



A PROPOSED FRAMEWORK FOR CUSTOMS' TRANSITION TO CIRCULAR ECONOMY

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Abstract

Study on a framework for a customs administration to transitioning to circular economy (CE) is limited. This study aims to propose framework for customs' transition to circular economy (CE) by modifying high-level framework for green customs with element of policy interventions. The policy intervention is intended to overcome the identified circular economy capabilities gap. By using this modified framework, this study identifies possible policy intervention needed by customs administration to accelerate its transition to CE. The design science research (DSR) approach was followed to develop the framework. Interview were conducted to provide evaluation on the framework; to provide description on current state of circularity in customs business processes; and to provide information needed to identify capabilities gap. This paper suggests several policy interventions, namely: raising the awareness on CE internally and externally; developing roadmap for customs' transition to CE; enhancing data exchange via national single window; revisiting regulation on bonded recycling zone to attract business. The limitation of policy intervention suggested is regarding its practical implications. Further consultation and discussion with expert on customs and CE is needed to evaluate the feasibility and practicality of the policy interventions proposed.

Keywords: Bonded recycling zone, Green customs, Policy intervention

Abstrak

Penelitian mengenai kerangka kerja bagi administrasi kepabeanan dalam persiapan menghadapi ekonomi sirkular cukup terbatas. Penelitian ini bertujuan mengusulkan sebuah kerangka kerja bagi administrasi kepabeanan dalam menghadapi ekonomi sirkular dengan memodifikasi sebuah kerangka kerja tingkat tinggi bagi kepabeanan yang ramah lingkungan, dengan menambahkan elemen intervensi kebijakan. Elemen ini diharapkan dapat mengatasi celah kekurangan kemampuan administrasi kepabeanan dalam menghadapi ekonomi sirkular. Menggunakan kerangka kerja yang dimodifikasi ini diharapkan penelitian ini dapat mengidentifikasi intervensi kebijakan yang dibutuhkan untuk mempercepat transisi menuju penerapan ekonomi sirkular. Metode design science research (DSR) digunakan dalam mengembangkan kerangka kerja ini. Wawancara dilakukan untuk mengevaluasi kerangka kerja yang disusun, untuk menjelaskan kondisi terkini kesiapan administrasi kepabeanan dalam menerapkan ekonomi sirkular, dan untuk menyediakan informasi untuk mengidentifikasi celah kemampuan untuk menerapkan ekonomi sirkular. Penelitian ini mengusulkan beberapa intervensi kebijakan seperti: meningkatkan kesadaran dan pemahaman mengenai ekonomi sirkular pada lingkup internal dan eksternal; mengembangkan peta jalan bagi transisi administrasi kepabeanan menuju ekonomi sirkular; meningkatkan pertukaran data melalui nasional single window; mengevaluasi peraturan mengenai kawasan daur ulang berikat agar lebih menarik bagi pihak pengusaha. Keterbatasan dari intervensi kebijakan yang diusulkan penelitian ini adalah terkait implikasi praktisnya. Konsultasi dan diskusi lebih lanjut dengan ahli di bidang kepabeanan dan ekonomi sirkular dibutuhkan untuk mengevaluasi kelayakan dan kebermanfaatannya dari intervensi kebijakan yang diusulkan.

Kata Kunci: Intervensi kebijakan, Kepabeanan ramah lingkungan, Kawasan daur ulang berikat

INTRODUCTION

As an alternative to linear economy that follows stages of take, make, and dispose, circular economy (CE) is an economic system that maximize the lifespan of resources by taking 9-R concept (reduce, refuse, redesign, reuse, repair, refurbish, remanufacture, repurpose, and recycle) to achieve better controls on the circulation of materials and minimize the waste that cannot be reused (United Nations Environment Programme, 2020). The transition to CE might have important policy and economic implications at the global level. Today, over 520 policies and regulations already promote CE goals at the national or regional level (Barrie et al., 2022), with nearly half of them dedicated to improving waste management and recycling activities. To boost transition to CE, government could intervene by providing economic incentives which encourage industries and societies to opt for circular, rather than linear economy (OECD, 2015).



Indonesia which ranked fourth in the world population with 278,6 million people in 2023 (based on data from *World Population Review 2023*) could exercise significant role in CE by linking it to one of the sustainable development goals: the responsible consumption and production nationally and globally, where international trade is often considered as an enabler to globalize a CE (Geng et al., 2019; Tamminen et al., 2020). Indonesia has adopted CE concept into its 2045 vision (Ministry of National Development Planning, 2021) by aiming for sustainable economic growth, incorporating water and energy resiliency, and commitment to environment. A joint study by Ministry of National Development Planning and United Nations Development Program (UNDP) argued that by transitioning to CE in five sectors (food & beverages, textiles, construction, wholesale & retail trade, and electrical & electronic equipment) in 2030 Indonesia could have economic, environmental, and social benefits by generating additional GDP of IDR593 to 638 trillion (USD42 to 45 billion), reduce waste in each sector by 18% to 52%, and create 4.4 million jobs (Ministry of National Development Planning, 2021). The beneficial results from these potential scenarios also face several challenges including job losses and decreasing demand in the five sectors, which calls for a multi-stakeholder roadmap to address it (Ministry of National Development Planning, 2021).

Indonesian government has implemented several policies on CE mainly focusing on low carbon development and green economy, i.e. green industry standard, waste reduction roadmap by producers, and green building policy (Ministry of National Development Planning, 2022). However, according to survey conducted by the ministry and UNDP, firms still face issues in legal framework and regulations and perceived it as barriers to adopt circularity actions: 63% firms highlighted inadequate defined legal framework as the 7th /10 barriers; and 66% firms stated that unintended consequences of existing regulations as the 4th /10 barrier (Ministry of National Development Planning, 2021).

As the production and consumption now tend to be conducted globally across the countries' border, the role of customs administration in facilitating international trade and protecting national economic interest and environment become more prominent. Therefore to promote responsible consumption and production for sustainable development and transition to CE, customs administration should be regarded as one of key players in the transition to CE. The World Customs Organization (2022), an intergovernmental body whose mission is to enhance the effectiveness and efficiency of customs administration in its Green Customs Action Plan (GCAP) provides several action plan toward circular economy, for example raising awareness of the CE in the "doing" phase, and study on CE and the implications of customs administration in the "innovating" phase. Its further study in 2023 has highlighted several implications for customs in the transition to CE. This includes potential increase in multilateral environmental agreements due to trade in reverse supply chain, data gaps for trade involved in CE, trade diversion of waste to low- and middle-income countries, protection of economic interests (used/second-hand goods vs new goods), waste leakage/illegal dumping that pose environmental and health risks, and illegal waste trade (World Customs Organization, 2023c).

To better align its business process with the transition to CE, customs administration needs to identify its current state and the needs for improvement in its business process due to increasing challenges to facilitate CE and to detect and prevent waste crime (World Customs Organization, 2023b). As in strategic management, the plan phase consists of analysis of current environment and existing condition (Slovic et al., 2015), analyze both external challenge and opportunities and internal strength (Mintzberg, 1990) to further design 'grand strategy' (Sarbah & Otu-Nyarko, 2014) and design/develop work plan (Slovic et al., 2015). Therefore, defining or designing a grand strategy is a crucial step for management in assuring achievement of its goals. However, the WCO GCAP and its further study on CE implications



for customs did not provide roadmap or framework as guideline for customs in transitioning to CE.

Previous study by Rukanova et al. (2022) have proposed a high-level framework for green customs by mapping relationships between the broader context of CE and other sustainability policy from high-level groups/legislation (A), customs and stakeholder (B), customs activities and role (C), customs innovation capabilities (D), and identification of customs CE capability gaps (E). We argued that a more comprehensive framework is needed, which is adding a clear solution on how to enable current practices to reach its needed capability. To minimize the gap between existing condition/practices and customs' potential capabilities, government could exercise policy as a tool to foster the improvement process. Ellen MacArthur Foundation (2015b) suggested six key categories of policy intervention to better understand the policy landscape, and policy interventions that could make sense for the country: education, information and awareness, collaboration platforms, business support schemes, public procurement and infrastructure, regulatory frameworks, and fiscal framework.

Therefore, this study modified Rukanova et al. (2022) framework by adding analysis using six types of policy intervention provided in Ellen MacArthur Foundation (2015b). This study provides a more comprehensive framework to better assist customs administration transitioning to CE. This study therefore will (1) propose a strategy framework by modifying Rukanova et al. (2022) framework to help customs administration transitioning to CE, (2) use the modified framework to assess level of circularity already achieved and support for circularity, and (3) identify gaps between the existing level of circularity and customs' capability toward CE and suggest managerial implication/recommendations.

LITERATURE REVIEW

Circular economy

The CE concept initially rooted from the industrial needs to optimize the systems by re-using inputs to enable productive and long-lasting flows of production, where producers emphasizing on selling the function or performance of products and not their consumption (Ellen McArthur Foundation, 2013). However, the concept cannot be assigned to one single schools of thought, rather it has been continuously refined and developed by several thoughts i.e. regenerative design by Lyle, performance economy by Stahel, cradle to cradle framework by Braungart and McDonough, industrial ecology by Clift, and biomimicry by Benyus (Ellen MacArthur Foundation, 2013a).

The European Commission defined CE as a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing, and recycling existing materials and products as long as possible, which further lengthen the product's life cycle and reduce waste (European Environment Agency, 2015). The CE is based on several principles: design out waste, build resilience through diversity, rely on energy from renewable sources, think in 'systems', and waste is food (Ellen MacArthur Foundation, 2013a). With a traditional focus (Recycle, Reuse, Reduce), a number of best practices could also be considered in a more CE (Recover, Recycle, Repurpose, Remanufacture, Refurbish, Repair, Reuse, Reduce, Redesign/ Rethink, and Refuse) (Potting et al., 2017).

CE-related initiatives need to be well designed and evaluated regularly (Winans, K et al., 2017). Each country, may have a different understanding of CE concept, and translated it in multiple ways into policy implementation areas (World Customs Organization, 2023b). For example in China and the European Union, China policies were aimed to better align industrial growth with environmental and social concerns, while EU policies were aimed to increase economic competitiveness and innovation, while pursuing environmental goals (McDowall et al., 2017). In 2008, China was one of the first to integrate the CE concept into its legislation,



using a top-down approach (Bleischwitz et al., 2022; Feng & Yan, 2007). To support its recycling industries, China implement recycling subsidy policy, and VAT exemption (up to 50%) to waste-related services, and self-produced products (China Briefing, 2011). The European Union, Japan and the United States have adopted a bottom-up approach to design environmental and waste management (Ghisellini et al., 2016), driven by initiatives from NGOs. In Indonesia, government

Government capabilities to support the transition to CE

Transitioning to CE is a complicated procedure which need extensive involvement from various levels and stakeholders in society (Ekvall et al., 2016). Utilizing only a single policy tool is likely to only impact one aspect, while overlooking comprehensive solution of the matters (Wilts H & O'Brien, 2019). Hence, a comprehensive strategy would be needed, which involve combination of policies to address various aspects of transitioning to a CE (Milios, 2021).

There are three main roles of government in relation to developing and implementing CE policies, namely as promoters, facilitators and enablers (Ministry of National Development Planning/Bappenas, 2023; OECD, 2021; Lacy et al., 2020). As *promoters* of the CE, government can: establish roles and responsibilities in policymaking; develop strategy for vision, goals, target and priorities; and provide information of the benefit of CE and current stage of implementation. As *facilitators*, government can: endorse co-ordination across levels of government; facilitate collaborations and dialogue between the public sector, not-for-profit actors and businesses to stimulate innovation; and enhance the urban-rural linkages and partnerships. As *enablers*, government can: provide incentives to increase innovation and stimulate economic growth; support training and education regarding the CE; and provide evaluation system that being updated regularly and available to the public.

Furthermore, in carrying out its role in achieving goals, the government can implement several policy interventions as suggested by Ellen MacArthur Foundation (2015b) as follows: (1) *education, information, and awareness*, to shift ways of thinking of CE, change behaviour, and provide adequate information to fill gaps in information which hinder opportunities to conduct CE; (2) *collaboration platforms*, by facilitating government-business partnership as well as across business and academic sectors; (3) *business support schemes*, which provides financial support (subsidies, capital, etc.) and technical (incl providing advice and training) to businesses implementing CE; (4) *public procurement & infrastructure*, where circular public procurement is aimed to benefit society and the economy, and significantly reduce negative impacts on the environment; (5) *regulatory framework*, which address regulatory failures where CE activity is negatively impacted by unintended consequences of existing regulations, which can be done through lifting existing restrictions or setting a positive legal framework to support CE; (6) *fiscal framework*, which can be applied to discourage non-circular activities and support CE opportunities.

Green customs framework or strategy

As CE faced obstacles to scale up activities across supply chains at a global level, cross border trade is one possible solution to provide materials stock across global supply chains (Ellen MacArthur Foundation, 2014). This circularity activities which need for non virgin raw material or used materials as their input would require improvement in business process of customs, where customs have to put specific focus on new business models and reverse logistics, strengthening the traditional role of customs in enforcing trade restriction and prohibition, and develop solutions to ensure compliant trade in green supply chain (Ferraro, 2023). Customs as the frontliner in facilitating and monitoring international trade need to carefully monitor certain substances and commodities which are environmentally sensitive, while on the other hand have to facilitate trade that support CE.



At the international level, when issues in transition to CE were first emerged, several guidelines on circular economy for regional economic community (ASEAN, 2021) and on green customs or role of tax administrations have been suggested (United Nations Environment Programme, 2018; European Commissions, 2021), but they were limited only on certain areas such as customs role in implementing Multilateral Environmental Agreements (MEAs) and types of incentives suggested to boost CE. Specifically for customs, the WCO in support to United Nations Sustainable Development Goals including transitioning to CE, are endorsing ‘green customs’ by its Green Customs Action Plan (GCAP). It is a measures that customs administrations can develop to reduce its environmental footprint, to protect the environment and facilitate green trade, and to conduct transformative ideas towards sustainability excellence (World Customs Organization, 2021). However, GCAP are a broad guidelines that do not provide specific roadmap or step by step to transitioning to CE. Subsequently the World Customs Organization (2023b) provide study reports suggesting a more technical approach transitioning to CE, but not yet a comprehensive framework to assist customs as one of the expected mover of the activities. A more comprehensive step by step tools to accelerate the transition toward CE were provided by Ellen MacArthur Foundation (2015b). Although it was not specifically designed for customs administration, it provides country-level policy interventions that would be needed to overcome barriers during the transition process.

At the national level, several countries e.g. the United States Customs and Border Protection (2022) and Canada Border Services Agency (2022) has developed strategy for customs to better promote and implement sustainable development initiatives as listed in Table 1 below. Their strategies are at the starting position or at the implementation phase, where the customs administrations already determine priority aspects and focus on developing those key areas, and not providing guidelines on ways to prepare the transition to CE itself.

Table 1. Selected Organization and Customs Administrations’ Strategy for Green Customs or for Transitioning to CE

Country/organization (Year) and Scope of strategy/framework	Key areas being focused/strategic goals	Type of Policy interventions referring to Ellen Macarthur Foundation (2015)
United Nations Environment Programme (UNEP) (2018) Green Customs Guide to Multilateral Environmental Agreements (MEAs) - The role of customs in MEAs - The Green Customs Initiative by raising the awareness and building the capacity of customs on trade-related multilateral environmental agreements (MEAs) through partnership of organizations	Provide specific guidance on technical role of customs in monitoring and enforcing MEAs: Basel Convention, Cartagena Protocol, Chemical Weapons Convention, Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Montreal Protocol, Rotterdam Convention, Stockholm Convention	- Education, information, and awareness - Collaboration framework – cooperation with MEA competent national authorities and other authorities
European Commissions (2021) Incentives to boost CE a guide for public authorities	- Incentives on financial instruments - Incentives on non-financial policy instruments - Relevant incentives for member state, regional, and local authorities	- Business support schemes - Regulatory framework - Fiscal framework



<p>ASEAN (2021)</p> <p>Framework for Circular Economy for the ASEAN Economic Community (AEC)</p>	<ul style="list-style-type: none"> - Resilient economy - Resource efficiency - Sustainable and inclusive growth 	<ul style="list-style-type: none"> - Collaboration framework - Regulatory framework
<p>World Customs Organization (2022)</p> <p>Green Customs Action Plan</p> <p>Three building blocks of Green Customs:</p> <ul style="list-style-type: none"> - being: greening the administration itself - doing: policy measures for green trade - innovating: transformative measures based on innovative thinking 	<p>Being:</p> <ul style="list-style-type: none"> - performance measurement - greening customs administration - raise awareness of IPR, health and safety <p>Doing:</p> <ul style="list-style-type: none"> - enhance knowledge and regional cooperation on waste management - environmental compliance – enhance collaboration with OGA and international cooperation - greening WCO instruments (HS, customs laboratory) - greening trade - customs border management (joint operation on wildlife trafficking and on waste and substances under Montreal Protocol) - exchange of information networks <p>Innovating:</p> <ul style="list-style-type: none"> - research on green customs matters - study on circular economy - collect experiences in implementing disruptive technology 	<ul style="list-style-type: none"> - Education, information, and awareness - Collaboration framework - Regulatory framework
<p>World Customs Organization (2023)</p> <p>Study report highlighting overview of the implications of CE for customs administration from economic and legal dimensions</p>	<ul style="list-style-type: none"> - Implement the Multilateral Environmental Agreements to support CE - Endorse data harmonization focusing on HS code, customs digitalization and the use of data analytics, data sharing in CE - Facilitate trade towards CE by clarifying scope and definition of waste, adjusting customs procedures to address CE - Enforcing cooperation between customs administrations and environmental agencies to combating waste crime 	<ul style="list-style-type: none"> - Education, information, and awareness - Collaboration framework - Regulatory framework



<p>Canada Border Services Agency (2022)</p> <p>Strategy FY 2023-2027</p> <ul style="list-style-type: none"> - Promote sustainable development - Collaborating with OGA and international partners 	<ul style="list-style-type: none"> - Reducing greenhouse gas emissions (GHG) - Advancing reconciliation with indigenous people - Promoting sustainable procurement - Enhancing emergency management 	<ul style="list-style-type: none"> - Collaboration platforms - Public procurement & infrastructure
<p>United States Customs and Border Protection (2022)</p> <p>Green Trade Strategy</p> <ul style="list-style-type: none"> - As a champion for the green economy and a leader in the fight against climate change by accelerating the global transition to green trade; and - Serving as a responsible steward of our own environmental footprint 	<ul style="list-style-type: none"> - Incentivize green trade - Strengthen environmental enforcement posture - Accelerate green innovation - Improve climate resilience and resource efficiency 	<p>Business support scheme and fiscal framework – provide benefits and incentive to promote utilize green friendly trade practices and supply chains</p>
<p>Ellen MacArthur Foundation (2015)</p> <p>A toolkit or methodology for policymakers to accelerate the transition to CE</p> <ul style="list-style-type: none"> - Explore and priorities CE opportunities - Quantify their impact - Identify barriers preventing these opportunities - Map and priorities policy interventions to overcome barriers - Engage relevant stakeholders 	<ul style="list-style-type: none"> - Align on starting point, ambition and focus - Assess sector CE opportunities - Analyse national implications 	<ul style="list-style-type: none"> - Education, information & awareness - Collaboration platforms - Business support schemes - Public procurement & infrastructure - Regulatory frameworks - Fiscal frameworks

Source: ASEAN (2021); Canada Border Services Agency (2022); Ellen MacArthur Foundation (2015b); European Commissions (2021); United Nations Environment Programme (2018); United States Customs and Border Protection (2022); World Customs Organization (2021), (2023b).

Aside from suggested practical strategies and guidelines as listed in Table 1, currently there is still lack of research on CE framework for tax administrations including customs. Research were mainly focused on providing framework to monitor and enhance the governance of CE by specifically utilize digital infrastructure (Rukanova et al.,2021b), by using data pipeline (Rukanova et al., 2021a), and blockchain-based solid system (Kofos et al., 2022); and framework for comprehensive taxation across the life cycle of products (Milios, 2021) as listed in Table 2 in the Annex.

Most recently, Rukanova et al. (2022) proposed framework for green customs which links the policy developments related to CE to customs and related stakeholder groups, customs activities, and customs innovative capabilities. The framework consists of (1) the broader context of CE policies, legislation, (2) the customs stakeholder context and relationship of customs with its stakeholders, and (3) activities of customs with respect to these stakeholders that can become subject to green customs, include greening border control activities; system based control that support trade facilitation of reliable and greener companies; and customs'



internal green actions (Rukanova et al., 2022). This study will use and modify this framework by adding possible policy intervention by government (Ellen MacArthur Foundation, 2015b) and broadening customs innovation capabilities to three roles: promoter, facilitator, and enabler (OECD, 2021) as a map to better understand Indonesia customs' starting point on CE and develop ways for customs administration to accelerate the transition toward green customs and CE.

METHODOLOGY

Research design.

This study was based on desk study and interview. Desk study was conducted to answer the first objective of this study – designing a framework for customs' transition to CE; in addition, interviews were conducted to fulfill the last activities of designing the framework, and to answer the second and third objectives of this study. For the development of the framework for customs' transition to CE, the simplified version of Design Science Research (DSR) approach was adopted. The simplification was chosen because this study did not build the framework from zero, hence it modified previously proposed framework by Rukanova et al. (2022). Therefore, this study conducted several relaxations on the design and develop process. The method for DSR compared to scientific method are as follows: (i) explicate problem is comparable to ask a question; (ii) define requirements and design and develop are comparable to form a hypothesis; (iii) demonstrate and evaluate artefact are comparable to check the predictions (Johannesson & Perjons, 2014).

First, for the explication of the problem, a literature review was conducted on the main concepts of circular economy, green customs, and government capabilities to support transition to CE (Ellen MacArthur Foundation (2013a), (2015b); World Customs Organization (2021), (2023b); Ministry of National Development Planning/Bappenas, 2023; OECD, 2021; Lacy et al., 2020). The findings of the literature review were presented in literature review section.

The next process was to define requirements and develop the framework. A requirement is defined as a feature of an artifact perceived as desirable by the stakeholders, which can be utilize to enforce the development action (Johannesson & Perjons, 2014). Since the aim of this study is to develop framework guiding customs in its initial steps toward transition to CE, we adopted Rukanova et al. (2022) framework which offered overview on several aspects externally and internally related to customs' business process. However, Rukanova et al. (2022) only rely on customs innovation capabilities to overcome the CE capability gaps, therefore this study added concept of policy intervention introduced by Ellen MacArthur Foundation (2015a) to provide clearer view on alternative actions could conducted by customs through its policies.

The last process was demonstration and evaluation. Expert evaluation was performed to evaluate whether the framework design suitable and complies with the requirements in the explication process. These experts were representatives from three relevant fields in customs: trade facilitation, enforcement, and revenue collection. They were interviewed to gain feedback about the suitability and usefulness of the framework to assess current state of customs practices, and to identify gaps and possible policy interventions to overcome gaps and support the transition to CE. The findings from the demonstration and evaluation is presented in the discussion section.

To fulfill the second and third objectives of this study, we conducted coding using template analysis based on previous research and literature which had developed a theoretical framework to structure the perception of issue being investigated. Template analysis is one of the thematic analysis techniques that provide flexibility of the coding structure, possible use of a priori themes and use of initial template (Brooks & King, 2014). This study identified three a priori themes based on framework proposed by Rukanova et al. (2022): (1) CE and



sustainability policy; (2) customs stakeholder; and (3) customs role. Based on a priori theme, we conducted preliminary coding, and clustered and organized them into themes based on their similarities and differences. Next, we developed final template from those themes and modified the template based on our identification of the full set of transcripts as shown in Figure 2 in the discussion section. We applied the final template to the full data set, and used it as the basis of interpretation and guidance in writing our findings. This study findings of this study are supported by quotations.

Informants

The participants for interview were three customs officers, each held position as the head of section in enforcement unit at customs headquarter, head of section of facilitation unit at customs headquarter, and functional officer (the same position level as the head of section) at Tanjung Perak Port. The interviews lasted for 40 minutes to 1 hour 15 minutes each, and conducted online via microsoft teams. The online interviews were video-recorded via microsoft teams, transcribed in Bahasa Indonesia, and analyzed using template analysis method.

Scope of the Study

Scope of this study is limited to strategies and action based on assessment using proposed framework, that could be implemented specifically by customs administration as an organization with role as community protector, trade facilitator and industrial assistance, and revenue collector. Period of study is from January to September 2023. This study will capture Indonesia Customs as the case study.

FINDINGS AND DISCUSSION

Findings

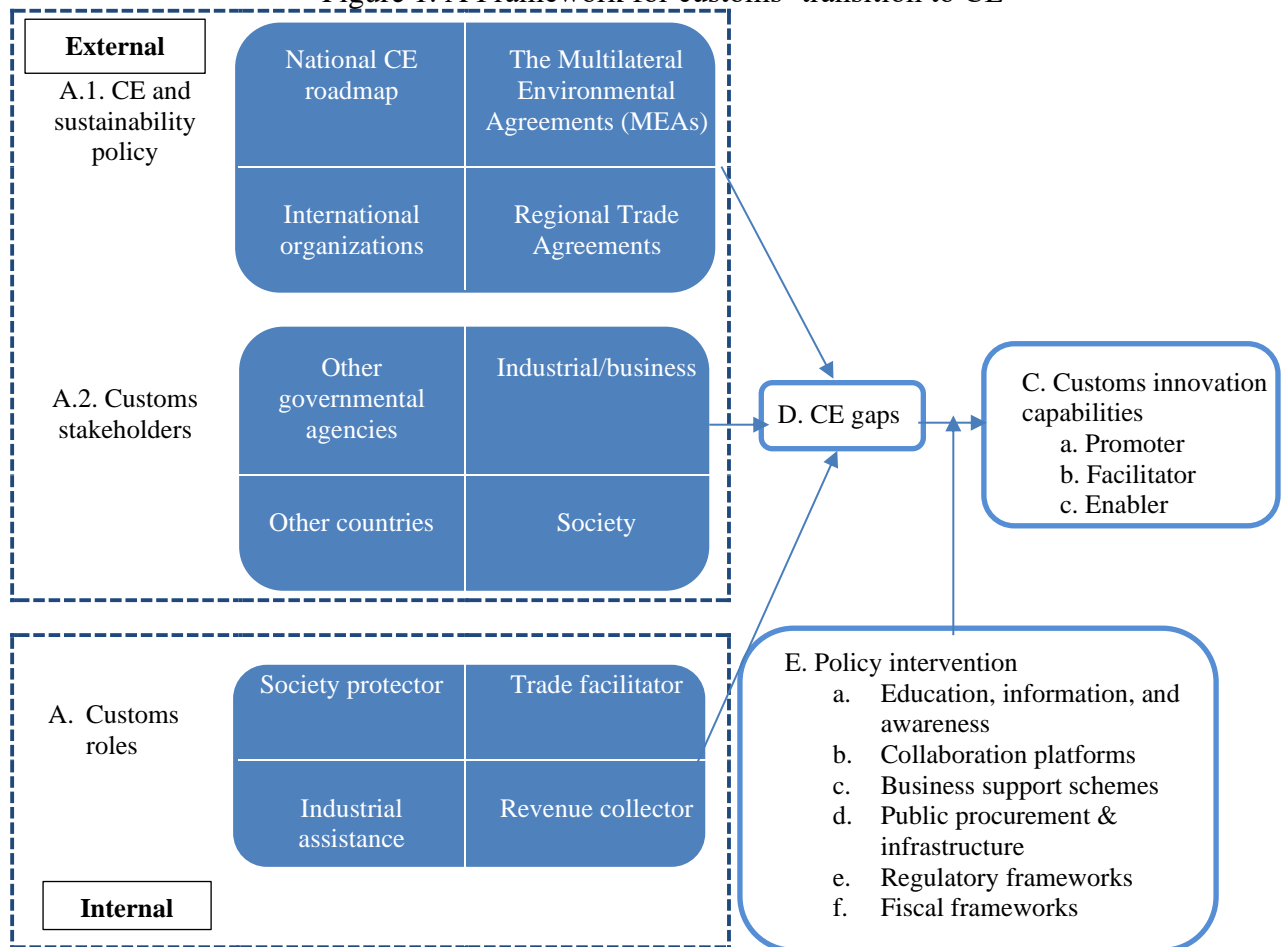
The framework for customs' transition to circular economy

The framework for customs' transition to CE that was the outcome of the DSR approach is illustrated in Figure 1 below. The framework can serve as a support tool for customs administration to evaluate existing readiness towards CE, gaps, and specific practical policy interventions needed to support customs' capabilities enabling transition to CE.

The framework consists of five segments. The first and second segment (A and B) help to identify strength and weakness of customs' existing condition related to transition to CE. First segment A consists of external factors influencing customs' activities toward CE, which are CE and sustainability policy and customs stakeholders. Customs' role in international trade is bounded with international regulations and agreements (regional and multilateral), therefore, national regulations are needed to be aligned with these policies for better transition to CE (Rukanova et al., 2022). In addition, to fulfill the WCO long-term vision where customs administration should be key player in national environment policy (World Customs Organization, 2021) customs should be involved in the policy-making discussion at national level with other governmental agencies and involved in dialogue with the private sector and societies (Rukanova et al., 2022). This required customs to enhance their knowledge and expertise in CE concepts and policies.



Figure 1. A Framework for customs' transition to CE



Source: Author's analysis based on Ellen MacArthur Foundation (2015a); OECD (2021); Rukanova et al. (2022).

The second segment is internal factors consists of customs main roles as society protector, industrial assistant and trade facilitator, and revenue collector. In line with the World Customs Organization (2021) GCAP, internally customs should reduce their own environmental footprint (being phase) by greening its own business process and operation, greening border control activities and enforcing system based control which allows for trade facilitation of reliable and greener companies (Rukanova et al., 2022). However, the national policies and interest of stakeholders can affect customs business process. There should be coordination channel where customs can jointly work on solutions with other stakeholders and provide feedback to the policymakers and legislators (Rukanova et al., 2022).

The third segment C is identifying innovation capabilities of customs. Examples of this capabilities are use of high technology, digital infrastructure, artificial intelligence, and big data analytics in customs business process to support monitoring and facilitation of trade in CE (Rukanova et al., 2022). To that extent, customs could exercise its role as promoter, facilitator, and enabler (OECD, 2021). The fourth segment is identify potential CE capability gaps. Although customs has developed innovations but it needs to be evaluate in accordance to the need for transitioning to CE. The last segment policy interventions are strategic options to overcome barriers or gaps that limiting customs' support toward transition to CE (Ellen McArthur Foundation, 2015).



Assessment on current level of circularity already achieved using the framework for customs' transition to circular economy

The final coding template from themes emerged during interviews is shown in Figure 2 below. Based on initial template questioned to the informants: customs role in policy making; customs strategy for CE; customs' coordination with stakeholders; and customs' role as enabler and policy intervention, there are sixteen subthemes mainly discussed by informants during the interviews. The interview results will be discussed according to the framework segment in this result section and in the discussion section.

Figure 2. Template developed from interview results.

1. Customs role and responsibility in policy making
 - 1.1.Lack of clear roles and responsibility in CE at the national level
 - 1.2.Informal coordination for coherent policy implementation
 - 1.3.Adoption of international conventions in supporting CE
2. Customs' CE strategy
 - 2.1.Lack of roadmap of customs' role in the transition to a CE
 - 2.2.Need for consensus and common vision, and raise awareness on CE
 - 2.3.Need for support on budget
 - 2.4.Need for effective monitoring and evaluation program to exercise the role of community protector
3. Coordination among customs and other government agencies
 - 3.1.Meetings/working bodies
 - 3.2.Need for improvement in common database and information system
 - 3.3.Need for policy consistency and integration across policies
 - 3.4.Collaboration among customs with business and academic
4. Customs' role as enabler of CE /policy interventions
 - 4.1.Provide supportive regulation including incentives
 - 4.2.Improve customs officer capacity on CE
 - 4.3.Improve stakeholder/business' knowledge on the CE opportunities
 - 4.4.Support the development of R&D for CE
 - 4.5.Supply data to the public to enhance policymaking and facilitate the implementation of a CE.

Source: Author's compilation from interview results.

Policy

Indonesia customs administration as an active member of the WCO has complied with MEAs and treaties covered by the Green Customs Initiative and has conducted joint enforcement activities, aim to safeguard human health and the environment from the harmful impacts of dangerous waste materials, such as Basel Convention, Rotterdam Convention, CITES, Montreal Protocol, WCO Operation DEMETER, and WCO CENcomm (Interview A). At the national level, the adoption of MEAs are implemented in various national regulations mainly issued by Ministry of Agriculture, Ministry of Trade, and Ministry of Environment and Forestry.

Indonesia has adopted the CE concepts into Vision Indonesia 2045 and incorporated its vision in the National Medium-Term Development Plan (RPJMN) 2020-2024, but the indicator has not been determined yet (Ministry of National Development Planning/Bappenas, 2020), and plan to develop a National Circular Economy Roadmap guided by the next National Medium-Term Development Plan for 2025-2029 (Ferraro, 2023). However, at the national level, customs administration has not being involved in the policy making on CE, as informant from Directorate of Customs Facilitation, in charge for designing customs national policy, stated:



“in the blue print or roadmap making, Directorate of Customs Facilitation has not being involved in any discussion yet ... and i just discussed with the head of section in charge for Other Bonded Zone Facilities, he just heard/aware regarding CE.” (Interview C).

Although at international level the WCO has issued GCAP and study report on CE transition and its implication on customs administration, the lack of policy and guidelines for transitioning to CE at the customs administration level in Indonesia affect the level of knowledge and understanding of customs officer on matters related to CE and green customs. Informants were not aware of any customs’ national strategy related to the transition to CE. There was no explicit statement on measures taken for transitioning to CE in customs’ strategic initiatives agenda (Interview C).

There were also different findings on informant’s level of knowledge on CE concept. Some informants argued that customs were on board to support the implementation of CE, and in a narrower perspective, transition to CE has been partially implemented by different units in customs. The partial customs strategies toward CE were described by informant as *“providing customs facilitation”, “border protection by controlling waste import by enforcement unit”, and “accustoming employees to plastic-less habit by all units” (Interview C)*. However, not all informants were aware of concepts of CE and green customs, specifically on how customs should response in the transition to CE (Interview B, C). They argued: *“information of CE, not many of us know and concern about it” (Interview C)*. Therefore, to assure appropriate implementation and smooth transition to CE, customs administration need to improve its officer capacity on CE related matters. Current condition where customs internally have different point of views and goals toward CE, calling for a consensus, common vision and goals, which are needed to ensure correct customs’ response and further policy making related to CE.

Customs cooperation with stakeholders

The relationship and coordination among customs and other government agency (OGA) at national and international level were mainly evolved around specific part of CE which had been dealt by customs regularly: facilitation of legal trade of waste; enforcement action to combat illegal trade of prohibited waste or goods; and coordination conducted by customs specialist in determining the valid customs value for the import of second hand goods. As for enforcement, informant stated that coordination with other countries i.e. data/information sharing under the Operation DEMETER and CENcomm, has provided inputs to profiling the risk of countries and commodities that involved in hazardous waste smuggling, which improve customs ‘enforcement strategies in dealing with illegal trade of waste. At the national level, there were good cooperation between customs and OGA. For example, prohibition and restriction regulations issued by Ministry of Trade were centralized and automated via Indonesia National Single Window (INSW) that informed customs on licensing requirement on goods being imported according to its classification of harmonized system. Furthermore, informant argued that the coordination were smoothly conducted between customs and Ministry of Environment and Forestry.

“in general, it (coordination between customs and KLHK) went smoothly. When customs had doubt, when examining waste whether it was in accordance with its designation, or for example that the waste did not have any contaminant, or the waste had impurity rate as allowed we could ask help from KLHK to assure the matter. So far it went well if it were regarding waste.” (Interview A).

Customs activities and roles – greening its business process

Although there is lack of clear roles and responsibility of customs in the transition to CE at the national level, customs’ role related to CE are currently emphasized on community and border protector. This role has supported CE by securing legitimate trade of legal waste, controlling waste import, and combating illegal trade of prohibited waste (Interview A), and



facilitate recycling industries through fiscal incentive (Interview C). As for enforcement or control on waste/prohibited goods, customs officer are conducting control based on environmental protection related policies from other government agencies (OGA).

Indonesia customs administration is part of the National Taskforce for Non-Hazardous Wastes, that is required by the national law and regulation to support and encourage recycling businesses. In practice, customs has to enforce related laws and regulations of other ministries and agencies. Currently, Indonesia prohibits the import of all categories of hazardous waste. It allows the import of specific categories of non-hazardous waste (such as paper, metals, plastics, rubber, textiles and glass, under certain conditions, for example not mixed with trash or garbage, or contaminated with hazardous materials or waste, in a homogeneous state) and used goods (such as capital goods and other goods, on a case-by-case basis) under strict procedures by the Regulations of the Minister of Trade. To ensure coherent policies implementation, customs headquarter act as information channel from OGA to customs vertical units. In addition, customs officer could conduct informal horizontal coordination with the headquarters or with OGA (Interview B), as argued: *“we (the officer) at technical offices received information or regulation from the headquarter ... practically, we are updated by the headquarter and the update is quite okay.” (Interview B).*

In greening its business process, customs has implemented risk management to preserve its resources where physical examination only selectively performed for the red lane stakeholders. System based control via database and information systems to monitor and facilitate trade including legal waste are conducted through a single platform Indonesia National Single Window (INSW). However, currently there were several permit and license from the Ministry of Environment and Forestry that still in form of hardcopy and not yet automated via INSW. It caused potential delay for customs to process importation due to additional waiting time at the expense of the importer, since they have to declare or submit the permit or license from the Ministry of Environment and Forestry in hard copy to customs (Interview B).

“several regulation on second hand goods still required hard copy document and not yet fully utilize INSW ... INSW is very convenient and helpful for customs ... that we (both customs and importer/exporter) don't have to wait (for the hardcopy document) .. if the permit/license were available in INSW ... we could process it .. if INSW did not provide it, it means that the operational permit/license were not being issued yet.” (Interview B).

Therefore, informant from customs specialist expected that data exchange and utilization of INSW could be optimize to allow all permits concerning restriction goods (including waste that could legally being traded, and second hand goods) completely paperless and automated completely via INSW.

In addition, any additional response or action on customs' transitioning to CE requires additional resources (budget and staff capabilities). Informant from enforcement unit, referring to current enforcement practices on waste trade, argued that customs support on CE for example by utilizing gamma-ray for physical check on containers at the border would have high cost consequences: cost of equipment, cost of maintenance, and cost of human resources since it would require specific certification must be owned by customs officer. Therefore, to be effectively implemented, the transition to CE should comprises on improvement on current monitoring and evaluation framework, i.e. by incorporating more risk management tools.

Customs innovation capabilities

Indonesia has regulated bonded processing zone which provide fiscal incentives for recycling industries. Fiscal incentives are a great support for the relatively low-profit-margin business (World Customs Organization, 2023b). However, the bonded processing zone has not been utilized by business. Several plastic waste processing company located in the suburbs of



Jakarta chose to operate in regular bonded zone and bonded warehouse. This company import plastic waste from the United States, Japan and Australia, processes it into synthetic fibers in Indonesia, and exports it to the United States, the EU, China, Japan and others. Customs duties and other charges (5% on plastic waste) are exempted under the bonded warehouse scheme.

CE capability gap

a. Promoter gap

Customs are key players in national environment policy (WCO, 2023a), however, at the national level in Indonesia, customs has not been involved in the policy designing and making of CE. At customs level, CE or green customs related matters has not been adopted in customs strategic plan. Customs officer's knowledge regarding CE or green customs are limited, and there were not many officer concern about the issues, and the potential of customs involvement and contribution to CE.

b. Facilitator Gap

Coordination between customs and OGA at both international and national level is essential to boost transition to CE. There have been good cooperation between customs and OGA in term of informal consultation regarding customs officer's doubt on certain regulation, and data/information exchange via INSW. In solving special cases on environmental issues, government form an ad hoc team consists of relevant government agencies including police authority and prosecutor office (Interview A). There are no regular ad hoc meetings or task force dedicated to lead the transition to CE. The common database and information system currently being utilized by multi government agency including customs, need to be more optimized by gaining greater commitments from all related GA, to ensure that all GA are submitting all their permits concerning restriction on goods (including waste that could legally being traded, and second hand goods) digitally to INSW, so the clearance process for import and export could be automated faster via INSW (Interview B).

Another gap was that INSW or database system was mainly focusing on permit, license, and trade data on goods, (including legal waste). The data was not specific and detailed enough to provide comprehensive picture of CE data/condition i.e. where, when, to whom, for what value and in what volume, waste streams were moved. This data are needed to support government to design incentives, targets, and outcome (World Customs Organization, 2023a).

c. Enabler Gap

Informant from facilitation unit argued that although customs had fiscal incentives provided for business located in the bonded recycling zone, but the strict regulations on bonded recycling zone business process make it less attractive for business. The regulations consists of: (i) bonded recycling zone has to be located in the industrial area which required significant amount of investment; (ii) limited time period (only three months) to complete the production, recycling, and stockpiling process. This time limit was considered to have high risk of overtime, and violation to the stockpiling time would be sanctioned by license suspension; and (iii) license suspension as sanction on overtime stockpiling, were considered to hinder the potential economies offered by the recycling industries itself (Interview C).

Other gaps are lack of incentives in the upstream stage of recycling industries such as at the research and development process, and lack of incentives to boost innovation in the household waste recycling. Another gap was that the postponed implementation of excises on plastic. This policy if being implemented were argued could force society and industries to switch their consumption to substitute goods, and to encourage the development of recycling industries.

In addition, customs administration has implemented risk management for profiling physical examination on red laned transactions. However, customs have not utilise high



detection technologies and big data analytics as innovation to foster and facilitate better transitioning to CE.

Discussions

Suggestion on policy intervention needed to support transition to CE

According to Ellen MacArthur Foundation (2015a) after specific CE opportunities and related barriers have been identified, government should start discussion with key stakeholders on policy intervention that relevant to minimize the barriers. There were six types of policy interventions suggested by Ellen MacArthur Foundation (2015b). Based on analysis on CE capability gaps, interview results, and study on literature review, here are our discussion regarding suggestion on policy intervention which could direct customs to better transition to CE.

Education, information and awareness

Customs should improve its capacity on CE by providing capacity building for its officer. Training from environmental related OGA i.e. Ministry of Environment and Forestry should be conducted regularly to enhance expertise on customs enforcement. Formal and informal channel of information flow should be maintained across the administration to ensure a coherent understanding about CE and its policy implementation. In addition, customs with enabler role should improve stakeholder/business' knowledge on CE opportunities by intensively conducting public communication and information campaign on CE (Ellen MacArthur Foundation, 2015a), i.e. promoting fiscal incentives provided by bonded recycling zone as alternative to other regular bonded zone.

Collaboration platforms

Indonesia National Single Window (INSW) as a data exchange platform should be re-design to capture CE data, and optimizing data digitalization to speed up import and export process. Customs could provide information sharing other than those published in INSW, i.e. customs' information technology inventory (IT Inventory) data; and the balance of commodity. Customs possess IT inventory database which could portray import export activities based on commodities. This data could be useful in mapping and regulating inflows and outflows of goods related to CE. As example, data on recycled imported goods converted to non virgin materials could be useful for local industries that need those materials as their input. However, currently only customs and tax administration that have access to those data due to its limited access. There should be amendment in the regulation when IT Inventory data are going to be provide available for public (Interview C).

For the balance of commodity, currently there were only six commodities (sugar, salt, fisheries, rice, meat) recorded in the system. The system were also not fully automation and required manual recommendations from related ministries to be adjusted to the system. Therefore, the option to utilize balance of commodity to record and provide data on CE related goods were not feasible yet.

Support schemes for business and fiscal framework

Customs could provide incentives for research and development program conducted by academics and business to support recycling activities in bonded zone. Incentives could be in a form of levying import duty and taxes on import of machines/equipment used for research and development on recycling issues, and machine/equipment used for recycling industries.

Other fiscal incentives are provided to those who endorse import substitution. By the right amount of fiscal incentives for using local recycled material, local industries could be expected to switch their import input by local recycled material. This practice were expected to had impact both economically and socially at regional and national level. Besides the incentives for bonded zone, customs could collaborate with local government in providing incentives for



capital goods import for recycling industries for recycling waste (non hazardous waste, e-waste) and household waste, which are not located inside the bonded zone.

In addition, customs could give indirect support for business by improving customs' business process to provide more efficient and effective service for business. This could be in terms of investing in high technology in goods detection, laboratory equipment, and big data analytics (Rukanova et al., 2022).

Regulatory Framework

Currently customs does not have roadmap of customs' role in the transition to CE. Customs could use this framework as tool to determine priority area in developing roadmap for transition to CE. In addition, any activities supporting CE should backed up with adequate budget, therefore the regulation should also incorporate budget for these activities.

Since bonded recycle zone has not yet being utilized, it is suggested that government lead by customs revisit the regulation on bonded recycle zone. This regulation should fit for business' characteristics and needs i.e. relaxation that businesses operated in bonded recycling zone do not have to be built/located in a industrial area, and to lengthen production and recycling period according to normal time needed for the activities.

Other issues were regarding the need to focus on HS codes to drive data harmonization (World Customs Organization (2023b) and regulate specific HS code for used/worn goods that commonly further recycled i.e. used machinery, plastics. Specific HS code would be useful as additional risk mitigation in facilitating legitimate waste trade as well as in combating illegal waste trade.

CONCLUSION

By utilizing strategy framework to assess customs readiness in transitioning to CE, this paper found that customs have been implementing enforcement and facilitation role to support legal trade waste and recycling activities. However, according to CE capabilities gap customs administration need to enforce several policy interventions namely in education, information and awareness; collaboration platforms; support scheme for business and fiscal incentives; and regulatory framework, to overcome the gap and support transition to CE.

Recommendations And Limitation Of Study

Based on our discussion section, customs could implement policy intervention by developing national roadmap for customs transition to CE, raising awareness on CE internally and externally, providing comprehensive database and data exchange for better policy making, specify HS code for recycled goods, provide more incentives for R&D and recycling activities inside and outside bonded zone, and revisit bonded recycling zone regulation to attract business.

However, this study is limited to suggesting policy intervention based on desk study. Future research should evaluate the suggested policy interventions by conducting focus discussion with experts on the CE and customs matters.

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ANNEXES

Table 2. Previous researches on framework for transition to CE

Author (year) and research title	Methods and scope of research	Results
Rukanova et al. (2021) Digital infrastructures for governance of circular economy: a research agenda	<ul style="list-style-type: none"> - Qualitative method - Framework and outline a research agenda on how digital infrastructure innovations can enable and support CE governance 	<p>A framework on digital infrastructure for CE governance consists of:</p> <ul style="list-style-type: none"> - Data sources to create visibility on the production process; visibility on re-use/recycling; visibility at the border - Role of blockchain tech, IoT, AI - Potential use of CE visibility offered by digital infrastructure by government, banks, insurance companies, and auditing firms to monitor, audit, and account CE supply chains
Rukanova et al. (2021) Extended data pipeline for circular economy monitoring	<ul style="list-style-type: none"> - Qualitative method - Extended data pipeline to support CE visibility 	<p>A framework for extended data pipeline for CE monitoring consists of:</p> <ul style="list-style-type: none"> - Visibility – adding data on the production process - Visibility – adding data at the border (digital product passport, chemical composition, goods provenance) - Visibility – adding data in the processes of recycle, refurbish, reuse - CE visibility enable CE monitoring by government, banks, auditing firms
Milios (2021) Towards a taxation framework: expectations and challenges of implementation	<ul style="list-style-type: none"> - Mixed method, interview and desk study - Comprehensive taxation framework 	<p>A framework for taxation:</p> <ul style="list-style-type: none"> - natural raw material tax - a repair/reuse tax relief - waste hierarchy tax
Kofos et al. (2022) Circular economy visibility evaluation framework	<ul style="list-style-type: none"> - Qualitative method - CE visibility evaluation framework for block-chain enabled digital infrastructures 	<p>A CE visibility evaluation framework consists of:</p> <ul style="list-style-type: none"> - Identification of necessary visibility in the CE context - Evaluation of blockchain-enabled data pipelines - CE information tools
Rukanova et al. (2022) A high-level framework for green customs and research agenda	<ul style="list-style-type: none"> - Qualitative method - Framework for green customs which links the policy developments related to CE to customs and related 	<p>A framework for green customs that captures role of customs in CE and sustainability monitoring:</p> <ul style="list-style-type: none"> - Broader context of CE - Customs stakeholder - Activities - Identification of customs' innovation capabilities



	stakeholder, activities, and innovative capabilities	
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