middle and upper management. About 55% of the respondents were from small- and medium-sized enterprises (SMEs) catering to consumer products, and a majority (about 44%) were top management, followed by board members. About 55% of the respondents were males. The data collected from the workshop and the survey was analyzed manually for similarities in opinions and is presented in the following sections.

For the literature review, the information from the shortlisted papers was added to a customized code book produced in the Microsoft Excel workbook. The key information extracted and analyzed from these shortlisted papers includes the bibliographic information, key barriers to transition, enablers to transitions, benefits of circular economy, and suggestions/other relevant information. This collected information was further analyzed for commonalities amongst the barriers and enablers and is presented in the sections below.

Benefits of Circular Economy for SMEs

The adoption of the CE concept requires analysis of the potential benefits that it could bring to businesses and economies like the potential for reducing liabilities and warranty costs of firms because of the longer-lasting, healthier, and more environmentally friendly products [8]. These benefits become increasingly important in the SME context as SMEs dominate the manufacturing and production sector in Southeast Asia. SMEs make up about 89 to 99% of the total establishments in the ASEAN region and contribute about 30 to 53% of the GDP in the region [9].

Business decisions to shift towards more circular models are therefore likely to bring both short- and long-term benefits, thus improving business competitiveness and resilience in the long run. SMEs, globally, are increasingly becoming aware of the benefits of closing loops and improving resource efficiency [10].

For SMEs, many researchers have identified that cost savings can be achieved in production by transitioning to circular production processes and by recovering waste [11, 12]. Research by Mangla et al. and Stratan points out that the circular business models will help

organizations increase differentiation, decrease service and own, generate new revenues, and reduce risks and their impact on the rules of resource supply and demand [13, 14]. According to an article by Venkatachalam [15], in Bangkok Post, "The adoption of CE principles could lead to proa fit of 324 billion USD and create 1.5 million jobs in the cities and those sectors in Asia over the next 25 years" [16]. For example, research by Ellen McArthur Foundation states that remanufacturing mobile phones could be 50% cheaper than manufacturing phones from virgin materials [15].

Results from the Survey

The survey found that out of the 17 respondents from the Thai survey and 33 respondents from the English survey, 68.8% SE-Asian SMEs and 58.8% of the Thai respondents were aware of the concept and working of CE. Additionally, the respondents were asked to enlist the benefits of circular practices (as seen in Table 1). However, the circular practices were not observed to be widely implemented as 58.8% of the 17 Thai respondents and 69.7% of the 33 SE-Asia respondents stated that they did not implement any circular practices.

The survey results from both the surveys state almost similar benefits of adopting circular practices like better waste management, better production processes, and better cliental relationships. Given that most Thai and SE-Asian respondents are aware of the concept of circular economy and aware of the benefits of circular transitions, why is it that linear

Table 1 Survey results for benefits of implementing circular practices

Benefits according to Southeast Asia respondents	Benefits according to Thailand respondents
Better sustainability footprint and lower emissions like carbon dioxide emissions	Behavior changes in municipal waste management
Reduction of waste to landfill	Cost of waste management reduced
Higher production efficiency	Increase the value of waste materials
The ability to quantify the unit-based impact of projects that reduce waste	Optimization of local resources for tourism
For Asphalt Plastic production, it improvised bitumen durability up to 40% while using plastic waste	New sources of income by co-creating and creating new products and services
Lower input cost and lower consumption of scarce resources	Reduces waste material and water
Extended producer responsibility, positive brand building, customer engagement, and cost recovery	Promotes new products creation
Attracts clients that are values-aligned, and this makes it more convenient to act on recycling	Lowers production cost
More effective man-hour allocation	Reduction of energy consumption, greenhouse gas emission, products carbon footprint, water consumption, and raw material usage
Reduces costs per hour	Better customer relationship
Creates room for improvements for existing products and innovations	Financial incentives from new products made from recycled waste
	Encourages the consumer to rethink how they can together help the world less waste and help made local the economy community strong and promote closer relationships with local suppliers

This table depicts the survey results and the benefits of the implementation of circular practices as highlighted by the respondents

forms of production are still dominant amongst SMEs in SE-Asia? The following section states the barriers faced by SMEs to transition to circular forms of production.

Barriers to Circular Transition

Despite the global campaign and urgency to shift from linear to CE, practitioners from industries and private sectors face barriers to implementing adopting this concept. The survey found this particularly true in the context of Southeast Asian SMEs. The traditional way is still heavily driven by fossil fuel and mass production models, making it challenging to transform. These barriers appear to be both internally and externally driven.

Key barriers to transformation both collected from the literature review and survey are identified in Figs. 1 and 2 and are discussed in more detail below.

The following section describes the key major barriers as identified by the survey participants in Figs. 1 and 2 and through literature.

Weak Regulatory Support

Regulatory support aiding circular transitions plays an important part in encouraging circular transitions of SMEs especially due to the limited financial and technical capacities SMEs generally have. This can also be seen in the survey results where inadequate regulatory support ranks as one of the highest barriers to circular transitions in Southeast Asian SMEs. Regulatory barriers include the following:

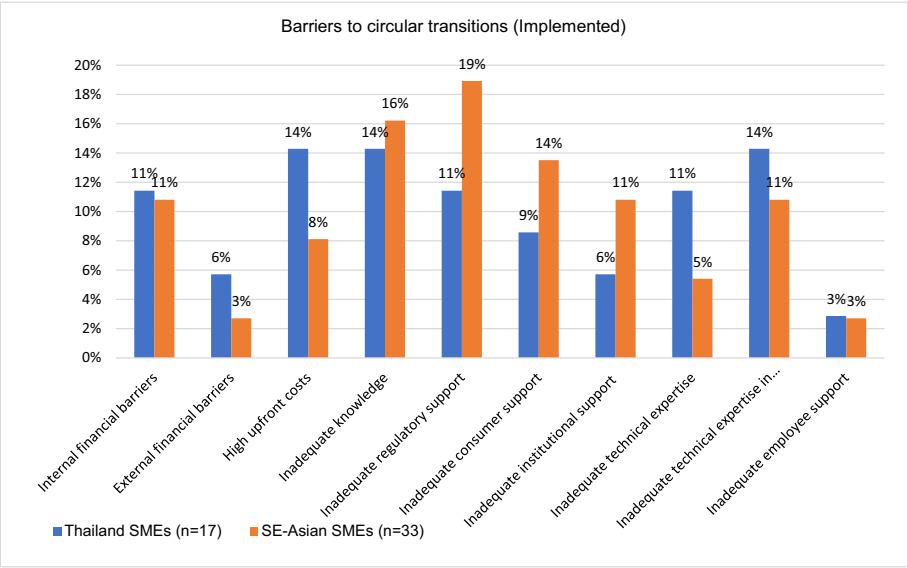

Fig. 1 Survey results for barriers for SMEs that have implemented circular practices to a certain extent (source: authors' own). This figure depicts survey results for barriers to circular transitions for SMEs that have already or currently implementing circular practices in their production process to a certain extent

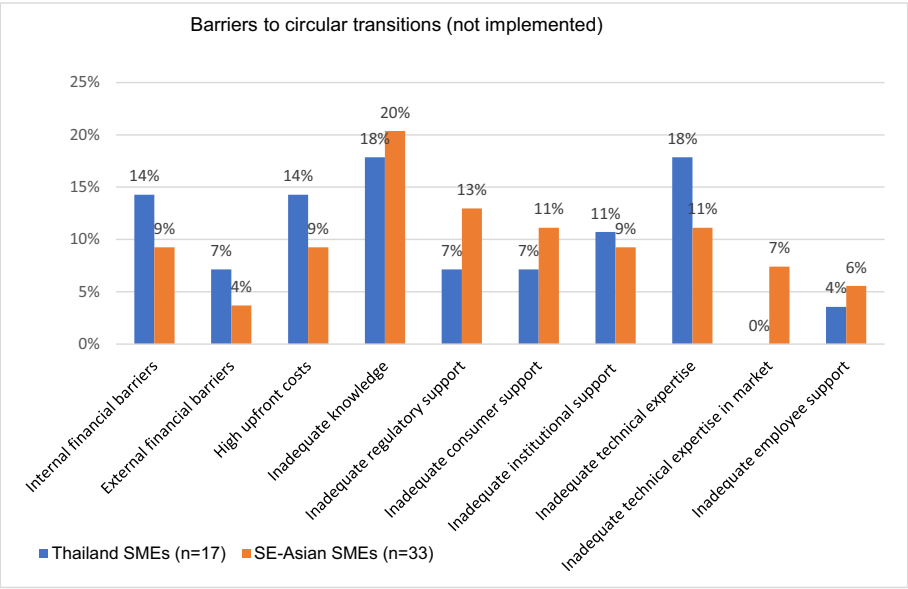

Fig. 2 Survey results for barriers for SMEs that have not implemented circular practices (source: authors' own). This figure depicts survey results for barriers to circular transitions for SMEs that have not implemented circular practices

- Lack of subsidies and tax breaks for sustainably made products and technology: Subsidies and tax breaks that support linear manufacturing processes and extraction of resources still dominate in many SE-Asian countries. For example, in Indonesia, the government tends to subsidize coal, disincentivize renewables, and have low-carbon economies [17]. The lack of products produced through circular processes makes it difficult and costly for SMEs to want to invest in such transitions.
- Lack of coordination between government agencies: While some incentives do exist, they may not go through strong coordination amongst different governmental departments resulting in conflicting policies resulting in chances of weak implementation.
- Internal barriers within SMEs: Many of the senior management at SMEs highlighted that lack of clarity and insufficient understanding of regulation is one of the key barriers to transition. It is challenging to transition when there is no standard performance and evaluation assessment in place.

Financial and Economic Barriers

Literature reviews and survey responses show that transitioning to circular practices will potentially bring positive impacts to the business in the long term, such as fostering growth, being environmentally friendly, and reducing vulnerabilities to resource-price shocks [18]. However, in the short term, given the low-profit margin of SMEs, only a limited number of SMEs can commit to the risk of putting an upfront investment cost for their business. It involves implementing costly pollution control technologies and drastic changes in the supply chain [19].

Most respondents (both SE-Asian and Thai) who have not introduced any circular practices suggested that economic barriers were the main challenges to circular transition. It shows that in most SE-Asian SMEs, economic incentives play a significant part in any successful implementation of circular transitions.

Additionally, it is important to highlight that CE practices are not limited to the production stage but also consider the cause and effects of the entire supply chain beyond the manufacturing stage, either directly or indirectly. For example, limited information on sustainable supply chains and sustainable materials in some industries, along with durability and repairability features, can lead to an increase in production costs.

Consumer Behavior and Perception

To support the transition, it is crucial to create a positive consumer perception of sustainable products. As shown in the survey, lack of consumer support ranked highly as a barrier to circular transitions. Hence, consumer acceptance of sustainable products can aid companies to shift their business model [13, 20]. However, SMEs will not be encouraged to transition if the consumers keep supporting linearly produced products [21]. Consumer support through a positive perception towards reused projects is crucial to encourage private sectors to engage in more sustainable development practices.

Infrastructure, Knowledge, and Technical Expertise

Given the rapid economic growth rate and existing global supply change in many SE-Asian countries, the infrastructure to support circular practices like waste management and treatment facilities, packaging, and recycling, both internally as well as outside the production facilities, is still not completely implemented or available. In addition to the barriers due to management systems, limited available or usable technical knowledge to shift from a linear to a circular product life cycle is also a bottleneck for transitions, especially with SMEs and other types of industries that have limited human capital. The survey highlights that lack of technical capacity is the leading barrier amongst both Thai and SE-Asian respondents. The respondents further emphasized that there is limited training or investment attributed to improving understanding and knowledge theoretically or practically. This has also been identified by [17], where a lack of knowledge of innovative technologies was identified as one of the barriers to industrial transitions. Research by Türkes et al. states that a lack of knowledge of processes needed for circular transitions is one of the main key barriers faced by SMEs to transition [22].

Technical knowledge can be improved by enhancing knowledge transfer between countries with already implemented CE-related technologies and SE-Asian countries. Further, scholarships or free MOOCs in English, as well as the local language by international governmental organizations, can aid in enhancing the knowledge base amongst SME personnel.

Enablers for Circular Transitions

During the workshop conducted for this research, the participants identified that the awareness of the concept of CE has been receiving increased traction and is becoming increasingly dominant in the development practice in SE-Asian countries. However, not

enough discussion or evidence was found in the literature review and survey on how SE-Asian SMEs can transition to CE practices as well as how to involve the business sector and encourage investment in CE practice in SE-Asia. There is a range of enablers and barriers Southeast Asian SMEs face due to the high rate of growth that makes SME transition towards circle economy difficult.

During the workshop conducted for this research, stakeholders mapping was conducted as an analysis tool to understand key actors that can support SMEs to do the transitions based on the identified barriers and enablers. The objective of this exercise is to help us identify entry points on which key actors SMEs should highly collaborate in achieving the transition.

Figure 3 (Source: authors' own) provides the mapping of key stakeholders according to their power versus impact. This mapping was done by the workshop participants at the workshop conducted for this research. This figure helps provide perspective and confirms the above statement of government being considered having high power and influence. This highlights the importance of policy involvement in circular transitions.

Complimenting to the above findings, key data collected from literature review and surveys showcase enablers that encourage the adoption of CE initiatives, which can be broadly divided into two categories according to the internal environment and the external environment [4]. The following section provides a summary of key identified enabling factors identified from the existing literature and surveys and complimented by the workshop results (Fig. 4). These enabling factors are grouped into two levels: the organizational level and the societal level.

The key identified enablers at the organizational level are as follows:

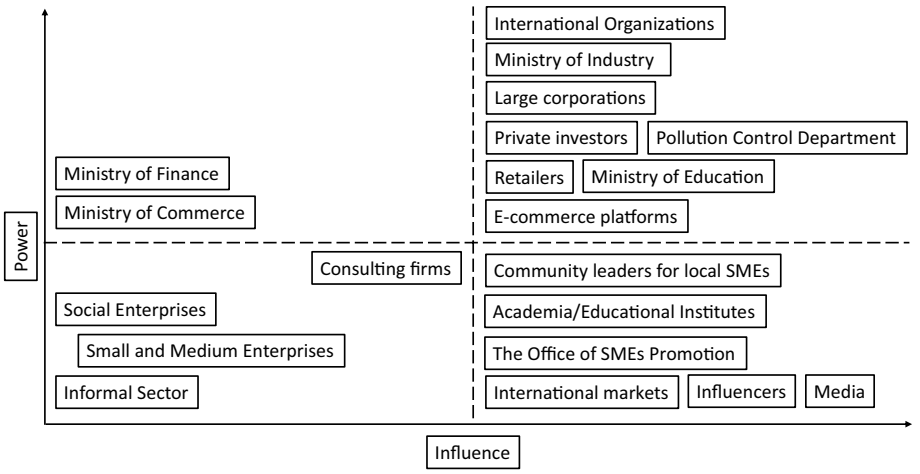

Fig. 3 Mapping of key stakeholders in Thailand's CE by power and influence (source: authors' own). This figure depicts the power versus influence graph and where the key SME stakeholders lie to better understand which stakeholders need to be targeted to move the transition towards circular manufacturing faster

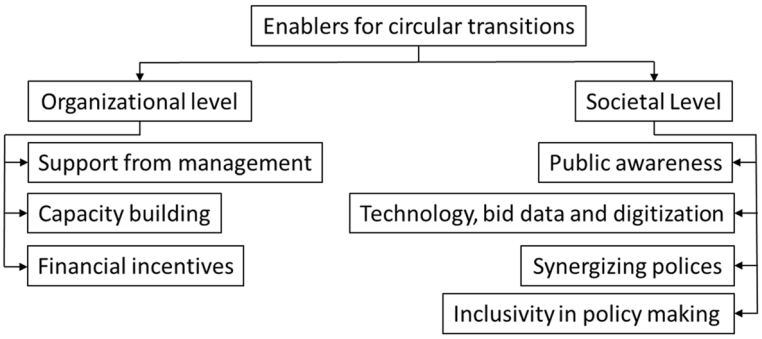

Fig. 4 Types of enablers for circular transitions (source: authors' own). This figure depicts the different types of enablers as described in the section below

Support from Management

Support from stakeholders related to the SME (inclusive of investors, clients, suppliers, etc.) and internal commitment have the potential to aid the transition to circular practices. Hence, the willingness of the people in power such as stakeholders and investors, within the SMEs, is particularly important. Various research studies have agreed on the importance of management [14, 23]. Studies focusing on management commitment and support state that proper employee and suppliers' training has shown to have an important influence on sustainable initiatives of organizations. It is important to have a clear vision in terms of goals, objectives, and targets to shift towards the CE [24]. Integrating the principles of CE in the SMEs strategy along with clearly described goals and measurable parameters to monitor progress can be a strong enabler towards implementation.

Human Resources: Capacity Building to Increase Skills and Knowledge Related to CE Practices

The relevance of addressing the human side of organizations in circular transition is important as addressing the production or technological aspects of it. Studies have shown that aligning environment-friendly strategies and innovation through management leadership, training, and other pro-environmental behaviors can support sustainability practices in the company [25]. To facilitate the circular transition, training programs by expert facilitators, like universities or knowledge centers on CE, need to be provided to develop capabilities, skills, and tools needed for circular business models. Training and education and free information from reputable sources ranked one of the highest enablers of circular transitions both amongst Thai and SE-Asian respondents (Figs. 5 and 6). In the SE-Asia online survey, support from employees was also identified as the leading enabler in SE-Asia-wide enterprises.

Increasing knowledge and information related to the CE practices will help them to understand what changes they need most and how to do these changes. The survey result shows the gap and the potential for capacity building as it shows the majority (68% for SE-Asia respondents and 58% for Thai respondents) of respondents said they have not received any training on CE and those who received training indicate that

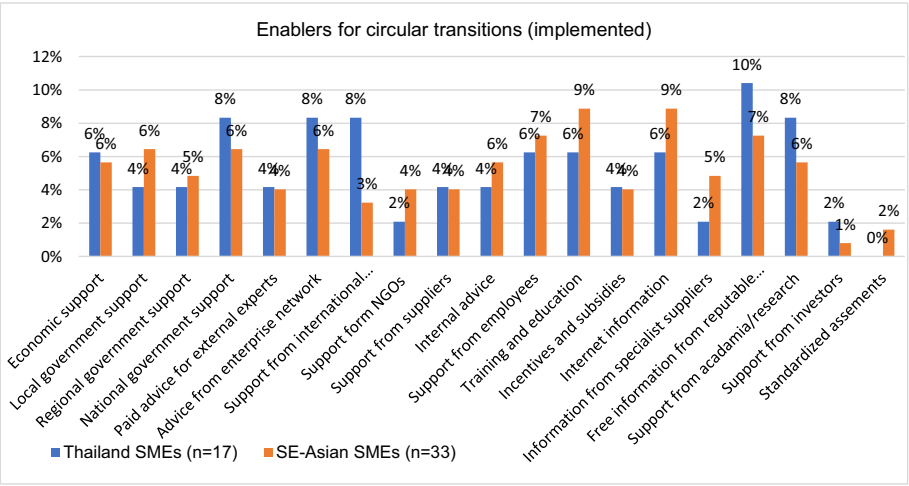

Fig. 5 Survey results for enablers for SMEs that have implemented circular practices to a certain level (source: authors' own). This figure depicts the survey results for the enablers for SMEs that have not implemented circular practices to a certain level

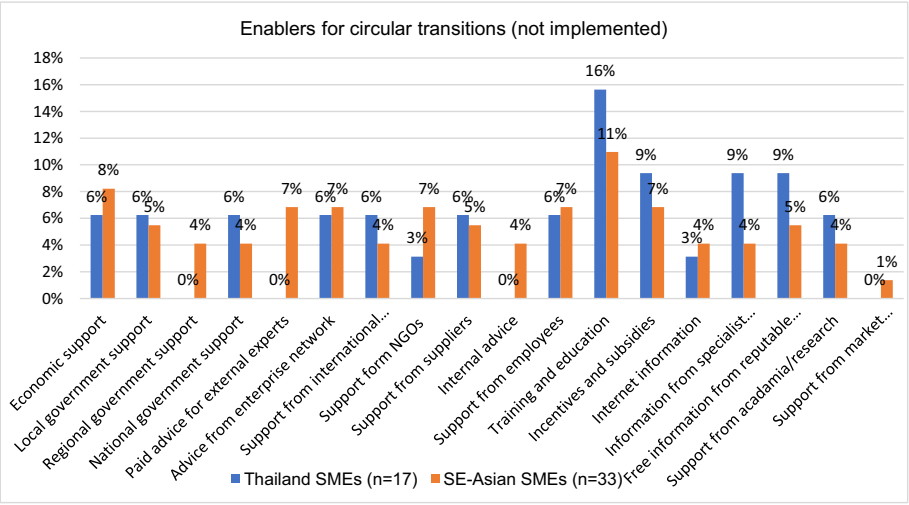

Fig. 6 Survey results for enablers for SMEs that have not implemented circular practices (source: authors' own). This figure depicts the survey results for the enablers for SMEs that have not implemented circular practices

they find the training useful (86% for SE-Asian respondents and 90% for Thai respondents). Respondents from surveys and workshops distinguished that the information and knowledge can be derived either formally or informally. They identified training and education as important driving factors; this could be from the national government, universities, research institutions, and reputable organizations. Moreover, they also highlight that information and knowledge could be in a format of advice, information

from a network of enterprises, reputable resources such as the UN, and other scientific bodies. Respondents also mentioned that they gain some of the information from the internet since it is considered a free source.

Respondents from surveys highlighted that there is a lack of expertise not only within their company but also in the market. To address this issue, government, private sectors, and service providers alike should provide skills development programs for personnel in various sections. Through the partnership, they can also provide educational scholarships and funds for certifications and degree training for financially unfortunate employees as well as vulnerable populations.

Additionally, environmental awareness and technological innovation are key in forging a long-term acceptance of transitions to circular supply chains and recycling activities [26]. The global call to sustainable development has been imbued by many enterprises as a core principle of their business operations, especially regarding the decoupling of economic growth from environmental degradation and the need for sustainable consumption and production patterns. Research shows that a majority of the companies in the Asian automobile industry expressed that their transitions to circularity are a strategic means to ensure the core business principle—concern for the environment and appreciation of the shared concerns of sustainable development enshrined in many national and international documents is adhered to [27]. In addition to environmental awareness, the availability of free and reputable knowledge sources is also important for SMEs to transition to circular practices. This has been rightly pointed out by the survey respondents in Thailand as it ranked the highest enabler for circular transitions both in the SMEs that had implemented circular practices and the ones that had not.

Financial Incentives and Support for Process Improvements Within SMEs

One of the major barriers mentioned by the respondents, in both workshop and online surveys, is economic and financial (Figs. 3, 5, and 6). Given the small scale and limited profit margins of SMEs, they do not necessarily have the financial capacity to invest in the high upfront costs needed for a variety of production chain changes and pollution control strategies. The process modifications needed to transition from the current liner production system to a circular production system that enables CE transition to require high upfront costs in the form of technologies. To enable these investments, incentives can be in the form of tax subsidies for green technologies from the government or funding targeted towards SMEs from public or private funding. This also requires certain expertise and training and education of employees. The survey results from both sets of respondents, as seen in Figs. 5 and 6, show that both incentives and subsidies and training and education have been identified as the leading enablers in circular transitions, further emphasizing the need for this enabler.

Additionally, providing tax subsidies for green transition technologies and subsidizing sustainably manufactured products may encourage consumers to buy more green products, thus encouraging the producers to shift to circular forms of production. Additionally, implementing an environmental tax for linear-produced products would encourage SMEs to transition. Furthermore, implementing green labels can promote streamlining the quality of green products in the circular supply chain.

Societal Level

Investing in Public Awareness and Behavioral Change for Consumers, Decision-Makers, and Practitioners

In emerging economies such as Asian countries, researchers for this paper conclude that consumer awareness is the one of the key factors in the adoption of CE principles based on analysis of the existing literature. The transition to CE depends on the customers' adoption of emerging products produced using alternative circular business models while consumption patterns are driven by societal norms. In developing economies, repair and reuse have been widely practiced, and repair shops are a part of the economy that provides many jobs [28]. Other countries also see emerging startups that handle electronic discards and refurbish them to be sold in a secondary resale market. These initiatives are preventing such products from going into landfill, thereby preserving valuable resources.

Education, communication, and economic factors have a major impact on the behavior of the population towards the adoption of CE at all levels [29]. Studies show that with renewed and effective communication, the concept and benefit of the CE are coming forward, and it is the consumer demand that will drive the movement [30, 31]. Consumer behavior is also driven by culture, social class, and peer groups [32], and varies by ethnicity and society as a whole [33]. Consumer ethics and culture have influenced how they utilize products over their life and extend their use through 3R (reuse-reduce-recycle) [34].

As we have discussed in the enablers and barriers section and by the workshop participants, political will and customer perception are the two main important things that could be seen as the key to promoting CE. The collective attitudes can even influence the authority towards enforcing regulations and can also lead to a movement towards circular behavior [35]. Existing research has shown that in Thailand when made aware of the benefits of CE, consumers were ready to pay premium prices for eco-friendly products [36].

Business sectors are depending on the market for their success and profit. However, there is an excessive cost involved in the decision to implement the practice. Many respondents are aware that long-term circular transitions will benefit them economically and environmentally. Participants perceived stakeholders like academia, community leaders, and celebrities as change agents that have the power to influence people in the market which in turn will influence managers, government, and policy-makers to issue regulations that support CE. The government can leverage the "people power" to aid the SMEs to transition through locally apt campaigns using local languages and creative outreach methods such as using music and art.

Technology, Big Data, Information, and Digitalization

An unprecedented favorable alignment of technological developments is now facilitating the transition to CE. Guided by CE principles, technological advances can create better opportunities for society. Information and industrial technologies are now coming online or being deployed at scale, which allows the creation of CE business approaches that were previously not possible. These advances allow more efficient collaboration and knowledge sharing, better tracking of materials, improved forward and reverse logistics set-ups, and increased use of renewable energy.

Research by Patwa et al. on enablers of CE in developing countries indicates that big data and information flows highly influence the adoption of CE in emerging economies [37]. An increase in the generation of data and hence the efficient analysis of this volume of data can support decisions to better manage precious resources in emerging economies. It also allows resource forecasting and planning efficiency, thus reducing wastage. The governments in emerging economies are also leveraging big data to manage agriculture, natural resources, water supply, energy distribution, transport, etc. and create policies accordingly. Big data and information flow highly influence the adoption of 3R/extended life cycle of products in emerging economies. Big data is also helping managers to extend the life of products through better reverse logistics, information exchange of availability of refurbished products, and easy returns. Big data and AI help inform companies of potential issues in products and provide timely service to products, thus extending their life through proper and preventive maintenance.

In addition, research also shows that digitalization creates new opportunities by enabling novel digital platforms and helps to create new kinds of markets, which can be based on the virtualization of the products and processes [38]. Digitalization facilitates easier and more efficient networking, collaboration, and co-creation with stakeholders including customers. Digitalization embraces consumer involvement in the product and service innovation processes while also helping companies reach and interact with consumers better than before. Following up on the point that consumer demand drives circular transitions, social media can play a major enabler in raising consumer awareness and better consumer-business communications by creating an interactive relationship with consumers. Thanks to digitalization, marketing is also becoming more interactive and intelligent. Finally, digitalization helps to cut costs and increase efficiency, including the efficiency of resources.

Synergizing Policies and Actions Within the Government—Adopting a Cross-sectional and Multi-stakeholder Approach

One important factor that is linked to the slow transition to CE is the complex synergies amongst various stakeholders. The results of the surveys highlight the importance of collaboration and partnership in supporting regulations and policies that can accelerate and enable CE implementation. CE cannot be done only by the private sector and need to be done through a multi-stakeholder measure rather than a unilateral action. In this sense, there is an urgent need to synergize the initiatives and efforts that each relevant sector should do to support the transition. According to survey and workshop participants, the key issues with policies in SE-Asia are either lack of policies or bureaucratic processes leading to loss of intended policy impact. The government needs to focus on implementing new policies that encourage sustainable transitions or improve the impact of the current ones through better monitoring and transparent assessments. There is an urgent need to prioritize the implementation of green policies as opposed to the ones supporting linear economy production.

Additionally, past research has proved that the pressure influenced by governmental regulation is the most influential factor in a firm's environmental behavior, such as waste reduction [39, 40]. Government and its policies also play a critical role in encouraging innovation and new initiatives for production and consumption. Governments can help create platforms for all stakeholders in the private and public sectors for idea exchange and cooperation between industries and improve awareness amongst the public for CE.

The prevailing gap in government policies and practices creates potential opportunities for private sector engagement. Enhancing public–private partnerships in various sectors that have been identified in the enablers above, such as human resources, funding, and management, could lead the pathway for CE transition. Regulations can provide intelligent market incentives which can help turn the market for products and services into circular practices and build an effective modern corporate governance system that could engage companies to improve their commitment to circularity. For example, the system could include establishing credible penalties for failure, strengthening boards of directors, empowering shareholders, and improving disclosure. Selective incentives provide useful means of encouraging companies to establish eco-industrial chains by changing the cost and profit of each participating firm. Another example is to set up clear policies and legislation to integrate ecological and societal costs into the pricing of products and services. In a correctly functioning economy, a valuation is needed of ecological systems and natural capital stocks, as they are critical for a functioning Earth's life-support system. Regulations help facilitate financing and investment in circular products and services as this carries different risks than investing in linear products and services. Moreover, the government plays a key role in promoting international cooperation in creating a CE. To implement a CE in one country, changes are needed in a region and worldwide since raw material supply chains and waste flows are global. Finally, government policies help to promote capacity building. For example, the handling of waste and energy requirements of society and eco-efficient industrial parks plays a key role in kick-starting sustainable industrial development [37]. Government policies are one of the main enablers that can highly influence sustainability practices such as reduce-reduce-recycle (3R) [37].

Inclusive Voice in Policymaking

As mentioned previously, in many SE-Asian countries, the policy-making procedures are long and bureaucratic and tend to seek public opinion (if at all), only after the policy is implemented. Policy making currently is a top-down process with a limited set of people with decision-making power. A large portion of stakeholders like SMEs, vulnerable populations, youth, and academia are excluded from voicing their opinion. This point was also emphasized by the survey and workshop respondents who felt that their voice was not heard in the policy-making process. To create a holistic policy design that creates an actual impact on society, it is especially important to include the voices of the unheard in the policy-making process by creating spaces for discussions like roundtable workshops, creating membership associations, etc.

Conclusion

With the continuation of resource depletion and effort to navigate the negative environmental impact of business practices, a circular economy offers a new concept that not only provides profit but also benefits the ecosystems. The basic concepts of the circular economy on designing and eliminating waste, the prolonged life cycle of the product by staying in the loop, and regenerating natural systems are seen as necessary solutions if we want to achieve sustainability. Integrating circular practices, however, does not come without challenges even though enterprises have a high awareness of its benefit. The adoption of a circular economy is challenging especially for small enterprises in Southeast Asia due

to barriers related to regulatory support, financial, consumer behavior, infrastructure, and technology.

This paper contributes to an effort to identify key recommendations on how to support a circular economy from small and medium enterprises in the Southeast Asia context. Our current linear production systems have been deeply rooted, budget-friendly, and widely accepted and adopted by many industries throughout the years. The transformation process will be challenging and complicated to unpack strategic plans, overcome power struggles, manage, and invest in sustainable resources and practices. Supporting the shifting and transformative changes to a circular economy needs to consider multi-factors that are often intertwined with multi-stakeholders interests.

Based on the findings, the factors that were highlighted as barriers can be shifted to become enablers of the circular economy. Factors such as policy and regulatory framework, environmental awareness and behavioral change, financial support, information, and technology were founded in both analyses. This highlights that there is a need for collaboration to change the paradigm. This study provides five main recommendations on potential action to support enterprises to integrate the circularity approach in their business that is through synergizing policies and actions, providing financial aid, capacity building, investing in behavioral change, and collective voice in policy-making.

Acknowledging that all factors are interlinked and interrelated, a systemic collaboration is needed to shift the paradigm. The circular economy cannot be implemented in silos. Hence, it is not solely the industry's responsibility but also needs to be supported by a collaborative effort from other actors, including the academic and research community, political will from the government agencies and management structure in the organization, and civil society. Thus, it is important to have a collective outlook towards the transition to CE.

The findings from this study are useful for policy-makers, enterprises, practitioners, and other stakeholders that are interested in applying or want to accelerate circular economy practices. The information provided would be able to assist them with strategic entry points and address issues on how to support sustainable consumption and production by transitioning to a circular economy.

Acknowledgements The authors of this paper would like to thank the Swedish International Development Cooperation Agency (SIDA) for funding this research. The authors would also like to thank the reviewing team, Clemens Grunbuhel, Corrado Topi, and Diane Archer (Stockholm Environment Institute), for their support. The authors would also like to thank Phuong Nguyen (PN), a past Research Associate, SEI, who helped with the data collection for this research. A special thanks to SEED, Bangkok, for supporting the research process.

Author Contribution The authors confirm their contribution to the paper as follows: study conception and design: JN, KM; data collection: JN, KM, and PN; analysis and interpretation of results: JN, KM; draft manuscript preparation: JN. All authors have reviewed the results and approved the final version of the manuscript.

Funding The funding for this research was provided by the Swedish International Development Cooperation Agency (SIDA).

Data Availability All data generated or analyzed during this study are included in this published article.

Declarations

Ethics Approval and Consent to Participate All the participants in the study (online survey and workshop) have consented to participate in the study through a written consent form. The online survey participants had to indicate that they understood the intention of the study and consented to the information they provided being used before the survey and the consent for the in-person workshop was taken verbally and recorded.

Consent for Publication The authors of this paper and the participants (both in the online survey and workshop) consent to have the research and information published in this journal.

Competing Interests The authors declare no competing interests.

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