A conceptual framework for understanding how the green city philosophy translate into sustainable behaviour and performance: The case of retail businesses in Cape Town

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ABSTRACT

The concept of a "green city" is increasingly gaining momentum across the globe being driven by western values and ideologies. The green city philosophy does not only require investments in green infrastructure, but also adoption of sustainable behaviour based on societal norms and values. Researchers and policymakers believe that declaring a city green might incentivise the retail industry to adopt sustainable behaviour which in turn result in higher performance at both firm and industry level. However, there are still challenges in terms of operationalizing the "green city" concept and achieving its benefits in most developing countries in Africa. In particular, the link between sustainable behaviour and performance is not well understood as the relationship is governed by latent and contextual factors in addition to complex interactions among system variables in the economy. The evidence that is available is mainly coming from the developed world while few a studies have been done in developing countries. Furthermore, there has been a challenge in adopting and implementing policies promoting the green city philosophy in developing countries which made it difficult to translate the rhetoric of policy into practice. We develop a conceptual framework based on the green city philosophy and use it to examine the conditions under which sustainable behaviour might lead to increased performance of retail outlets in the context of an African city such as Cape Town

Keywords: green city philosophy, practice, sustainable behaviour, performance, retail outlets, Cape Town

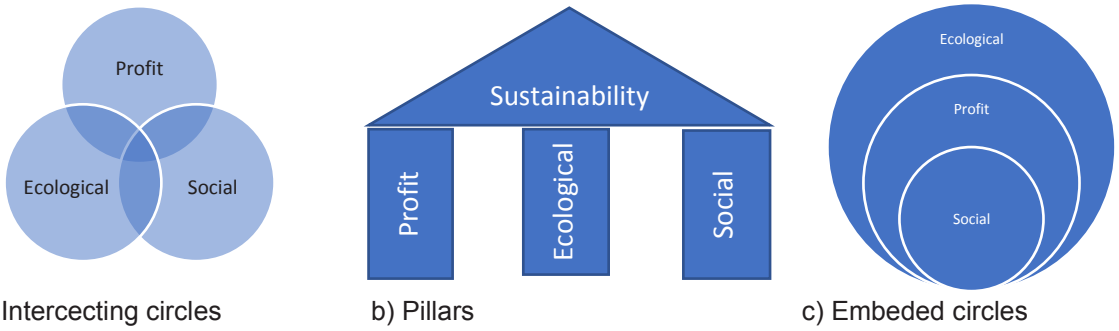
1. INTRODUCTION

The philosophy of a 'green city' has been around for several decades being driven by the need to make production and consumption sustainable by harmonising or aligning development goals with nature (Bibri, 2021). The concept of a green city is linked to other concepts in the literature such as 'green economy' (Loiseau et al., 2016; Merino-Saum et al., 2020), 'smart city' (Bibri, 2021), 'green marketing' (Mishra and Sharma, 2010), 'green consumers' (Diamantopoulos et al., 2003; Carrete et al., 2012) and 'sustainable cities' (Haughton and Hunter 2004). Although these concepts differ in scale and area of application, what they have in common is the need to balance development and nature. Narrowly defined, the green city philosophy entails investing in green infrastructure such as city parks, botanical gardens and street trees, and adoption of energy saving and emission-reduction technologies that harmoniously integrate urban development and environmental concerns (Kuratchenko et al. 2021). At a much broader level the concept of a green city also speaks to the adoption of sustainable behaviour by both firms and consumers that is consistent with nature preservation and conservation of biodiversity (Phipps et al., 2013; Jedliński, 2014). To achieve a sustainable green city, both investing in green infrastructure and adoption of sustainable behaviour should be used as complementary tools rather than as substitutes (Montalto et al.2013).

The philosophy of green cities borrows from the idea of sustainable development which has its roots in the concept of sustainability. Sustainability is best understood in terms of three elements which must be achieved simultaneously rather than in isolation, namely, social pillar, economic pillar and ecological pillar of sustainability (Singh et al. 2019). Figure 1 below provides a diagrammatic depiction of the three sustainability pillars based on different configurations from the literature. Without the attainment of any of these pillars, sustainability is compromised (Purvis et al., 2019). What this means for a green city is that the attainment of economic prosperity through the profit maximisation behaviour of the firm should not compromise both social integrity and ecological health of an urban social-ecological system.

Sustainable development therefore implies that economic development needs to be carried out in such a way that it does not interfere with the ability of urban ecosystem to provide goods and services that improve human welfare today, tomorrow and forever (Holden et al., 2014). Based on these concepts, there are different strands of literature whose objective is to understand how development can be harmonised with environmental goals whether we are considering the whole economy, sector or city level (see Schmidheiny and Timberlake, 1992; Lindfield and Steinberg, 2012; Dabija et al., 2018; Kutty et al., 2020). This study focuses on the idea of green cities and examine how this philosophy translate into sustainable behaviour and business performance in the context of a development country such as South Africa.

FIGURE 1
THEORETICAL CONCEPTUALISATION OF SUSTAINABILITY



a) Intercecting circles b) Pillars c) Embeded circles

Source: Authors' own source

Based on the notion of sustainability, different conceptual frameworks have been proposed for green infrastructure (Pakzad and Osmond, 2015), sustainable behaviour (Nguyen et al., 2019) and sustainable cities (Bibri, 2021). Our understanding of sustainable behaviour is based on models from first world countries and these models need to be adapted to suit the context of developing countries. From the literature, the ideas of green infrastructure and adoption of sustainable behaviour are viewed separately as distinct concepts for simplicity, yet in reality they should be analysed as part of a bigger picture aiding to our understanding of a complex world. The knowledge, therefore, is incomplete without understanding adoptions of sustainable behaviour in green cities as a complementary tool for supporting green infrastructure particularly in in the context of developing countries. Such a framework might be used to guide future research studies by identifying variables that explain sustainable behaviour and its links with the business performance should be defined in terms of social, economic, and ecological viability.

Theory and empirical accounts suggest that declaring a city green, certification of green production technologies and consumerism does not only generate adequate incentives for firms such as retail shops and restaurants to behave in a sustainable manner, but also helps then to improve the businesses' performance in line with their profit maximisation objective (Junior et al., 2015). Evidence from first world countries reveal that such programmes and interventions have led to the adoption of sustainable behaviour and increased business performance. In an endeavour to go green, firms have adopted green technologies (Kong et al., 2016) and behaviours such as waste reduction and participation in recycling programmes (Young et al., 2017). One of the driving forces behind the adoption of green production technologies and sustainable behaviour in first world countries is related to consumerism where consumer demand for goods and services is influenced by the firm's production choices that do not cause harm to the environment in addition to other factors (Malyan and Duhan, 2018).

Similar to consumerism, other forms of collective action are also used by consumers in first world countries to force the retail industry to comply with rules and regulations. This behaviour of consumers has led retail shops to adopt concepts such as green marketing and policies which make it mandatory for producers to provide information about the production process or seek certification of their production technologies. Under such circumstances, the choice of a production technology and the goods that are sold in retail shops affect the firms profits and reputation.

Although there is noticeable investment in green infrastructure in most cities in South Africa compared to other African countries, this has not been matched by the adoption of sustainable behaviour from production, distribution, and consumption of retail products (Cohen, 2011).

As with most countries across the continent, operationalisation of the green city philosophy in South Africa in terms of incentivising business firms to adopt sustainable behaviour has been very slow due several factors. First, the policy environment might not be conducive for firm such as retail businesses and restaurants to adopt sustainable behaviour (Beitzen-Heineke et al., 2021). Second, partial or lack of policy implementation could be another factor responsible for hindering the movement from theory to practice in the countries. Third, contextual, political, and socio-economic factors such as the high levels of illiteracy unemployment, lack of knowledge, infrastructural deficiencies, poverty, and inequality could be some of the most important factors given that a greater percentage of the population in developing countries is poor. Poverty forces consumers from poor countries to choose cheap products based on prices only rather than considering other dimensions such as the production process.

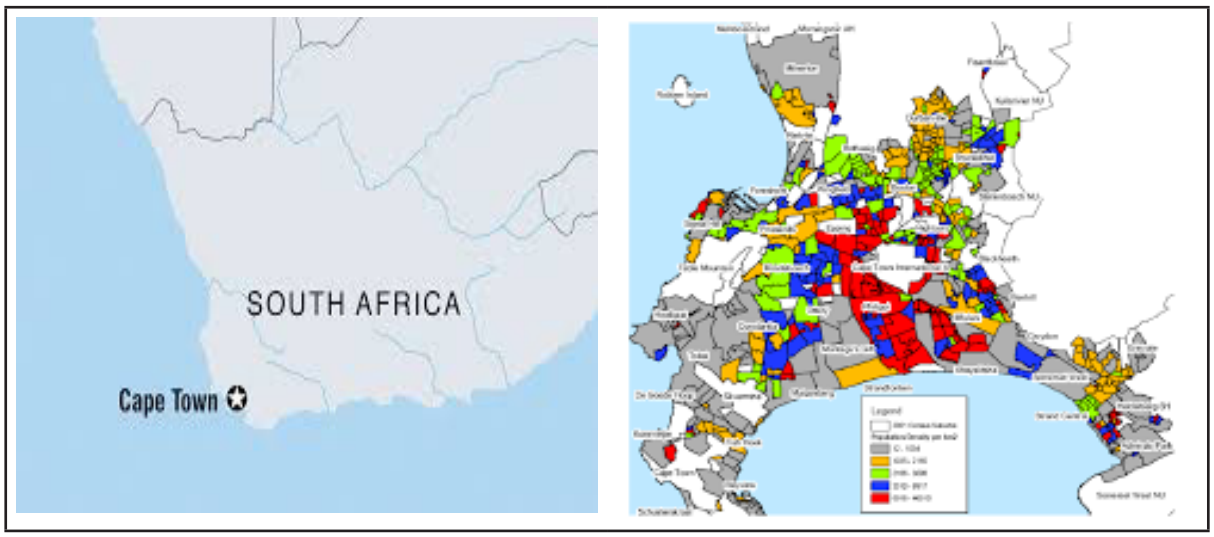
In the case of Cape Town, collective action is constrained by a mixture of people from different backgrounds thereby exacerbating the problem. Under these conditions, consumerism is bound to fail, and firms take advantage of the situation (Hardner and Rice, 2002). In the absence of strong consumerism and weak legal environment, there are no further restrictions on behaviour of firms except for market forces (Mansvelt, 2011).

In this study, we develop a conceptual framework hinged on the philosophy of a green city and use this to explain the link between sustainable behaviour of retail businesses and restaurants and business performance using Cape Town as a case study. The main objective of this study is to examine the conditions under which sustainable behaviour might lead to increased business performance. We ask: i) How can sustainable behaviour lead to improved performance in developing countries? ii) How can policy incentivise retail businesses to behave in a sustainable manner?

2. SETTING THE CONTEXT

Cape Town is a multiracial society with consumers from diverse backgrounds, culture that pans across different countries and continents (McEwan et al., 2015). Figure 1 below shows the map of the city of Cape Town. According to the results of the most recent census conducted by Statistics South Africa (2011), the majority of the population of Cape Town are coloureds (42%), followed by black Africans (39%), whites 16% and finally a small proportion of Asian communities (2%). The economy of the city is primarily based on tourism and wine farming which is also complemented by a vibrant retail industry of supermarkets and restaurants (Bruwer, 2003). Most supermarkets combine both grocery and fast foods section to cater for the ever-growing market. An increase in number of women recruited on the job market coupled with an increase in the number of consumers who prefer to eat fast foods signals an increase in the demand for consumer goods and services and growth in the retail sector (Steyn et al., 2011).

FIGURE 2:
MAP OF THE CITY OF CAPE TOWN



Source: Google Maps

It is indisputable that economic growth and urbanisation have contributed significantly to environmental pollution and degradation of ecosystems as firms and households seek to maximise their objectives. Like most cities in South Africa, the city of Cape Town has also experienced a significant growth of the informal settlements which has also contributed to waste generation in the informal sector (Weimann and Oni, 2019). The occurrence of the informal sector, poverty and inequality contributes to the complexity in implementing the green city philosophy in Africa. Even though the informal sector contributes a fair share towards environmental pollution, it is difficult to instill discipline and sustainable behaviour in poor communities due to lawlessness and lack of infrastructure. Policymakers face trade-offs in terms of choices between policies that favour environment sustainability and rehabilitation and policies that contribute to poverty reduction (Deininger, 2003).

The retail business sector generates a significant amount of solid waste (e.g., plastics, glass, paper, cardboard) and organic waste (e.g., vegetables, meat, cooking oil and grey water). Most of the waste will eventually end up at the landfills, on the streets, blocking drainage systems or polluting the oceans, while a small proportion is recycled or re-used (Verster and Bouwman, 2020). There is call for the retail business sector to adopt sustainable behaviour to reduce the amount of pollution generated. Different strategies are available, and these include waste minimisation or reduction, reuse, recycling and recovery.

3. THEORETICAL FRAMEWORK

Both development and the environment are goods with public good characteristics whose costs and benefits extend beyond individual experiences (Engel et al., 2008). Ordinarily, the environment is funded through the fiscus while development is privately funded since the net benefits of the later are much higher than the former (Figge and Tobias, 2012). We can think of the adoption of sustainable behaviour as contributing to a public good whose benefits and costs could be monetary or non-monetary.

In this case the public good is a healthy environment that can provide the ecosystem with goods and services. Some of the benefits of adopting sustainable behaviour are not experienced at firm level, but could be experienced industry wide or economy wide, while the costs are incurred at the firm level. Therefore, the adoption of sustainable behaviour has positive externalities on other firms and consumers since the benefits of a cleaner environment accrue to the society as whole. As a public good, adoption of sustainable behaviour is bound to fail as the behaviour could be characterized by free riding where firms do not contribute hoping that other firms will contribute. Without appropriate incentives, firms might not adopt sustainable behaviour even if there are benefits accruing to the broader society.

Firms adopt sustainable behaviour by weighing costs and benefits of engaging in such activities in addition to the knowledge they possess. Assuming perfect information, the theory of rationality assumes that firms make decisions to adopt an action if the benefits are greater than the costs. This is an idea situation which does not happen in reality. In practice, firms face information constrains when they make decisions which result in suboptimal outcomes which is the basis of the theory of bounded rationality (Conlisk, 1998; Todd and Gigerenzer, 2003). In the short-run, the adoption of sustainable behaviour might come at a cost to the firm which also erodes its profits, while in the long-run a firm might be able to adjust and make some profits (Camerer, 1998).

FIGURE 3:
VARIABLES GOVERNING THE FIRMS BEHAVIOUR

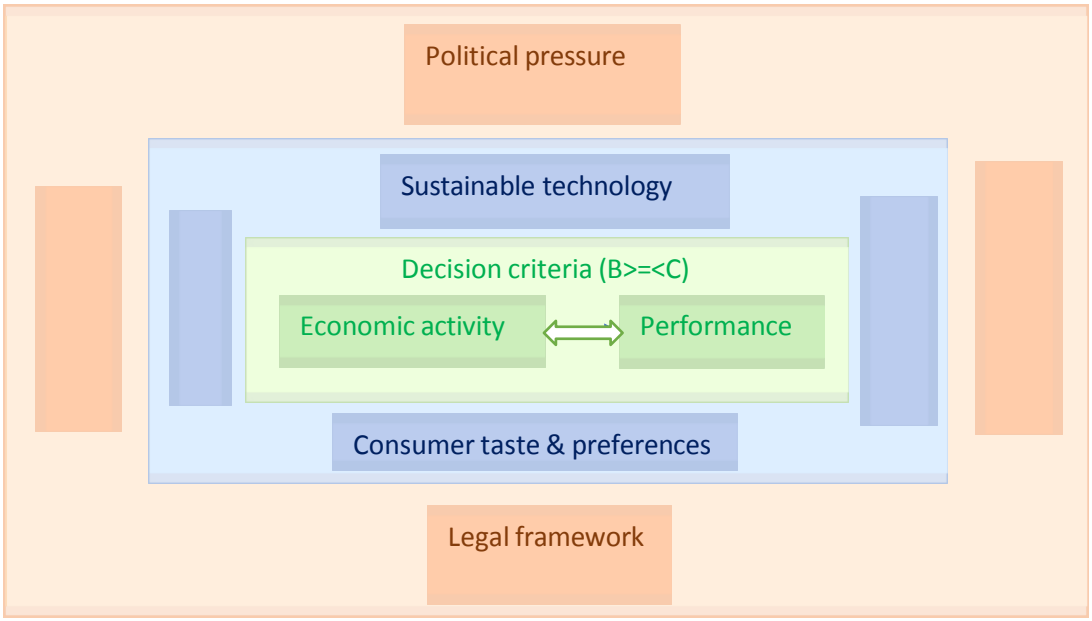
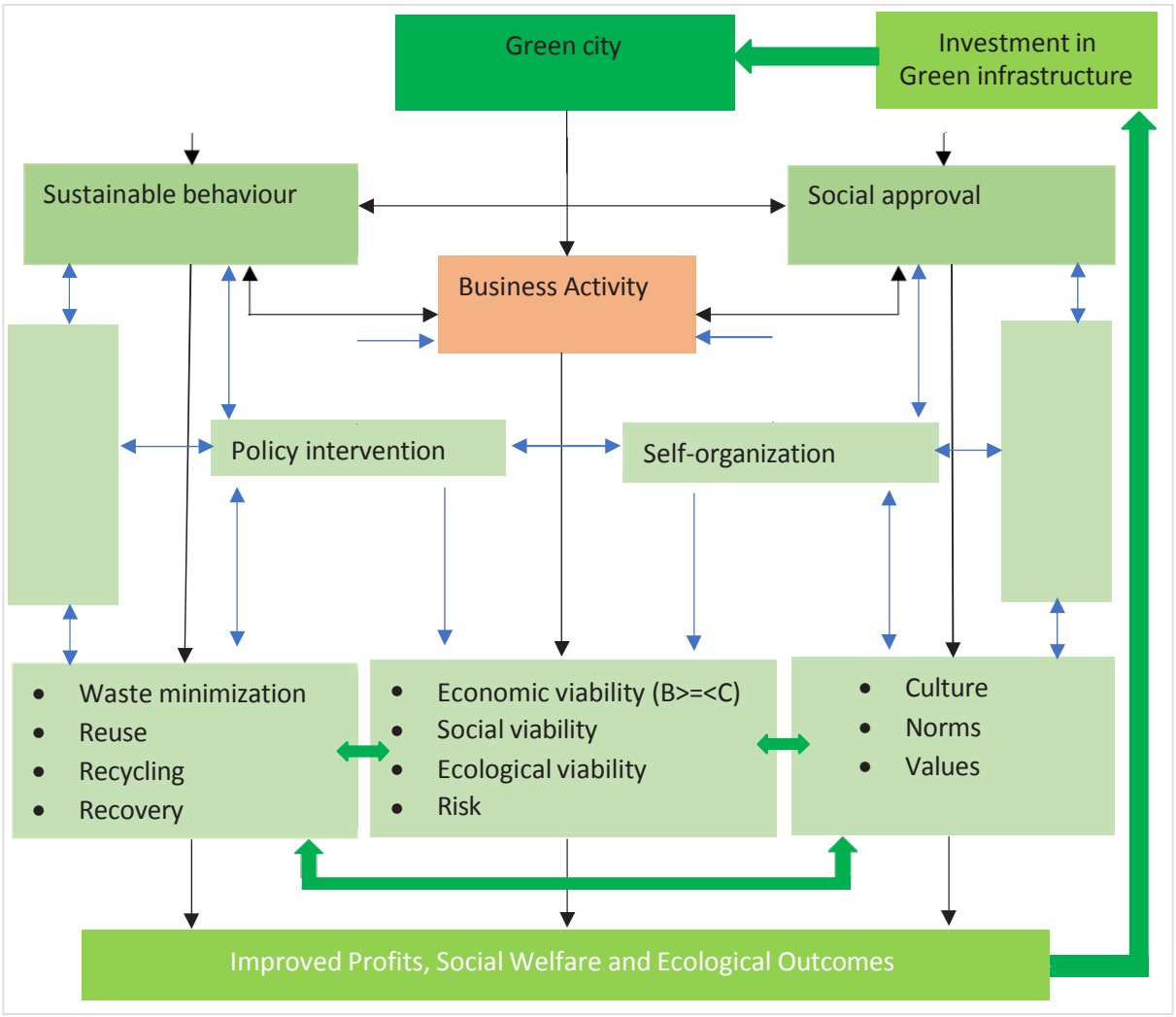


Figure 3 above shows the variables that affect the firm's performance, behaviour and decision criteria based on the cost-benefit analysis framework and idea borrowed from Ostrom's framework for analysing complex social-ecological systems (Ostrom 2007; Ostrom et al., 2007). Theoretically, we can think of these variables as being grouped into three layers where the outer layer is defined as contextual factors such as political, social, institutional, policy and legal environment, while the second-tier variables consist of market forces such as the price signal, changes in consumer taste and preferences, available technology whether it is clean or dirty (including green infrastructure) and the costs of doing business including fixed costs, variables costs and transaction costs. In the inner layer, the firm is governed by its own size (size of the economic activity), investment, social capital or business, network, and economies of scale. Based on the variables in the second and third tier, the firm decides to engage on an economic activity by weighing its costs and benefits which in turn translate into business performance in terms of social, economic and ecological viability.

4. A CONCEPTUAL FRAMEWORK LINKING SUSTAINABLE BEHAVIOUR AND BUSINESS PERFORMANCE

The conceptual framework presented in Figure 3 below helps to shed light on the conditions under which a green city and its infrastructure is supported by adoption of sustainable behaviour while at the same time improving business performance. Unlike in developing countries, one of the major forces shaping a firm's business conduct such as adoption of sustainable practices in first world countries is consumerism and collective action by consumers or other firms in the industry (Hardner and Rice, 2002).

FIGURE 4:
CONCEPTUAL FRAMEWORK OF THE GREEN CITY PHILOSOPHY



Source: Authors' own diagram

Without these additional forces, a robust policy and legal environment is required to provide the necessary incentives or constrains to unsustainable behaviour. Different policy instruments can be used to achieve the desired goals, but the efficacy of each policy depends on context. Policies can be used to incentivise sustainable behaviour (carrot) such as tax breaks and subsidies on technologies. Alternatively, policymakers can use stiff penalties (stick) to force firms to internalise externalities by adopting sustainable behaviours. Of course, this comes at a cost to the government in the form of monitoring and enforcement which imposes a budget constraint on the state. Most countries do not have enough capacity to monitor and enforce environmental laws and regulations given a limited budget and competing needs such as economic growth, infrastructure development, poverty reduction and health concerns. A combination of both carrot and stick instruments may produce superior results that both instruments working in isolation, but this also depend on the context. Therefore, a deep understanding of the context becomes imperative before adopting an instrument for use in different country.

In developing this conceptual framework, we assumed that the behaviour of retail businesses is constrained by variables that directly enter their profit maximisation or objective function, the policy and legal environment and those variables that indirectly affect its behaviour. Borrowing from the sustainability concept, a green city is achievable based on three elements. The first element pertains to adoptions of sustainable behaviour which will in turn lead to the sustainability ecological pillar. The second element addresses the business activities or economic behaviour of the firm which must be balanced to achieve both ecological and social pillars. Finally, the social pillar is achieved when both the economic activities of the firm and adoption of sustainable practices are socially-approved.

The mechanisms through which the adoption of sustainable behaviour and social approval of the firm's activities are achieved is via policy instruments and collective action behaviour either of the firms or community. Firms can come together for a common good to preserve the environment even without external force provided that a conducive environment for firms to adopt sustainable behaviour exist. Alternatively, consumers through their buying behaviour and pressure groups such as consumer organisation and environmental NGOs, can force firms to adopt sustainable behaviour. We assume that collective action can result in both formal and informal institutions that are meant to protect culture, societal norms and values. Both policy instruments and collective action can force firms to adopt waste management strategies such as waste minimisation or reduction, reuse, recycling, and recovery. Furthermore, adoption of these strategies come at a cost and this reduces the firm's profits.

The ability of consumers in developing countries to self-organise is constrained by contextual factors such as poverty, inequality coupled with very high levels of unemployment and illiteracy (Ntuli and Muchapondwa, 2018). Even without self-organising, consumers can communicate their preference for green products or technologies through demand. However, this is not possible in the developing world where the majority of the consumers live below the poverty line and their choices are based on affordability rather than product characteristics such as health and environmental impacts. According to the environmental Kuznets hypothesis, consumers tend to care more about the environment as their income and welfare increases (Dinda, 2004). As a result, firms take advantage of the context since they have market power over the consumer (Akenji, 2014). Under such circumstances, there is need for policy instruments that are capable of incentivising firms to adopt sustainable behaviour and poor consumer to either self-organize or make better product choices to force firms to go green.

5. ANALYSIS AND DISCUSSION

Public and private investment in green infrastructure is not adequate without the adoption of sustainable behaviour to support it (Montalto et al., 2013; Meng and Hsu, 2019). The potential of green infrastructure to yield the desired goals of restoring ecosystem integrity or functionality is compromised if the business community does not behave in a sustainable manner. Firms such retail businesses and restaurants, can adopt sustainable behaviour such as waste reduction at the source, reuse, recycling, and recovery in order to minimise environmental pollution. These strategies have been used extensively in first world countries, while in developing countries where the challenge of environmental pollution is on the increase, due to a combination of urbanisation and lack of infrastructure, little has been done so far (Marshall and Farahbakhsh, 2013).

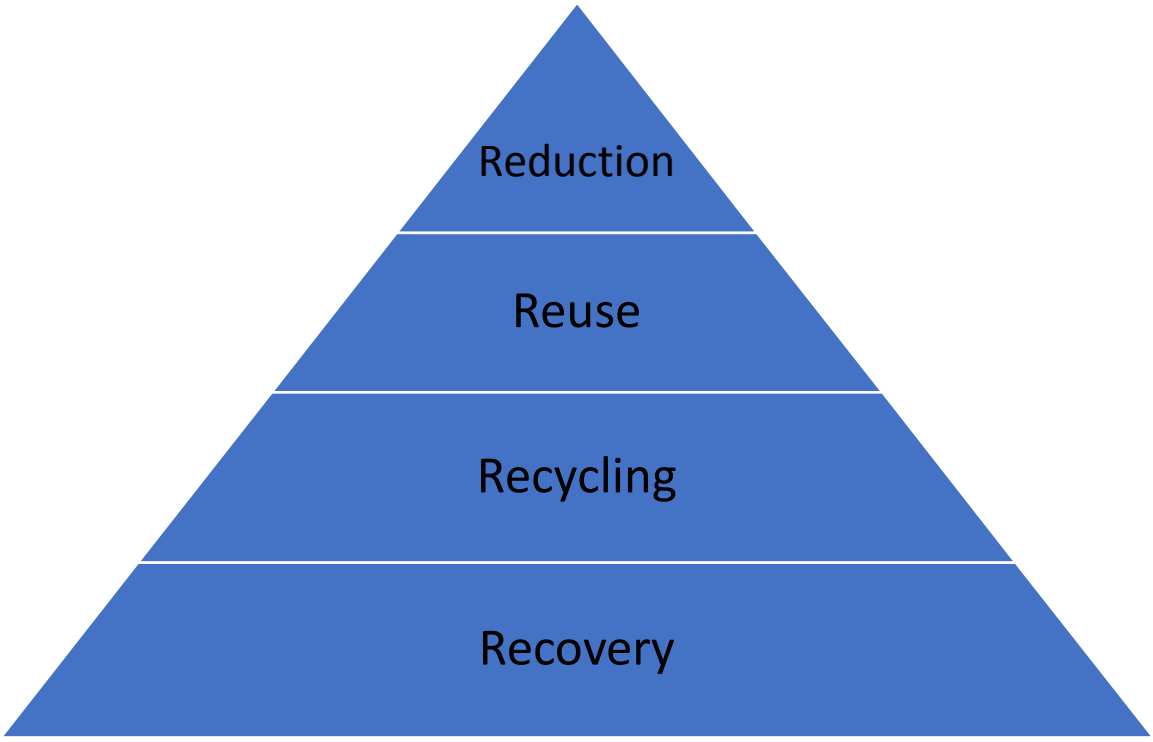
Environmental pollution places a limit on the capacity of the ecosystem to sequester the waste generated in a circular economy (Fiksel et al., 2021). However, some of pollutants such as plastics are non-biodegradable, while others such as dangerous chemicals pause a serious health hazard to the environment and people. The link between sustainable behaviour and firm performance is not straight forward since there are so many variables in the system that are interlinked (interacting) with potential and positive and negative feedback. Different tools and frameworks such as systems thinking, scenario analysis and social-ecological systems approach have been developed and used to analyse complex dynamics of social ecological systems.

5.1 WASTE MANAGEMENT STRATEGIES

Figure 5 below shows the waste management strategies that have been adopted widely in many cities across the globe. There is no single method or panacea in waste management since different products come out of different production chains. For some waste products, it makes sense to use a waste reduction strategy while for others a recycling or recovery strategy may be more appropriate. Therefore, one method can work efficiently for one type of waste while another work perfectly for another type. Although this is the standard way of thinking about waste management, Figure 5 below does not tell us about the amount of waste being extracted from the system. Both waste reduction and re-use may not require energy and are less costly while recycling and waste recovery could be energy intensive and more costly depending on the type of waste being processed.

Waste reduction can be practiced at the source by retail outlets and restaurants by adopting measure that reduce waste such as demand management and forecasting, i.e., estimations of daily sales and quantities purchased in restaurants (Marshall and Farahbakhsh, 2013). Grocery shops have been accused of promoting plastic pollution since they offer single-use or non-durable plastic bags to consumers sometimes for free and even without the consumer asking for it (Filimonau and Gherbin, 2017). Retailers can reduce the quantity of plastic bags distributed to consumers either by hiding them or not offering single-use plastic bags, but instead offer multi-use or alternative packaging that is more durable and can be use several times before being disposed. Waste reduction can also save the company and consumer some money by reducing costs (Wagner, 2017). This strategy is very practical and has been used in restaurants all over the world including developing countries since the benefits are huge to the firm.

FIGURE 5:
WASTE MANAGEMENT STRATEGIES



Source: Authors' own diagram

The strategy of reusing waste is also very common even in developing countries and is generally regarded as cost effective (Girotto et al., 2015). Not all polluting material can be reused and thus this strategy has limited use (Filimonau and Gherbin, 2017). Waste from one sector can be used as an input in the production process of goods and services in another sector. For example, cooking oil from restaurants can be used to make jet fuel in the aviation industry.

Organic waste from restaurants can also be converted into organic fertilizer through composting or used for feeding pets which can generate extra revenue if there is a market for such by-products. Japan is one of the best-case studies in the world where household and retail outlets actively participate and benefit from the waste value chain that is well serviced by the private sector (Chaudhary and Vrat, 2018). Household sell organic and electronic waste to private companies and get income and biogas for heating apartments during the winter season (Nnorom and Osibanjo, 2008). Because of these benefits, households and retailers have adequate incentives to adopt sustainable behaviour such as waste sorting at source which makes it cheaper and more efficient for processing (ibid).

Recycling is perhaps one of the most popular waste management strategy that has been used successfully in the developed world (Chaudhary and Vrat, 2018). This strategy is based on the fact that some of material that can pollute the environment such as glass, paper, cardboard box, electronic and plastic made of polysynthetic fibre can be

recycled into either a similar or a different product (Nnorom and Osibanjo, 2008). For example, glass can be recycled back to glass while cardboard box may be recycled into tissue paper. Sometimes a deposit payment can be attached to recyclable waste which generates incentives along the supply chain, including encouraging the final consumer to behave in a sustainable manner.

Depending on the amount of money charged, a deposit incentive can either induce sustainable behaviour or fail to incentivise the actors in the supply chain (Calcott and Walls, 2005). Sometime the behaviour of an actor might not necessarily be tied to the incentives induced by the deposit payment but other factors such as environmental concerns (Kahhat et al., 2008). For instance, there is little evidence that the deposit payment placed on empty beverage bottles of R1 is informed by research or through a consultative process with all important stakeholders including consumers. As a result, most consumers prefer to dump empty beverage bottles in the municipal bins together with other household waste products since the deposit incentive is too small (Nahman, 2010). The waste recycling industry in South Africa is dependent on poor vendors who play an intermediary role in the value chain by recovering recyclable waste products from street bins and reselling them as a livelihood strategy (Nahman and Godfrey, 2010). Further research is needed in this area to inform the optimal pricing strategy for deposit incentives on recyclable waste products.

Resource recovery using waste as an input material to create valuable products as new outputs (Kahhat et al., 2008). The aim is to reduce the amount of waste generated, thereby reducing the need for landfill space, and optimising the values created from waste (ibid). Zhou et al., (2020) defines waste recovery as any operation the principal result of which is the waste serving a useful purpose by replacing other materials which would otherwise have been used to fulfil a particular function, or waste being prepared to fulfil that function, in the plant or in the wider economy.

Examples of waste recovery practices include stripping Christmas lights, computer cords and other such electrical components for the wires contained within. Other examples include extracting precious metals and other valuable materials from cell phones and electronics. Other than recovering waste products that can be reused for other purposes, this method of recovery works better for valuable waste products such as chemicals where electrolysis is used to recover some elements or metals such as iron ore, aluminium and copper where the smelting process is used to separate the metal from impurities. Like all other strategies, recovery does not work for all waste products and sometimes expertise or specialised equipment is required which translate into huge investments (Chaudhary and Vrat, 2018). The recovery process is economically feasible if the benefits are greater than the costs.

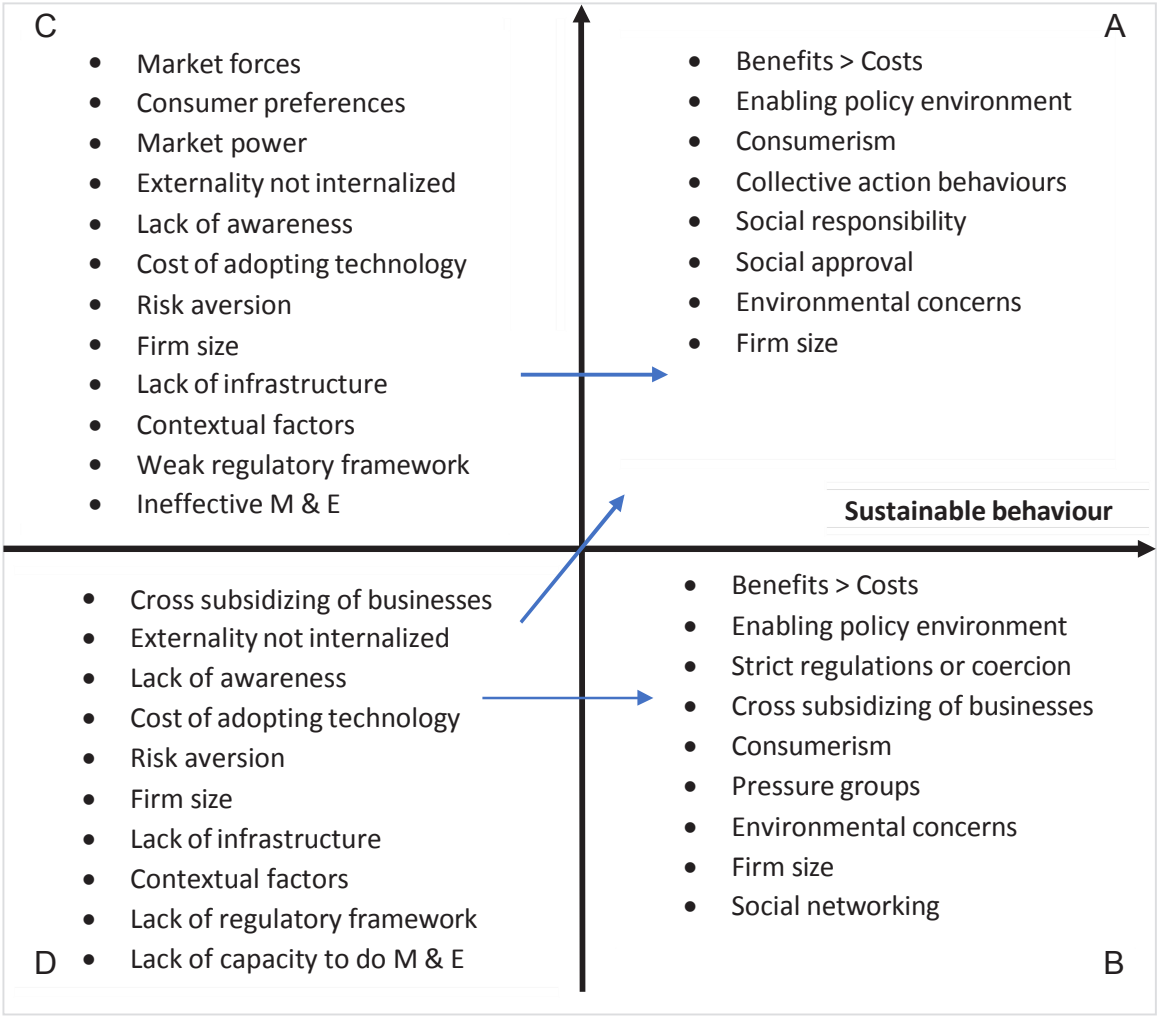
Empirical evidence reveal that the adoption of waste management strategies has not been widespread in South Africa and the city of Cape Town is not an exception to this (Nahman and Godfrey, 2010). The private sector lacks appropriate incentives to encourage participation in the waste value chain. There is a great opportunity for the retail industry to spearhead technology adoption since they generate a huge amount of waste that can generate value to the economy if a vibrant market is created (Mugobo and Ntuli 2021). The waste sector has potential to generate 1 billion rand annually and to create thousands of jobs if the sector can be transformed in such a way that private actors are able to capture value from the activity (Nahman and Godfrey, 2010). We discuss the conditions under which firms will adopt sustainable behaviour in the next section.

5.2 ANALYSIS OF SUSTAINABLE BEHAVIOUR AND BUSINESS PERFORMANCE

This study uses the conceptual framework developed earlier in section 4 to identify variables and analyse the relationship between adoption of sustainable behaviour as a complementary tool to support green infrastructure investment and performance. Figure 6 below shows the analytical framework where the x-axis represents adoption of sustainable behaviour while the y-axis stands for performance measured in terms of social, economic, and ecological viability.

The arrows represent movement from a less preferred position to a more preferred one. Quadrant A is the most ideal case where adoption of sustainable behaviour directly translates into increased performance provided the benefits of doing so are greater than the costs. The conditions in the quadrant must be supported by an enabling environment, consumerism, and other forms collective behaviours. Most of the time, consumer movements and pressure groups such as environmental NGOs force retailers to show good environmental citizenry by adopting sustainable practices (Hardner and Rice 2002). To a larger extent, consumer organisations in South Africa are still focusing on protecting consumers from unfair business practices rather than fighting environmental causes (Nahman, 2010).

FIGURE 6:
RELATIONSHIP BETWEEN SUSTAINABLE BEHAVIOUR AND FIRM PERFORMANCE



ource: Authors' own diagram

In some cases, the running of businesses such as a retail undertakings and restaurants might require social approval (licencing) or certification. Social licencing is an informal mechanism which occurs when the community gives the green light to a business to operate if that business meets certain standards required by the community otherwise community members will withdraw their demand of products from that business in protest for bad behaviour (Russell and Russell, 2010). Social approval can come from consumers or from the business community where other businesses act as constraints to the behaviour of other firms (Wilburn and Wilburn, 2011; Dare et al., 2014). Through collective action and discussion, the community can act as a powerful constraint on the activity of a business (Mugobo and Ntuli, 2021). In Cape Town, the idea of social licencing is not effective since the majority of the consumers are poor, and this affects their ability to self-organise.

Unlike social licencing, certification is a more formal way of making sure that businesses adhere to industry standards. A third party, usually an independent organisation, is responsible for certifying business activities that are consistent with sustainability so that these companies can gain access to certain markets (Poponi et al., 2019). Adoption of sustainable behaviour also stems from environmental concerns of the firm and other attributes such as altruism (caring for others) and bequeath motive (the need to leave a healthy and clean environment for our feature children).

In quadrant B, we have retail businesses and restaurants that have adopted sustainable behaviour, maybe because the benefits of adopting such behaviour outweigh the costs of doing so, but are not performing well socially, economically, and ecologically. An enabling environment is still needed to sustain the firm under these conditions. For some technologies, the adoption of sustainable behaviour does not yield meaningful results at firm level but at industry level which necessitates the need for coercive force (Kong et al., 2016). Sound consumerism, collective action and increasing tension between retailers and pressure groups might force firms to adopt sustainable behaviour because their performance might not be sound ecologically or socially. If firms are not performing well economically, but they have partially or completely adopted sustainable behaviour, then there might be need for developing appropriate policy instruments to incentivize the businesses to behave sustainably, e.g., the provision of tax break on firms that adopt sustainable behaviour or the removal of import duty for firms that import clean technology.

Large firms are able to adopt sustainable behaviour even if the benefits of doing so are outweighed by the costs because of economies of scale which allows these businesses to subsidise other non-profitable activities (Kong et al., 2016). A firm might be forced to adopt sustainable behaviour if it is part of a social network whose objective is to protect the reputation of the network (Haughton and Hunter, 2004). As part of its social capital, retail businesses are forced to sell products that are healthy and produced in an environmentally friendly way in order to maintain relationships since suppliers might not want to associate with businesses that are labelled as environmental unfriendly. Thus, firms might be forced to adopt sustainable behaviour along the value chain even if the network is made up of few influential firms with concern for the environmental.

Firms in quadrant C are characterised by high performance and unsustainable behaviour. This space is a more realistic representation of retail businesses in Cape Town. Market forces, consumer preferences lack of awareness of environmental challenges, risk aversion, firm size and cost of adoption shape the behaviour of firms in this space. The main objective of the firms operating in this space is to maximise profits at the expense of the environment. All this is happening is the presence of a weak regulatory framework, ineffective monitoring and enforcement, high levels of poverty and inequality, poor infrastructural development particularly in some parts of the city. Although larger firms, particularly chain stores and franchises are more likely to adopt sustainable behaviour than small firms, this might not be the case in developing countries since the incentive to maintain a good reputation on the market might not be linked to the firm's ability to prove good environmental husbandry (Marshall and Farahbakhsh, 2013). Self-organisation, consumerism and the role of pressure groups in cultivating sustainable behaviour.

Quadrant D has the least desirable conditions characterised by poor performance and unsustainable behaviour. If the retail businesses operating in this space are not performing well economically, then the usual shut down conditions apply. In the short run, a firm should continue to operate if the price equals or exceeds average variable costs, while in the long-run exiting the industry – should only be undertaken if revenues are unable to cover total costs (Jehle and Reny, 2011). Due to cross subsidisation units, a retail business might keep on operating even if it is hardly making profits. Another potential scenario is when the firm is making some profits economically, but the business activity might not be viable from a social and ecological point of view. Firms in this quadrant also fail to adopt sustainable behaviour due to adoption cost, firm size, lack of awareness, risk aversion, lack of a regulatory framework, lack of state capacity to conduct monitoring and enforcement and other contextual factors. Strict monitoring and enforcement mechanisms are required to force adoption of sustainable behaviour.

6. CONCLUSION AND POLICY PROPOSALS

This paper sought to establish a link between sustainable behaviour as a complement to green infrastructure and firm performance. We developed a conceptual framework and used this framework to identify variables used in the analysis. We observe that achieving both high performance and adoption of sustainable behaviour requires the creation of an enabling environment, consumerism, effort from pressure groups and other forms of collective action behaviours involving both consumers and businesses. Firms are also likely to behave in an unsustainable manner if market forces and consumer preferences dictates the behaviour of firms in such a way that it favours the objective of profit maximisation at the expense of environmental concerns. The same conditions are also achieved when businesses have market power, external costs are not internalised, lack awareness of environmental challenge or their consequences, there are high costs of adoption, high level risk aversion, high inequality and they operate in an environment of poor infrastructure, a weak regulatory environment and ineffective monitoring and enforcement.

In a natural state, self-organisation might eventually occur without external coercion as certain variables in the economy change such as an increase in household income and reduction in unemployment, poverty, and inequality. These are structural variables of the economic system which takes a very long time if not centuries to adjust or move towards the desired level through policy interventions. However, consumerism and self-organisation might not occur with appropriate policy incentives. In the very short-run, awareness campaign, training and strengthening institutions to improve monitoring and enforcement mechanisms is required to force firms to adopt sustainable behaviour. For medium -long term solutions, we propose policy incentives such as tax break and removal of duty on all imports of clean technologies associated with adoption of sustainable behaviour. In the long-run, the creation of an enabling environment might also stimulate the emergency of endogenous and robust institutions such as consumer organisations or other forms of formal and informal collective action involving both consumers and the business sector.

REFERENCES

Adam H. 1995. The politics of ethnic identity: Comparing South Africa, *Ethnic and Racial studies*, 18(3):457-75. Akenji L. 2014. Consumer scapegoatism and limits to green consumerism, *Journal of Cleaner Production*, 63:13-23.

Bălan C. 2021. How Does Retail Engage Consumers in Sustainable Consumption? A Systematic Literature Review, *Sustainability*, 13(1):96.

Beitzen-Heineke EF, Balta-Ozkan N, Reefke H. 2017. The prospects of zero-packaging grocery stores to improve the social and environmental impacts of the food supply chain, *Journal of Cleaner Production*, 140:1528-41.

Bibri, S. E. 2021. Data-Driven Smart Sustainable Cities of the Future: An Evidence Synthesis Approach to a Comprehensive State-of-the-Art Literature Review. *Sustainable Futures*, 100047.

Bruwer J. 2003. South African wine routes: some perspectives on the wine tourism industry's structural dimensions and wine tourism product, *Tourism Management*, 24(4):423-35.

Calcott P, and Walls M. 2005. Waste, recycling, and "Design for Environment": Roles for markets and policy instruments, *Resource and Energy Economics*, 27(4):287-305.

Camerer C. 1998. Bounded rationality in individual decision making, *Experimental economics*, 1(2):163-83.

Carrete L, Castaño R, Felix R, Centeno E, González E. 2012. Green consumer behaviour in an emerging economy: confusion, credibility, and compatibility, *Journal of Consumer Marketing*, 29(7): 470 - 484.

Chaudhary K, and Vrat P. 2018. Case study analysis of e-waste management systems in Germany, Switzerland, Japan and India: A RADAR chart approach, *Benchmarking: An International Journal*,

Cohen N, editor. 2011. *Green cities: An A-to-Z guide*. Sage.

Conlisk J. 1998. Why bounded rationality? *Journal of economic literature*, 34(2):669-700.

Dabija DC, Bejan BM, and Grant DB. 2018. The impact of consumer green behaviour on green loyalty among retail formats. Moravian geographical reports.

Dare M, Schirmer J, and Vanclay F. 2014. Community engagement and social licence to operate, *Impact assessment and project appraisal*, 32(3):188-97.

Deininger KW. 2003. *Land policies for growth and poverty reduction*. World Bank Publications.

Debrah C, Owusu-Manu DG. An apposite framework for green cities development in developing countries: the case of Ghana. Construction Innovation. 2021 Aug 10.

Debrah C, Owusu-Manu DG, Kissi E, Oduro-Ofori E, Edwards DJ. 2020. Barriers to green cities development in developing countries: evidence from Ghana. Smart and Sustainable Built Environment.

Diamantopoulos, A., Schlegelmilch, B. B. Sinkovics, R. R. Bohlen, G. M. 2003. Can socio-demographics still play a role in profiling green consumers? A review of the evidence and an empirical investigation, *Journal of Business Research*, 56(6):465-80.

Dinda S. 2004. Environmental Kuznets curve hypothesis: a survey, *Ecological Economics*, 49(4):431-55.

Engel S, Pagiola S, and Wunder S. 2008. Designing payments for environmental services in theory and practice: An overview of the issues, *Ecological Economics*, 65(4):663-74.

Fiksel J, Sanjay P, and Raman K. 2021. Steps toward a resilient circular economy in India, *Clean Technologies and Environmental Policy*, 23(1):203-18.

Figge, F, and Tobias H. 2012. Is green and profitable sustainable? Assessing the trade-off between economic and environmental aspects, *International Journal of Production Economics*, 140 (1): 92-102.

Filimonau V, and Gherbin A. 2017. An exploratory study of food waste management practices in the UK grocery retail sector, *Journal of Cleaner Production*, 167:1184-94.

Google Maps. 2021. Map of the city of Cape Town. https://www.google.com/maps/place/Cape+Town (Accessed on 22 June 2021).

Hardner J, and Rice R. 2002. Rethinking green consumerism, *Scientific American*, 286(5):88-95. Haughton G, and Hunter C. 2004. *Sustainable Cities*. Routledge.

Girotto F, Alibardi L, and Cossu R. 2015. Food waste generation and industrial uses: a review, *Waste Management*, 45:32-41.

Holden E, Linnerud K, and Banister D. 2014. Sustainable development: Our common future revisited, *Global Environmental Change*, 26:130-9.

Jedliński M. 2014. The position of green logistics in sustainable development of a smart green city, *Procedia-Social and Behavioural Sciences*, 151:102-11.

Jehle GA, and Reny PJ. 2011. *Advanced Microeconomic Theory* (Third). Essex: Pearson Education Limited.

Loiseau E, Saikku L, Antikainen R, Droste N, Hansjürgens B, Pitkänen K, Leskinen P, Kuikman P, Thomsen M. 2016. Green economy and related concepts: An overview, *Journal of Cleaner Production*,139:361-71.

Junior SS, da Silva D, Gabriel ML, de Oliveira Braga WR. 2015. The effects of environmental concern on purchase of green products in retail, *Procedia-Social and Behavioural Sciences*, 170:99-108.

Kahhat R, Kim J, Xu M, Allenby B, Williams E, Zhang P. 2008. Exploring e-waste management systems in the United States, Resources, *Conservation and Recycling*, 52(7):955-64.

Kong D, Feng Q, Zhou Y, and Xue L. 2016. Local implementation for green-manufacturing technology diffusion policy in China: from the user firms' perspectives, *Journal of Cleaner Production*, 129:113-24.

Kuratchenko, MA, Fadario YO, and Belenok I. 2021. "Green cities" in China: philosophy and practice. In E3S Web of Conferences, EDP Sciences, Vol. 296, p. 04004.

Kutty AA, Abdella GM, Kucukvar M, Onat NC, Bulu M. 2020. A system thinking approach for harmonizing smart and sustainable city initiatives with United Nations sustainable development goals, *Sustainable Development*, 28(5):1347-65.

Lindfield M, and Steinberg F. 2012. *Green Cities*. Asian Development Bank.

Malyan RS, and Duhan P, editors. 2018. *Green Consumerism: perspectives, sustainability, and behaviour.* CRC Press.

Mansvelt J, editor. 2011. *Green Consumerism: An A-to-Z guide.* Sage.

Marshall RE, and Farahbakhsh K. 2013. Systems approaches to integrated solid waste management in developing countries, *Waste Management,* 33(4):988-1003.

Merino-Saum A, Clement J, Wyss R, Baldi MG. 2020. Unpacking the Green Economy concept: A quantitative analysis of 140 definitions, *Journal of Cleaner Production*, 242:118339.

Mensah J. 2019. Sustainable development: Meaning, history, principles, pillars, and implications for human action: Literature review, *Cogent Social Sciences*, 5(1):1653531.

McEwan, Cheryl, Alex Hughes, and David Bek. 2015. Theorising middle class consumption from the global South: A study of everyday ethics in South Africa's Western Cape." *Geoforum*, 67: 233-243.

Meng T and Hsu D. 2019. Stated preferences for smart green infrastructure in stormwater management, *Landscape and Urban Planning*,187:1-0.

Mishra, P. and Sharma, P. 2010. Green marketing in India: Emerging opportunities and challenges, *Journal of Engineering, Science and Management Education*, 3(1):9-14.

Montalto FA, Bartrand TA, Waldman AM, Travaline KA, Loomis CH, McAfee C, Geldi JM, Riggall GJ, Boles LM. 2013. Decentralised green infrastructure: the importance of stakeholder behaviour in determining spatial and temporal outcomes, *Structure and Infrastructure Engineering*, 9(12):1187-205.

Nahman A. 2010. Extended producer responsibility for packaging waste in South Africa: Current approaches and lessons learned, Resources, *Conservation and Recycling*, 54(3):155-62.

Nahman A, and Godfrey L. 2010. Economic instruments for solid waste management in South Africa: Opportunities and constraints. Resources, *Conservation and Recycling*, 54(8):521-31.

Nguyen HV, Nguyen N, Nguyen BK, Lobo A, and Vu PA. 2019. Organic food purchases in an emerging market: The influence of consumers' personal factors and green marketing practices of food stores, *International Journal of Environmental Research and Public Health*, 16(6):1037.

Nnorom IC, and Osibanjo O. 2008. Overview of electronic waste (e-waste) management practices and legislations, and their poor applications in the developing countries. *Resources, Conservation and Recycling*, 52(6):843-58.

Ntuli, H and Muchapondwa, E. 2018. The role of institutions in community wildlife conservation in Zimbabwe, *International Journal of the Commons*, 12(1):134.

Ostrom, E. 2007. A diagnostic approach for going beyond panaceas, *Proceedings of the National Academy of Sciences*, 104(39):15181-7.

Ostrom E, Janssen MA, Anderies JM. 2007. Going beyond panaceas. *Proceedings of the National Academy of Sciences*, 104(39):15176-8.

Russell DW, and Russell CA. 2010. Here or there? Consumer reactions to corporate social responsibility initiatives: Egocentric tendencies and their moderators, *Marketing Letters,* 21(1):65-81.

Pakzad P, and Osmond P. 2015. A conceptual framework for assessing green infrastructure sustainability performance in Australia. In Proceeding of the State of Australian Cities (SOAC) National Conference.

Parker J, Simpson GD. 2020. A theoretical framework for bolstering human-nature connections and urban resilience via green infrastructure, *Land*, 9(8):252.

Phipps M, Ozanne LK, Luchs MG, Subrahmanyan S, Kapitan S, Catlin JR, Gau R, Naylor RW, Rose RL, Simpson B, Weaver T. 2013. Understanding the inherent complexity of sustainable consumption: A social cognitive framework, *Journal of Business Research*, 66(8):1227-34.

Poponi S, Colantoni A, Cividino SR, and Mosconi EM. 2019. The stakeholders' perspective within the B corp certification for a circular approach, *Sustainability*, 11(6):1584.

Purvis B, Mao Y, and Robinson D. 2019. Three pillars of sustainability: in search of conceptual origins, *Sustainability Science*, 14(3):681-95.

Schmidheiny S, and Timberlake L 1992. *Changing course: A global business perspective on development and the environment.* MIT press.

Singh B, Keitsch MM, Shrestha M. 2019. Scaling up sustainability: Concepts and practices of the ecovillage approach, *Sustainable Development*, 27(2):237-44.

Steyn NP, Labadarios D, Nel JH. 2011. Factors which influence the consumption of street foods and fast foods in South Africa-a national survey, *Nutrition Journal*, 10(1):1-0.

Todd PM, and Gigerenzer G. 2003. Bounding rationality to the world, *Journal of Economic Psychology,* 24(2):143-65.

Verster C, and Bouwman H. 2020. Land-based sources and pathways of marine plastics in a South African context, *South African Journal of Science*,116(5-6):1-9.

Wagner TP. 2017. Reducing single-use plastic shopping bags in the USA, *Waste Management*, 70:3-12.

Weimann A, and Oni T. 2019. A systematised review of the health impact of urban informal settlements and implications for upgrading interventions in South Africa, a rapidly Urbanising middle-income country, *International Journal of Environmental Research and Public Health*, 16(19):3608.

Wilburn KM, and Wilburn R. 2011. Achieving social license to operate using stakeholder theory, *Journal of International Business Ethics*, 4(2).

Young W, Russell SV, Robinson CA, and Barkemeyer R. 2017. Can social media be a tool for reducing consumers' food waste? A behaviour change experiment by a UK retailer, *Resources, Conservation and Recycling*, 117:195-203.

Zhou G, Gu Y, Wu Y, Gong Y, Mu X, Han H, Chang T. 2020. A systematic review of the deposit-refund system for beverage packaging: Operating mode, key parameter and development trend, *Journal of Cleaner Production*, 251:119660.