Zhao, Shasha; Ku, Sarah; Dilyard, John

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CHAPTER 4

GLOBAL WASTE CRISIS AND THE ROLE OF INNOVATIONS BY GLOBAL CORPORATIONS

Shasha Zhao, Sarah Ku and John Dilyard

ABSTRACT

This chapter offers novel insights into how global corporations can innovate to tackle the global waste crisis and gain sustainable competitive positions. Using two of the most prominent types of global waste crises – food and plastic wastes – we discuss the dilemma of food and plastic waste, why innovations in global firms are needed to address them, and argue that a different perspective among those firms is needed, one which conceptualizes the development, dissemination and use of innovations in waste management, and one which recognizes that innovations, thus, created contribute to advancing the creation of economic, environmental and social value. We conclude using an overarching conceptual framework that depicts the complexity of the new perspective.

Keywords: Waste; innovation; sustainability; competitive advantage; multinational enterprises; UN SDGs

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INTRODUCTION

Even before the creation of the UN's Agenda 2030, but especially afterwards, the purpose of business has been evolving away from solely making money for shareholders to create value for stakeholders. The emphasis on sustainability and sustainable development exemplified in Agenda 2030 and its Sustainable Development Goals (SDGs) has resulted in defining stakeholder value as the maximization of the triple-bottom line of planet, people and profits (Elkington, 2013; Freeman, 1984). Doing so creates management challenges for companies who are serious about addressing this modern purpose. Among those is what to do about waste, which affects firms, environments and societies in every industry and country (Barnes, 1982; Corvellec & Hultman, 2012; Corvellec & Stål, 2017).

According to the Organisation for Economic Co-operation and Development (OECD), waste is defined as 'materials that are not prime products (i.e. products produced for the market) for which the generator has no further use in terms of his/her own purposes of production, transformation or consumption, and of which he/she wants to dispose' (United Nations, 1997). Waste occurs throughout each stage of the linear life cycle: extraction, production, distribution, consumption and disposal. Too often, the responsibility for waste management falls on governments and consumers, both of which have been slow to implement changes in policies or behaviour (Baumgartner, 2011). One assumption has been that public policy and legislation must mandate and incentivize certain activities to coax responsible behaviours from corporations and consumers. Another assumption has been that individual consumers can both demand responsible behaviours from waste producers and engage in responsible behaviour themselves.

Why, though, should the effective management of waste need persuading through carrots and sticks? Or, for that matter, why should it require the adoption of a virtuous moral compass to 'do the right thing'? Does it not make simple business sense to maximize the efficient use resources and processes before, during and after the creation of the goods and services they produce? Firms certainly can stimulate and influence a variety of stakeholders through the declaration and implementation of their own attitudes and activities with respect to waste management and even perhaps serve as models to others (Pelton et al., 1993; Corvellec & Hultman, 2012). One might think, too, that a firm would welcome a boost in public image from its voluntarily virtuous management of waste. It also can be argued that a reconceptualization of waste as not just something that must be discarded but perhaps something that can provide economic benefits to a firm (Hanson & Mitchell, 2017). Therefore, rather than waiting for policymakers and consumers to require or demand better and more sustainable waste management initiatives, firms can leverage opportunities to develop those initiatives to increase their competitive advantage through sustainable strategies (Sheth & Apte, 2016).

Getting firms to be leaders in waste management efficiencies may be desirable and forward thinking, but it is not without its obstacles. For example, much of business scholarship continues to prioritize increasing consumption with little attention to its consequences of waste. Yet, growing populations, decreasing resources, the threat of climate change and disruptive uncertainties (e.g. natural

disasters, health pandemics, political unrest) make urgent the need to change how we (as individuals, corporations, governments and society) manage our waste. Another example is that firm strategy commonly focusses on lean operations, but the focus is on inputs and processes, leaving outputs and disposal out of the conversation. While research has provided economic, environmental and social evidence for sustainable business operations, alternative approaches to waste management (e.g. vertically integrating reclamation processes or selling to secondary markets for processing and repurposing) are rarely discussed; landfilling waste remains the default practice around the world (Harrison et al., 2020).

By thinking differently, firms have a lucrative opportunity to influence how waste is valued, treated and managed. At the same time, corporations can stimulate organizational behavioural and societal changes for economic, environmental and social advancements through their own internal business strategies and operations. It is our view that global corporations are in an especially ripe position to do this. IB firms embody unique characteristics (e.g. cultural intelligence, migrant workforces, diversity of perspectives, agility) that enable them to design their business models in ways that incorporate a more holistic approach to stakeholders and scenarios. They are accustomed to tailoring business models, strategies, marketing and human resources to fit the needs of local markets. Emerging markets have high rates of informal waste sectors due to lack of existing infrastructures and standardizations, which often result in dangerous working conditions and exploitative pay structures that overwhelmingly afflict marginalized populations (Engel et al., 2016). Yet, these conditions also stimulate innovative reclamation opportunities (e.g. creating bricks out of plastic waste in Kenya and creating edible utensils from sugarcane waste in India) with the potential for emerging markets to leapfrog past developed markets in terms of waste management. Despite these capabilities, global corporations overwhelmingly squander opportunities to manage their waste externalities efficiently and profitably. Business paradigms must shift drastically to conceptualize waste as a resource rather than a burden.

So, how is this change in paradigm accomplished? How can something – waste – that is perceived to have little or no value be seen as something with high perceived value and, thus, worthy of attention? One way, perhaps, is through the lens of sustainability and corporate social responsibility, both of which are increasingly important to IB. Rather than send organizational externalities to landfills in high volumes and at high cost (Kass, 2015), is it not more sustainable and environmentally responsible to find productive uses for them? Rather than just tacitly assume that undesirable habits, services and attitudes cannot be changed or are too difficult to change, is it not more responsible to examine the evidence that challenges these socially constructed norms (Taylor & Todd, 1995)? The emergence of waste-induced ecological and potential health crises (e.g. microplastic waste infiltrating all sources of water) can also serve as an impetus for change. Indeed, the long-acknowledged existence of plastic waste in oceans has prompted many firms to rethink how they manufacture and/or use plastic in their operations (Morgan, 2019). Food waste, too, is something that has been receiving attention as a potential resource (e.g. feedstock for manufacturing, fertilizer from composting, etc.)

rather than as something that ends up in a landfill. In essence, what this paradigm shift entails is a fundamental transformation away from seeing production, consumption and disposal as a linear system to more of a circular one to reincorporate waste as a resource into business designs. The benefits of this shift include cost reductions, increased efficiencies and higher profits while simultaneously caring for our planet and people.

To support a paradigm shift in international business contexts, we focus on the two sources of waste – food and plastics – that account for the vast majority of all waste produced globally (44% and 12%, respectively). Organic waste, comprising food (44%), wood (5%) and paper and cardboard (17%), together make up 66% (Kaza et al., 2018). The purpose of this chapter is to describe existing waste dilemmas in global corporations around the world and explore opportunities for tackling these challenges in innovative, sustainable and competitively advantageous ways. As will be detailed in this chapter, however, reimagining how organizational waste is managed, focussing on food and plastic, reveals beneficial implications for the environment, society and business.

THE GLOBAL WASTE CRISIS

Waste management expenses are typically viewed as costs of doing business and regularly overlooked when evaluating and implementing lean operations strategies. As a result, seemingly unavoidable externalities receive little attention for optimization. In linear systems, products and materials that are used to create items for consumption are treated as discardable after their uses have been exhausted. Waste, therefore, is not just directly correlated to consumption (the more we consume, the more we waste); it also is related to the production of the things we consume. In circular systems that repurpose waste into other products and applications, though, the more we produce/consume, the more opportunities we have to repurpose, reincorporate and reutilize materials. Transforming waste through creative solutions has the potential to not only reduce the problematic practice of simply burying trash but also offers lucrative and sustainable business opportunities.

Landfilling, unfortunately, continues to be the default waste disposal practice around the world despite increasing tipping fees and legislation (Harrison et al., 2020). Considerable infrastructure is required for collecting and transporting to centralized sites, with additional logistics and equipment needed for processing. A majority of the costs surrounding waste management attribute to collecting and cleaning waste (Kaza et al., 2018). Separating waste materials before they enter waste management streams is a simple method that can substantially ease the costs of recycling. Utilizing recovered materials is generally cheaper and requires less processing than virgin materials (Ellen MacArthur Foundation, 2015).

However, if only one iteration of waste management is prioritized without considering the entire life cycle of the system, desired outcomes can backfire. Consider the case of recycling. While consumers have become used to regularly

separating materials for recycling into distinct bins and sorting their own materials, in an attempt to increase convenience for consumers, single-stream systems have emerged that shift sorting responsibilities further down the system onto materials recycling facilities instead of relying on consumers. As a result, recycling activities have become easier to standardize and streamline with existing municipal solid waste management; however, many unintended consequences also have arisen. These recycling facilities regularly receive non-recyclable materials as a result of 'wishcycling', which is when people attempt to recycle materials that are non-recyclable either because they do not know that they are non-recyclable or because they wish they could be. As a result, recycling facilities which receive wishcycled items are exposed to high levels of contamination through the blending of recyclable and nonrecyclable items as well as from residues from food and plastic. This phenomenon became particularly salient in 2017 when China launched 'Operation National Sword', which enacted much tighter restrictions on the waste the country was willing to accept. Because much of the world had been relying on China to process its waste, China's decision revealed both how dependent the rest of the world was on China for and the vulnerabilities in this stream of waste management. In response, countries have had to consider creating their own waste management systems.

The costs for building and maintaining these systems vary drastically around the world. A lack of existing infrastructures can make waste management difficult, but it can also enable creative solutions. Many regions around the world rely on informal sectors to collect, sort and process waste materials (Mitchell, 2008; Nzeadibe, 2009; Wilson et al., 2006). In these informal sectors, many individuals rely on waste for their livelihood. Waste workers in informal systems risk their health and safety, along with social disparagement, with little or no protections for low economic gains (Oteng-ababio et al., 2013). Yet, these informal markets are valued at over $880 million (Medina, 2007). Since recovery rates through informal sectors can be remarkably high (up to 80%), collaborating with these systems has the potential for even more efficient and competitive reclamation of waste (Engel et al., 2016; Iskandar & Tjell, 2009). Rather than trying to replace or eliminate existing informal systems, firms and governments who help expand and validate them can contribute to this growing and necessary circular industry. Interestingly, the lack of a formal waste management infrastructure actually can facilitate leapfrogging (when, a developed or emerging economy surpasses a developed economy) because it is able to they are able to create new waste management infrastructure from scratch instead of reconfiguring what already is there.

Next, we explore in depth two of the largest categories of global municipal solid waste, namely food and plastic (Hoornweg & Bhada-Tata, 2012). Our focus is on global corporations, as global corporations are often the largest food and plastic producers and are uniquely positioned to tackle wastes due to their access to diverse resources (physical, human and cultural), geographic scope and capabilities. Global corporations can facilitate the more holistic waste management innovations we envision because they are more globally connected.

The Food Waste Crisis

Approximately one-third of all food produced globally for human consumption, or around 1.3 billion tons, is wasted every year, costing the world US$940 billion annually (Food & Agriculture Organization of the United Nations, 2017; Gustavsson et al., 2011, 2013; US EPA, 2018). Municipalities in developing countries spend 20–50% of their budgets on solid waste management (Lohri et al., 2014). The environmental consequences of food waste include greenhouse gas emissions, land exhaustion, resource depletion, excess water consumption, pesticide saturation, and animal abuse (Buzby & Hyman, 2012; Hanson & Mitchell, 2017; Kline, 2017; Rayfuse & Weisfelt, 2012; World Resources Institute, 2016). Yet, because food waste is seen as biodegradable and therefore not harmful, its environmental impact tends to be overlooked.

One particular adverse environmental impact is methane, which is emitted when food decomposes without oxygen, and is 25–84 times more dangerous than carbon dioxide (Environmental Defense Fund, 2016; Yvon-Durocher et al., 2014). Additionally, food waste's annual global blue water footprint comprises roughly the equivalent volume of water discharged from the Volga River, the longest river in Europe (FAO, 2013). And, from a moral or human rights perspective, while 1.3 billion tons of food is being wasted every year, over 800 million people are undernourished (Loboguerrero et al., 2018). This asymmetry demonstrates that sufficient food production exists, but it is not being distributed properly. Yet, even with generous estimates of the redistribution of food to undernourished people, millions of tons of food waste still would remain (Egan et al., 2007).

The conservatively estimated direct economic consequences of food waste are approximately $750 billion USD annually (FAO, 2013). Since China's waste bans began in 2017, markets for waste have been struggling due to the lack of land capacity for landfilling and processing infrastructure for alternative methods (Liu et al., 2018; Qu et al., 2019). From a strictly economic perspective, open dumps and landfills are the least cost-effective markets for waste since there is little profit potential (Champions 12.3, 2017; Kaza et al., 2018; Kim et al., 2011). Consideration of the upfront and maintenance costs plus returns on investment provides a more accurate estimation for the economic impacts of these waste destinations. In addition, land capacity, methane emissions, carbon footprints from collection and transportation and water usage contribute to the environmental impacts of waste management. When waste is redirected to non-landfill alternatives (e.g. processed into feedstock for manufacturing or converted into energy), opportunities to reduce supply chain vulnerabilities and provide sustainable jobs contribute positive social impacts. A holistic and comprehensive understanding of these markets must be considered when designing marketing and policy efforts surrounding waste disposal.

Waste, in general, is frequently managed inefficiently (Wilson et al., 2006; Zaman, 2015), accounting for a 'premature ending of the useful life of many materials that would have some additional value for sale and/or recycling' (Pietzsch et al., 2017, p. 324). We essentially are wasting our waste because we do not see its value. If, however, companies, instead of relying on nonrenewable resources for

manufacturing, packaging, energy, transport, etc., shifted their thinking towards more sustainable waste management processes and used materials, such as food waste, that already exist and are renewable, they not only would be managing waste more efficiently but also would be recognizing that waste actually is a resource. Granted, certain types of waste are unavoidable; however, their function is entirely within our control. For example, small-scale operations around the world are using coffee grounds to manufacture reusable cups, eyeglasses and even to cultivate mushrooms. Just imagine the benefits large coffee manufacturers such as Starbucks, Dunkin' or McCafe could realize in their waste and supply chain management activities if they adopted these local practices and applied them on a global scale! For decades, marketing scholars have highlighted that 'commodities which have no markets are assumed to be worthless' (Peattie, 1999). When something is discarded – is seen as dirt or trash – its purpose, function and value are depleted; it has become worthless and useless (Drackner, 2005). However, adages such as 'one man's trash is another man's treasure' and 'what counts as trash depends on who's counting' highlight the importance of framing our perception of waste differently, as a source of value creation (Polonsky & Rosenberger, 2000). Perceptions are malleable and dynamic (Kahneman & Tversky, 1981, 1984). Similarly, value can be driven through social consensus (Edvardsson et al., 2011, p. 334). An example is how aesthetics shape our view of food. Marketing research on food waste perceptions often focusses on aesthetics to salvage 'ugly', but entirely edible, food rather than throwing it out (Cooremans & Geuens, 2019; Grewal et al., 2019). Secondary markets are useful for this kind of food, and global corporations have a variety of opportunities to either outsource this food to secondary markets or vertically integrate it to prevent it from being waste (Ku, 2022).

A certain amount of food waste, though, is inevitable no matter how much we try to prevent or reduce it. This reality, however, does not have to be a problem. Waste is only waste if we waste it. On the contrary, if repurposed efficiently, waste can be very useful. Therein lies the paradox and ethical dilemma of whether we should reduce the waste we produce or welcome (or even increase) it. Waste as a detriment versus waste as a resource is entirely dependent upon what we do with it. If we let it sit in a landfill, leaching dangerous contaminants into our environment and polluting our societies, then, of course, it is a problem. However, if we utilize it to feed humans and animals; as a resource to produce clean, renewable energy; as a raw material to manufacture products circularly and as a nutrient-rich fertilizer (to name just a few applications), then we can quite literally turn trash into treasure. We will discuss more value-added innovations later on, but next, we will discuss the dilemmas of plastic waste.

The Plastic Waste Crisis

In a way, the food waste crisis also brings about another problem – plastic waste crisis. For example, purchase and consumption of food bring about plastic packaging waste problems. More broadly, not only is the use of plastics in just about anything we buy or use is ubiquitous but so is plastic waste. A recently released

report by the OECD (The Global Plastics Outlook) contains some sobering statistics. They include (1) plastic consumption has quadrupled over the past 30 years, driven by growth in emerging markets; (2) global plastics production doubled from 2000 to 2019, reaching 460 million tons; (3) plastic waste generation doubled over that time, to 353 million tons, 40% from packaging, 12% from consumer goods and 11% from clothing and textiles; (4) only 9% of plastic waste is recycled (15% is collected for recycling but 40% of that is disposed of as residues). Another 19% is incinerated, 50% ends up in landfill and 22% evades waste management systems and goes into uncontrolled dumpsites, which is burned in open pits or ends up in terrestrial or aquatic environments, especially in poorer countries; (5) In 2019, 6.1 million tonnes (Mt) of plastic waste leaked into aquatic environments and 1.7 Mt flowed into oceans. There is now an estimated 30 Mt of plastic waste in seas and oceans, and a further 109 Mt has accumulated in rivers (OECD, 2022).

Clearly, to say that there is a 'plastics crisis' would be a gross understatement. And, among the many other weaknesses in the global economy that was revealed by the COVID-19 pandemic, so was the reliance on plastic. Among the set of distinct pressures, the pandemic placed on global corporations to seek alternative means to operate or survive was a severe disruption in global supply chains for the manufacture of disposable personal protection equipment (PPE) and a desperate effort to find innovative alternatives for them. Much of PPE, including packaging, contains single-use plastic. As a result, any efforts that had been made to move away from single-use plastics pre-pandemic disappeared, exacerbating the plastic waste problem. Most IB research has focussed on the impact of the pandemic on global corporations' strategies, business models, performance and global value chains (e.g. Delios et al., 2021; Dörrenbächer et al., 2021; Hitt et al., 2021). Sparse research, however, has been conducted on how the pandemic has affected global corporations' efforts towards managing waste, or if or how their pandemic-influenced actions might have resulted in negative consequences. The response to the demand for PPE – switching to single-use/disposable product – is an example. Ironically, while PPE manufacturers derived a great deal of social value from providing their much-needed product, a blind eye was turned towards the harm disposable PPEs have had on the environment. Moreover, the surge in ineffectively managed PPE wastes – most likely to be found in wealthier economies – has led to them (along with other wastes) being exported to countries with weaker waste management systems, less formal institutions and limited regulations – contributing to already existing chasms along economic, environmental and social disparities. Indeed, the largest economies tend to generate the vast majority of global waste plastics (besides PPE), which then end up in the peripheries, creating severe and long-lasting environmental problems.

Two long-standing questions are worth highlighting: (1) Given the increasingly severe global plastics crisis (made worse by the pandemic), should corporations be held directly responsible for its resolution? And (2) is it appropriate (or acceptable) that the corporations who are the largest producers of virgin and recycled plastics essentially offload the responsibility to other parties for the recycling and/or treatment of waste plastics? The answer to (1), in our opinion, is an unequivocal 'yes', and the answer to (2) should be 'no'.

Somewhat ironically, while large corporations do not appear to be inclined to think about how they could produce their plastics better, there has been a growth in firms that develop innovative plastic alternatives that are 100% biodegradable (Cell Press, 2020; Matchar, 2019). Most large corporations, however, have not learned or embedded much of the available green or eco innovations into their value chains despite having the resources, capabilities and capital to do so. In addition, plastic-producing corporations are faced with at least three major challenges to internalizing the handling of the waste plastics crisis or considering drastic eco-technologically based changes in value chains. These include a lack of technological and operational agility, shareholder interest and financial incentives and overreliance on the peripheries to handle the waste.

In summary, we have highlighted the magnitude of the two major global waste crises – food and plastics – on societal stakeholders and the role of global corporations as a major economic actor contributing to the problem. In particular, we shed light on the environmentally unfriendly, profit-driven operations and their implications on a number of the SDGs.

INNOVATIONS TO TACKLE THE WASTE CRISIS

Rethinking Global Innovation Approaches

Recent empirical developments show that international organizations and policymakers are increasingly calling for global corporations to act more responsibly in terms of addressing both social and environmental challenges and to be more cognizant that what happens in the peripheries has consequences that could cycle back to the global corporations. In essence, acting responsibly with respect to society and the environment means that global corporations should become full partners in achieving the totality of the UN's Agenda 2030. In the case of the global waste crisis, global corporations must take more responsibility for reducing and managing the wastes. To do this, they need to move away from a relatively narrow view of economic performance (one which essentially ignores or passes off the environmental costs of plastic waste) towards a multilevel and multidimensional perspective (one which incorporates into their business models how plastic waste is mitigated and managed throughout their value chains). Such a multilevel and multidimensional perspective makes sense because the global waste crises exist at multiple levels and in multiple dimensions. This view points to the need for more holistic, novel innovation approaches among the global corporations when considering their role in tackling the waste crisis.

More specifically, we propose a conceptual framework (Fig. 1) depicting three innovation approaches for global corporations. First is top-down ambidextrous innovation. In this regard, global corporations can take an advanced-to-emerging economies approach for innovations that focusses on addressing the market demand for them through product or process innovation, for example, a radically advanced smart phone or reusable, safe and clean PPE. This may require global corporations to continue to configure their most advanced R&D activities and resources in pro-innovation environments of the developed countries or a few technologically advanced emerging

economies to achieve the best innovation possible. Innovations so developed should then be pushed down to other locations within the entirety of a firm's global network, especially social and green innovations. While doing this, though, global corporations should be willing to take advantage and/or incorporate knowledge and technologies that might exist in other locations within their networks, including those in the periphery, which they then could disseminate throughout the network.

Next is bottom-up ambidextrous innovation. Here, global corporations can shift towards an emerging-to-advanced economies approach for innovations that focusses on the most pressing issues or the most affected locations, for example, those in developing countries, but which could have applications elsewhere within the firm. This may require an increase in the level of autonomy of subsidiaries in developing countries to undertake innovation activities that better address local social and environmental issues. Global corporations then can explore the extent to which those local innovations and knowledge should be used across the rest of the firm's network and how useful they might be for product innovation in other locations. Leveraging local expertise, capabilities and cultures represents valuable and equitable competitive strategies.

Third is the need for a bidirectional flow of knowledge between developed and developing countries and across the firm's global R&D network to become ever more prominent. In this concept, it is possible to have innovation 'champions' in multiple locations that share what they learn and develop with other locations, all for the purpose of adding economic value to the firm and creating social and environmental benefits wherever they are needed. What this implies is a strategic mapping of what kinds of innovations are being developed and where, and mandating the sharing of information throughout the global corporations. Doing so ought to optimize new knowledge creation, which should be intended to promote product innovation that supports green and society-benefitting innovation, or green and society-benefitting innovation that supports product innovation. Both of these things can be done simultaneously but will require the careful configuration of R&D subsidiaries.

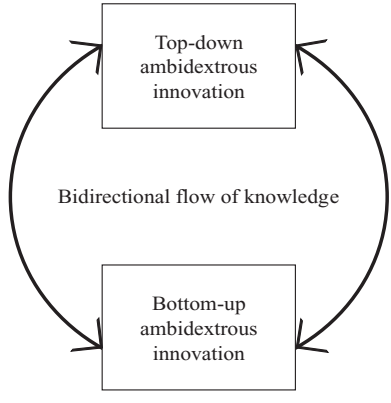

Fig. 1. Framework for Global Corporations to Incorporate Innovations to Tackle Waste.

Waste Capitalization Through Innovations

A commonly heard refrain against adopting more sustainable business practices is that it is both costly and requires sophisticated technologies when compared to the status quo. Sure, there can be costs and technological improvements associated with being sustainable. However, research continues to show that sustainable business practices consistently outperform those that are non-sustainable (Sheth & Apte, 2016). Clean energy, for example, is now cheaper than coal (Magtulis & Sen, 2022). And, despite common practice, landfilling is not the only option for waste disposal. The impression that waste is costly to a firm is a narrow view and a false assumption. To be sure, changing to sustainable development activities and systems does require often substantial short-term initial investments; however the benefits they bring are long lasting and, therefore, must be considered using a long-term rather than a short-term lens. Some of the recent research shows that the long-term effects of sustainable activities surrounding waste surpass their initial costs fairly quickly, making them economically as well as environmentally and socially beneficial (Hanson & Mitchell, 2017; ReFED, 2016). For example, research from the World Resource Institute showcased that the benefit–cost ratios for over 700 companies across 17 countries elicited a median potential return of $14 for every $1 spent, averaging a 1,300% return on investment (Hanson & Mitchell, 2017). So how can innovations in sustainable practices tackle the global waste crisis?

Capitalizing on waste is a business proposition that requires a shift in mindset and behaviours from many levels. Simply put, if waste is costing a firm money, an opportunity is being overlooked. In 2015, a collaborative study between McKinsey and the Ellen MacArthur Foundation demonstrated that implementing waste into a circular system 'could boost Europe's resource productivity by 3% by 2030, generating cost savings of €600 billion a year and €1.8 trillion more in other economic benefits' (McKinsey & Company, 2017). Food waste can be converted into feed for animals, fibre for clothing, feedstock for manufacturing, biofuel for energy, fertilizer for agriculture and biochar for carbon sequestration, to name just a few applications. Similarly, plastic waste can be transformed into building materials, railroad sleepers, carpeting, outdoor furniture and a variety of clothing items; however, more fixed and stable applications arguably are much more ideal than being recycled back into more single- or limited-use products that will likely end up discarded or in need of further recycling.

Ironically, businesses have considerable control over their innovative transformation of waste into a cost-effective asset, and it actually weakens them if they do not. These days, firms not only lose financially from the misuse of waste, but their reputations also can suffer (McKinsey Center for Business & Environment, 2016). But in order for firms to realize that waste is an asset rather than a cost, they must first recognize that waste has value. Global corporations, therefore, have a choice: they can either facilitate environmental restoration in both home and host country locations by seeing that waste has value or they can aggravate it by continuing to see waste as just waste. If, however, global corporations want to act and behave sustainably and responsibly, it is our view, our thesis, that this is not a choice, but a responsibility. Capitalizing on waste that is inevitable, abundant, renewable and sustainable is not only responsible and economically

advantageous but also essential to operate in a modern world. Managing waste in a responsible and sustainable manner offers opportunities for global corporations to gain substantial competitive advantages. Waste can be marketed as a valuable asset that capitalizes on its abundance, renewability and representative potential to signal sustainable business practices and purchase options (Cicatiello et al., 2016; Falasconi et al., 2019; Visschers et al., 2016).

CONCLUSION

The preceding discussions highlighted the severity of the global waste crisis that we face as societies and the role of global corporations in causing and tackling the problem. We paid particular attention to food and plastics crises as they represent important, relevant and universal resources that deserve prioritization (The World Bank, 2012). We offered novel insights into on how global corporations can innovate through their waste to gain sustainable competitive positions. As we have demonstrated using the global food and plastic waste crisis, global corporations must turn their attention to their own waste to be responsible and sustainable players in the global marketplace. We summarize these two main points of discussions into an overarching conceptual framework (Fig. 2). To tackle these dilemmas, a different perspective within global corporations is needed, one which conceptualizes the development, dissemination and use of innovations and one which recognizes that innovations, thus, created contribute to advancing economic, environmental and social value for sustainable competitive positioning.

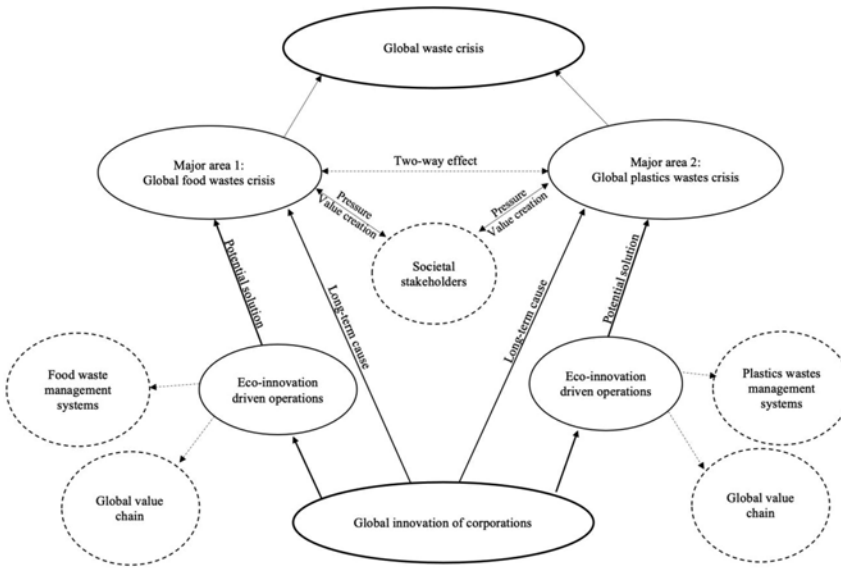

Fig. 2. Overarching Framework of Global Waste Crisis and Corporate Innovation Solution.

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