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Considerations, benefits and unintended consequences of banning plastic shopping bags for environmental sustainability: A systematic literature review

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Abstract

Although the ban on plastic bags is gaining in prominence as a policy option to manage plastic bag litter, there are mixed views on its rationale and effectiveness. This study employs a systematic literature review to understand considerations, benefits and unintended consequences of banning plastic bags. The review's results pointed to the limited success of a plastic bag ban owing to lack of suitable alternatives, limited state capacity to monitor and enforce the ban, thriving black market, structural and instrumental power of the plastic industry. The power of the industry was manifested by the covert practice of deflecting accountability to consumers by focusing on business-oriented solutions, including an inclination towards self-regulation. The findings of this study underscored the need for a global treaty to address the transient nature of plastic bag litter and moving away from the symbolic gesture of targeting only plastic shopping bags but considering the environmental impact of all forms of plastic such as straws, foamed plastics, plastic bottles and caps. There is a general consensus in literature that the end of plastic shopping bags is not nigh due to their utilitarian benefits. This study therefore recommends the promotion of a circular economy focusing on ecological modernisation, sustainable plastic bag manufacturing and recovery strategies such as recycling as a long-term strategy. A significant strand of literature reviewed also recommends the adoption of community-driven approaches such as voluntary initiatives as opposed to a plastic bag ban as they proved to be effective in promoting environmental citizenship behaviours in countries such as Finland.

Keywords

Plastic bag ban, plastic bag governance, circular economy, systematic literature review

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Introduction

Single-use plastic shopping bags (SUPBs) are a significant source of environmental pollution (Jambeck et al., 2015; Xanthos and Walker, 2017). Improperly disposed SUPBs clog waterways resulting in flooding (Martinho et al., 2017), impair the visual appeal of landscapes (Xanthos and Walker, 2017) and reduce the recreational value of seashores (Jory et al., 2019). The magnitude of this problem has resulted in the growing tide of an anti-plastic bag sentiment characterised by the implementation of several interventions that include bans, taxes, nudges and voluntary initiatives (Clapp and Swanston, 2009). In this regard, the plastic bag tax and plastic bag ban emerged as the most commonly employed tools (Rivers et al., 2017). In Europe, guided by Directive 2015/720, which required European Union countries to achieve a target of 40 plastic bags per capita by 31 December 2025, a plastic bag tax is the popular policy instrument (European Commission, 2017). This explains why the majority of empirical studies in Europe focused on the efficacy of the plastic bag tax as a plastic bag governance tool (Convery et al., 2007; Martinho et al., 2017; Oosterhuis et al., 2014).

In contrast to the plastic bag tax that was predominantly adopted by European Union members, the majority of countries in Asia and Africa implemented a plastic bag ban (PBB). Bangladesh, India, Taiwan and China pioneered the implementation of a PBB in Asia (Gupta, 2011; He, 2012; Larsen and Venkova, 2014). Floods forced the implementation of a ban in Bangladesh in 2002, while China was motivated by the need to reduce coastal litter and the desire to host 'green' Olympic Games in 2008 (He, 2012). As of 31 December 2018, more than 25 African countries had implemented a PBB (UNEP, 2018a), becoming the continent with the largest number of PBB in the world. In North America, a PBB was mainly introduced by states

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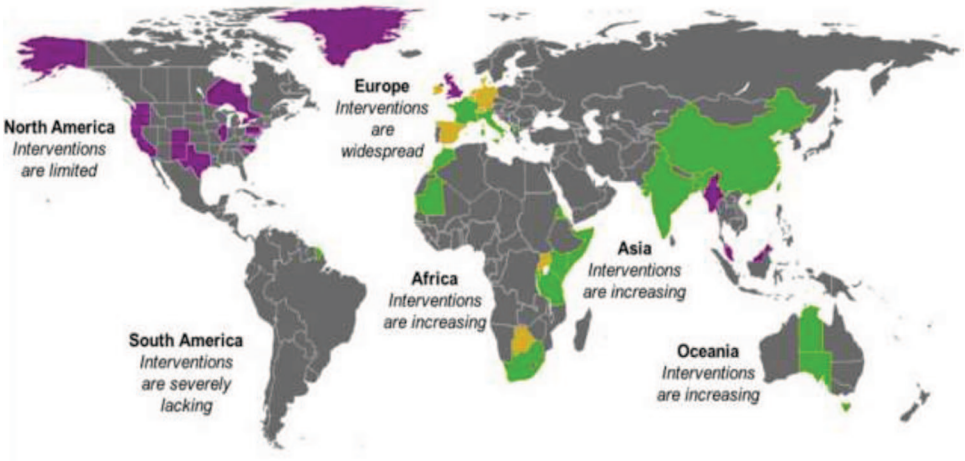

Figure 1. Countries with a plastic bag ban.
Source: Xanthos and Walker (2017).

such as California, Hawaii and New York (Nielsen et al., 2019), while Australian states (e.g. South Australia, Tasmania and Australia Capital Territory) and Papua New Guinea introduced the ban in Oceania (UNEP, 2018a). In South America, Brazil (Sao Paulo) and Argentina (Buenos Aires) introduced the ban while Chile opted for voluntary initiatives (Larsen and Venkova, 2014; Macintosh et al., 2020). Figure 1 provides a map of countries with a PBB, while specific names and timeframes are provided in Appendix 1.

A PBB prohibits the manufacturing, importation and selling of plastic bags that do not meet recommended thickness thresholds (Rivers et al., 2017). The PBB targets ultra-thin, non-biodegradable plastic bags used in the grocery retail sector (Clapp and Swanston, 2009). The thickness thresholds however vary across jurisdictions from less than 30 μm to 100 μm (Larsen and Venkova, 2014). A PBB is regarded as a punitive, command-and-control approach of addressing plastic shopping bag litter (Macintosh et al., 2020), and has triggered divergent views on its rationale and effectiveness. Proponents of the PBB such as McLellan (2014) and Behuria (2019) consider bans to be the most effective tool to manage the burgeoning problem of plastic bag litter. On the other hand, the PBB is criticised for causing shopping inconvenience Wagner (2017), failing to consider the influence of shopping occasions (He, 2012), increasing shopping cost owing to expensive alternatives (Coulter, 2009), focusing on short-term benefits (Zhu, 2011), triggering deviant behaviours such as illegal dumping (Taylor, 2019), imposing an enforcement burden on national governments (He, 2012), and causing negative economic impacts such as job losses and plastic industry disinvestment (Klick and Wright, 2012; Stephenson, 2018).

To date, empirical studies on PBB (Macintosh et al., 2020; McLellan, 2014; Xing, 2009; Zhu, 2011) have been confined to specific municipalities or countries. While such studies permit an assessment of the effectiveness of the PBB based on contextual realities, the comparative quality of gleaning best practices from multiple scenarios is lost. Given the transient nature of plastic bag pollution (Vince and Hardesty, 2017), this study argues that a holistic approach that harnesses best practices in several jurisdictions is critical in assessing the effectiveness of a PBB. To this end, this study adopts a systematic literature review with the overreaching objective of assessing the considerations, benefits and unintended consequences of PBBs implemented in several jurisdictions. This study also intends to understand current research gaps and provide input to the development of current and long-term plastic bag policies. A systematic literature review was preferred for this study because it is recommended for public policy studies (Saunders et al., 2012).

This study contributes to the environmental sustainability debate by addressing the following key objectives: (a) to understand considerations influencing adoption and implementation of a PBB as a policy option; (b) to delineate the benefits and unintended consequences of PBB; and (c) to suggest strategies for managing the problem of SUPB litter. The remainder of this article is structured as follows: The next section discusses the research methodology. Thereafter the results, implications, limitations and conclusion are presented.

Materials and methods

A systematic literature review was employed to achieve the research objectives. It involved a predetermined, comprehensive approach of searching, analysing and synthesising extant literature on plastic bag bans with the objective of drawing conclusions and identifying research gaps. A systematic literature review was used as it is recommended for public policy studies (Saunders et al., 2012) and it permits replicability (Denyer and Tranfield, 2009). It was also a preferred methodology in previous studies on plastic bag policies (Pietzsch et al., 2017; Rivers et al., 2017; Xanthos and Walker, 2017). The review focuses on PBB implemented at both national and municipal level, and was operationalised by developing the PRISMA checklist recommended by Denyer and Tranfield (2009) and Moher et al. (2009). The beginning of January 2002 was identified as the base year, up to December 2020. In 2002, Bangladesh and India became the first

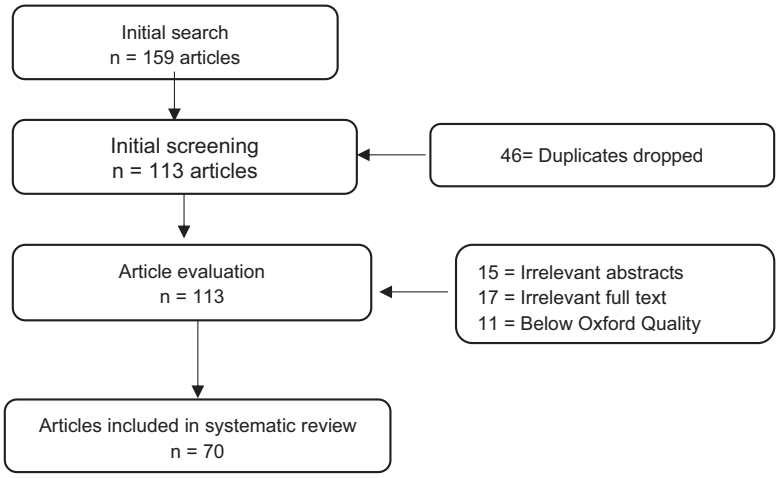

Figure 2. Article selection flow diagram.

countries to introduce plastic bag ban legislation (Synthia and Kabir, 2015).

The first stage of the review involved the definition of the research objectives, which were to understand the considerations, benefits and unintended consequences associated with banning plastic shopping bags. The next stage involved database selection. Following the example of Pietzsch et al. (2017) and Xanthos and Walker (2017), databases that publish peer-reviewed articles and proceedings on environmental sustainability such as Science Direct, Scopus, ProQuest, Google Scholar, Emerald Insight, EBSCO Host and Web of Science were selected. Working papers, book chapters and environmental reports from reputable institutions such as the United Nations Environment Programme, European Commission, World Economic Forum, Greenpeace, Earth Policy Institute, PlasticsEurope and EuroCommerce were also considered following established practice (Nielsen et al., 2019; Xanthos and Walker, 2017). Grey literature from print and online newspapers was not included owing to validity and reliability concerns. The second step involved the identification of key search words. Plastic bag ban, plastic bag policies, plastic bag regulations, plastic bag interventions, and plastic bag ordinances were identified as search terms and phrases. The third stage involved article search. Articles were manually searched from the selected databases. A total of 159 potential articles emerged from the search.

The fourth stage involved the selection of compatible articles and evaluation. The selection process involved carefully checking search terms in the titles, key words, abstracts and full texts of the extracted articles. To be included in the review, the article had also to be aligned with the research objectives. Articles focusing on plastic bag hazards, solid waste management and anti-plastic bag tools such as taxes, nudges and voluntary initiatives were excluded. Forty-six duplicate articles were dropped; 15 articles were further dropped for having irrelevant abstracts. After reading and analysing the full texts, an additional 17 articles were found to be inappropriate. The remaining articles were further evaluated by three independent researchers for methodological quality, using the Oxford Quality Scale (Jadad et al., 1996). This was done by reading and analysing the titles, abstracts and full texts. A minimum score of 3 out of 5 was required for the inclusion of an article in the study. Eleven more articles were dropped for scoring below the minimum threshold of the Oxford Quality Scale. Figure 2 provides a graphical depiction of the inclusion and exclusion criteria for reviewed articles.

The last stage involved data extraction and aggregation. This was done by following Lincoln and Guba's (1985) content analysis procedure. The selected articles were critically evaluated by three independent researchers focusing on three aspects: considerations, benefits and unintended consequences of banning plastic bags. The aggregation process was done by comparing, integrating and summarising themes that emerged from the systematic review process. The themes that emerged were independently confirmed by three researchers, thereby enhancing the credibility and rigour of the study findings. The distribution of the reviewed articles was to a greater extent representative of the continents where PBBs were implemented, that is, Africa, Asia and Europe, thereby enhancing the study's generalisability. The findings were categorised under four themes: considerations for PBBs, benefits of PBBs, impact of PBBs, and unintended consequences of PBBs. Table 1 provides a list of articles that were considered for systematic review.

Results

This section provides the results from the systematic literature review, focusing on the considerations, benefits, effectiveness and unintended consequences of PBB.

Considerations for PBB

The implementation of a PBB policy is justified on the basis of negative externalities posed by SUPBs (Thompson et al., 2009; Vince and Hardesty, 2017). Content analysed from the sampled articles identified environmental, economic and social factors as the main drivers for PBBs. It was evident from the literature reviewed that SUPBs are more than an environmental issue: the

Table 1. Systematic literature review – selected articles.

Journal	No. of articles	Authors
Marine Pollution Bulletin	7	Carman et al. (2015) Schnurr et al. (2018) Latinopoulos et al. (2018) O'Brine and Thompson (2010) Derraik (2002) Jang et al. (2014) Gall and Thompson (2015)
Waste Management	5	Wagner (2017) Nielsen et al. (2019) Ayalon et al. (2009) Wagner and Broaddus (2016) Nielsen et al. (2019)
Ocean and Coastal Management	2	Oosterhuis et al. (2014) McIlgorm et al. (2011)
Marine Policy	2	Willis et al. (2018) Jambeck et al. (2018)
Resources, Conservation & Recycling	2	Macintosh et al. (2020) Alarm et al. (2018)
Environment Science & Policy	2	Tessnow-von Wysocki and Le Billon (2019) Alpizar et al. (2020)
Journal of Environmental Economics & Management	1	Taylor et al. (2019)
Habitat International	1	Oyake-Ombis et al. (2015)
Geoforum	1	Njeru (2006)
Waste Management & Research	1	Kasidoni et al. (2015)
Journal of Business Ethics	1	Carrigan et al. (2011)
Environmental Politics	1	Clapp and Swanston (2009)
Global Environmental Change	1	Dauvergne (2018)
Environment and Development Economics	1	He (2012)
Science of the Total Environment	1	Heidbreder et al. (2019)
Science Advances	1	Geyer et al. (2017)
African Journal of Environmental Science & Technology	1	Rayne (2008)
City & Environment Interactions	1	Kwori (2019)
Sustainability	1	Kloblauch et al. (2018)
Environmental Pollution	1	Steensgaard et al. (2017)
Economic Affairs	1	Kish (2018)
Environmental Law and Policy Review	1	Godman (2013)
Packaging Technology and Science	1	Lewis et al. (2010)
Fashion Practice	1	Chida (2011)
Gender & Society	1	Braun and Traore (2015)
Social Transformations in Contemporary Society	1	Karlaite (2016)
International Journal of Consumer Studies	1	Ritch et al. (2009)
Third World Quarterly	1	Death (2015)
Economics & Environment Policy Brief	1	Gupta (2011)
International Journal of Development & Sustainability	1	Chitotombe (2014)
Applied Economic Perspectives & Policy	1	Taylor and Vilas-Boas (2016)
Energy Proceedings	1	Zhu (2011)
Journal of Sustainable Development	1	Xing (2009)
Restorative Ecology	1	Vince and Hardesty (2017)
Philosophical Transactions: Biological Sciences	1	Thompson et al. (2009)
International Journal of Hydrogen Energy	1	Silvarrey and Phan (2016)
Science	1	Jambeck et al. (2015)
William & Mary Law Review	1	Coulter (2009)
University of Memphis Law Review	1	Warner (2009)
Tulane Environmental Law Journal	1	Romer and Tamminen (2014)
GDI Working Paper	1	Behuria (2019)

(Continued)

Table 1. (Continued)

Journal	No. of articles	Authors
United Nations Environment Programme (UNEP)	3	UNEP (2009); UNEP (2018a, 2018b)
European Commission	1	European Commission (2018) Report
Greenpeace International	1	Greenpeace International (2007)
Conference paper	1	Klick and Wright (2012)
Plastic Bag Report	1	Larsen and Venkova (2014)
Wastecon conference paper	1	McLellan (2014)
Conference paper	1	Reazuddin (2006)
Book chapter	1	Stephenson (2018)
Earth Policy Institute	1	Larsen and Venkova (2014)
Victorian Government, Melbourne report	1	Marsden Jacob Associates (2016)
Conference paper	1	Macintosh et al. (2018)
World Economic Forum Report	1	World Economic Forum (2016) Report
Ocean Conservancy Report	1	Ocean Conservancy (2017)
Total	70	

economic and social costs of using such bags are as much part of the considerations for plastic bans as is their environmental impact. Included under 'economic concerns' are the costs of managing plastic bag litter, and the costs associated with repairing clogged waterways, both of which come with high opportunity costs, as they deprive citizens of funds that could have been used to provide other much-needed services. Furthermore, the pollution of land, including coastlines, results in a loss of tourism income. And, considering that plastic bags are a petroleum derivative, SUPBs are a wasteful way of using up precious oil resources. Negative social effects include adverse health effects on both humans and animals. Table 2 summarises the articles discussing the considerations for banning plastic shopping bags.

Benefits of plastic bag bans

The implementation of PBBs is rationalised by more than the concerns associated with the negative effects of using SUPBs. For example, banning SUPBs can promote a circular economy, for example economic activities aimed at eliminating waste through the continual use of resources, among other ways. Thus economic, environmental and social benefits are expected from banning plastic bags (Kloblauch et al. 2018; Muralidharan and Sheehan 2016). Table 3 summarises the benefits of PBBs.

Effectiveness of plastic bag bans

While many benefits may be expected from PBBs, the impact of any public policy – including a PPB – needs to be assessed in order to justify its implementation. The articles reviewed pointed to the limited success of such initiatives, as well as a general lack of detailed data for a proper impact assessment (UNEP, 2018b). The limited availability of data renders efforts to quantify the economic and social impact of the ban difficult (Macintosh et al., 2020; Xanthos and Walker, 2017). Equally, there is limited data from the reviewed articles on the environmental impact in areas such as reduced ingestion and entanglement of micro-plastics by animals in land and marine environments before and after the ban (Thompson et al., 2009; Vince and Hardesty, 2017). Several factors were identified during the review to contribute to the failure to implement PPBs effectively. These included a lack of business support, with some businesses advocating against such bans. Moreover, businesses that support banning SUPBs, especially those in the retail industry, are often accused of profiteering from the alternatives by charging high margins. In the end, this discourages consumers from taking up the alternatives to SUPBs. Community support captures general support of the ban by members of the public, while green consumerism focuses on specific support from consumers in adopting green habits. The plastic litter category looks at the impact from the perspective of the general reduction (or not) of the problem of plastic littering, while green innovation focuses specifically on the impact of green economic activities. Table 4 presents a summary of the findings relating to the impact of PBBs in different countries.

Unintended consequences

The review showed that an outright ban on plastic bags triggered a host of challenges that were unforeseen during the policy's promulgation. Examples of such unintended consequences included job losses resulting from disinvestments in the plastic industry, health and hygiene problems resulting from the increased use of unwashed reusable shopping bags. Moreover, profiteering by retailers and entrepreneurs through the sale of bags with unsubstantiated environmental claims tended to also escalate with PBBs. Table 5 provides a list of the unintended consequences of PBBs from the reviewed articles.

Discussion of results

A systematic literature review was conducted to understand the considerations, benefits, impacts and unintended consequences of the plastic bag ban policy. There was a broad consensus in the reviewed literature that environmental, economic and social

Table 2. Considerations for plastic bag bans.

Theme	Theme specifics
Environmental factors	About 50% of SUPBs are discarded after only single use, causing air, land and water pollution (Clapp and Swanston, 2009; Mathalon and Hill, 2014; Xing, 2009). Global carbon emissions from SUPBs litter range from 100 to 300 million tonnes per year (Silvarrey and Phan, 2016). An estimated 8.4 million tonnes of plastic bag litter contaminate oceans every year; 46,000 plastic fragments float per each square mile of the ocean (Jambeck et al., 2015; UNEP, 2018a). Accumulation of plastic litter is typified by the Great Pacific Garbage Patch and the North Atlantic Sub-Tropical Gyre (Goldstein et al., 2012; Morritt et al., 2014). SUPBs take over 500 years to biodegrade and this constrains landfill capacity (Karlaite, 2016; Oyake-Ombis et al., 2015). 31% of plastic bag litter is deposited in landfills, constraining landfill capacity (PlasticsEurope, 2015). In Baltic and North Sea, plastic accounts for approximately 70% of total marine litter (Oosterhuis et al., 2014).
Economic factors	Cost of managing plastic bag litter is massive (Jambeck et al., 2015; Macintosh et al., 2018). Tourism revenue worth US$29–37 million was lost due to pollution of Geoje Island (Jang et al., 2014). In 2008, cost of clearing the Asian Pacific Coast was US$1.26 billion per annum (McIlgorm et al., 2011). In China, the economic cost of regulating litter was 18.5 million yuan per year (He, 2012). In Sweden, marine debris on beaches reduced tourism by 1–5% (OSPAR, 2009). UK municipalities spend almost €18 million each year removing beach litter (Wagner and Broaddus, 2016). In Canada, the cost of cleaning marine ecosystems was US$13 billion. Banning plastic bags will save 4% of global oil consumption (Thompson et al., 2009). Plastic bag ban is necessitated by low global recycling rate estimated at 1% (Rivers et al., 2017). Cost of repairing clogged waterways (Oyake-Ombis et al., 2015). NB: In most instances the economic cost of managing plastic litter is aggregated to include all forms of plastic litter. However, plastic bag litter is known to contribute more than 60% of overall plastic litter (Jambeck et al., 2015, 2018).
Social factors	More than 200 species of marine animals are susceptible to ingest plastic debris in their life (Thompson et al., 2009). 17% of species affected by plastic entanglement and ingestion are listed as endangered (Gall and Thompson, 2015; Willis et al., 2018). Loss of over 70% of livestock due to ingestion in Mauritania (Jambeck et al., 2018). In 2018, a whale died in southern Thailand after ingesting lots of plastic bags (Zachos, 2018). Severe floods that occurred in Dhaka, Bangladesh in 1989 and 1998 were worsened by the presence of plastic bags that blocked the drainage systems (Synthia and Kabir, 2015). Use of plastic bag toilets had adverse public health effects in Kenya (Clapp and Swanston, 2009; Njeru, 2006). Discarded plastics provide breeding ground for malaria-causing mosquitoes in developing countries (Chitotombe, 2014; Kwori, 2019; Oyake-Ombis et al., 2015). Human exposure to toxic phthalates when consuming seafood (Reazuddin, 2006; Thompson et al., 2009).
Political and civic organisations	UN 2030 Agenda for Sustainable Development, Greenpeace, Global Partnership on Marine Litter, G7 Action Plan to Combat Marine Litter and Ocean Conservancy (UNEP, 2018b). In Kenya, civic society supported by UNEP and Nobel Prize winner Wangari Maathai pushed for the plastic bag ban (Njeru, 2006).

SUPB: single-use plastic bag; UNEP: United Nations Environment Programme.

factors were the main motivating drivers of a plastic bag ban policy (Oyake-Ombis et al., 2015; Xing, 2009; Zhu, 2011). As shown in Appendix 1, there are variations in the success rate of plastic bag bans, ranging from minimal success in India, Bangladesh and Bhutan to remarkable success in the cases of Australia and Rwanda. China, The Gambia, Mali, Niger, Tanzania, Uganda and Zimbabwe are still struggling to enforce the plastic bag ban (UNEP, 2018a). For example, bans were announced in Mali in 2012 and in Tanzania in 2016; but by December 2019 they were yet to be implemented. China and India continue to be the largest contributors of plastic bag litter, pointing to the limited success of the ban (Jambeck et al., 2015).

The literature reviewed attributed the limited success rate of the various bans to a lack of stakeholder support, the absence of a global treaty, and lapses in enforcement and monitoring (Dauvergne, 2018; He, 2012). Incidences of consumer and business disobedience in the form of reluctance to comply with the ban were reported in China, India, Kenya, Uganda and Zimbabwe

Table 3. Benefits of plastic bag bans.

Theme	Theme specifics
Economic benefits	Substantial amount of petroleum used to manufacture plastic bags (Rivers et al., 2017; Taylor and Villas-Boas, 2016; Zen et al., 2013).
	Prior to the lawsuits that outlaw the plastic bag ban, retailers in California were able to reduce estimated packaging costs of $140 million per year (UNEP, 2018a).
	Objective of promoting ecological modernisation premised on circular economy, green growth, resource saving and efficiency through recycling and green reverse logistics not yet realised in developing countries such as Rwanda, Kenya, South Sudan, Somalia due to lack of recycling infrastructure and incentives to industry such as subsidies (Behuria, 2019; Death, 2015; Kloblauch et al., 2018).
	Green entrepreneurship emerged as a promising business opportunity, although it is being tainted by the use of unsubstantiated environmental claims in most developing countries (Kwori, 2019; Stephenson, 2018).
Environmental benefits	The ban was effective in reducing the use of SUPBs in Rwanda. It was awarded the prestigious United Nations Scroll of Honour Award for its commitment to curb plastic bag litter (Larsen and Venkova, 2014).
	No significant reduction in global environmental pollution. China and India continue to be the largest contributors to marine plastic bag litter despite implementation of plastic bag ban (Dauvergne, 2018; Jambeck et al., 2018; Xanthos and Walker, 2017).
Social benefits	Enhanced public health in Kenya as the use of unhygienic plastic bag toilets was reduced (Njeru, 2006; UNEP, 2018a).
	Promotion of reusable shopping bags created employment opportunities (Behuria, 2019; Larsen and Venkova, 2014).
	In Bangladesh, China and USA the ban was regarded as a form of social injustice as other cities were exempt (Larsen and Venkova, 2014; Newman et al., 2015; Synthia and Kabir, 2015).

SUPB: single-use plastic bag.

(Chitotombe, 2014; Death, 2015; He, 2012). Consumer concerns centre on the inconvenience associated with the ban, especially with unplanned buying behaviour and the high cost of alternatives such as reusable shopping bags (Coulter, 2009; Wagner, 2017). Critics of reusable shopping bags doubt the credibility of their claimed environmental benefits (Muthu et al., 2013). Such doubts are encouraged by the lack of a universally acceptable instrument for measuring the ecological characteristics of reusable plastic shopping bags (UNEP, 2018b). The literature also highlighted concerns about the use of paper bags as an alternative. For instance, although paper bags easily biodegrade, they consume more energy in production than do plastic bags (Macintosh et al., 2018; Wagner, 2017).

The literature also indicated that the effective implementation of a PBB is undermined by the unbridled power of large corporates (Dauvergne, 2018). Several articles showed that the majority of businesses rejected the plastic ban outright by deflecting accountability for plastic bag litter to national governments, lobbying for business-centred solutions, and – in some instances – advocating for self-regulation. In Kenya, business's power led to the postponement of a plastic bag ban more than five times (Njeru, 2006). The literature reviewed also showed that powerful companies often circumvent the ban by negotiating directly with government. A typical example is Rwanda, where RAMCO and Bobmil Industries were granted special permits to produce plastics for selected sectors (Behuria, 2019). Companies in the plastic industry rationalise their pro-plastic bag stance by citing the fear of job losses, the threat of disinvestment and the failure of government to provide incentives and subsidies for the production of sustainable alternatives (Behuria, 2019; Clapp and Swanston, 2009). For this reason, Clapp and Swanston (2009) argue that the success rate of PBBs largely depends on the structural power of the plastic industry and the profile of the consumer market. For example, He (2012) notes that a ban can be more easily enforced in a formalised retail system than in an open market system. In the latter case, found in most developing economies, the competitive retail environment often compels marketers to offer plastic bags to entice shoppers to buy their merchandise.

The complexity of plastic bag governance emerged from the reviewed literature as one of the key issues. One glaring challenge relates to the absence of a global treaty against plastic bags. This has led to variation in thickness thresholds of plastic bags subjected to the ban. For instance, in Kenya and Mozambique plastic bags of less than 30 μm were targeted, while in Rwanda the focus was on non-biodegradable bags of less than 100 μm (Nielsen et al., 2019). In the EU, Directive 2015/720 addressed plastic bags of 15–50 μm (European Commission, 2017).

This makes it a challenge to manage the trans-boundary nature of plastic bag pollution. The reviewed articles showed that some countries enacted PBBs without any formal agreements with other countries. This results in excessive plastic bag leakages (Taylor, 2019). For instance, in Cameroon, Rwanda and Zimbabwe, plastic bags were smuggled from neighbouring countries when the ban was enforced (Behuria, 2019; Chitotombe, 2014). Articles also showed a variation in the thickness thresholds for the banned plastic bags. The literature also noted that the PBB policy remains uncoordinated, fragmented and uneven in its implementation (Dauvergne, 2018). Evidence from the reviewed

Table 4. Impact of plastic bag bans.

Indicator	Indicator specifics
Business support	EuroCommerce, PlasticsEurope, trade unions and Plastic Bag Manufacturers Associations opposed the ban based on the lack of subsidies to promote sustainable business models. EuroCommerce proposed the use of market-based tools such as taxes, nudges and use of voluntary initiatives (Behuria, 2019; Braun and Traore 2015; EuroCommerce, 2014; PlasticsEurope, 2015).
	Lawsuits delayed the implementation of ban in USA, California. Business resistance in California resulted in 'banning the ban' campaign (Knoblauch et al., 2018; Stephenson, 2018).
	In Uganda, Kenya, Mali, Bhutan, California, China and India enforcement was weakened by the structural power of plastic bag manufacturers (Braun and Traore, 2015; Gupta, 2011; Oyake-Ombis et al., 2015; Zhu, 2011).
	In Italy, the regulation has not been fully implemented due to litigations by retailers and plastic bag manufacturers (Larsen and Venkova, 2014).
Community support	The ban received widespread support in the Australian Capital Territory and in Rwanda. Community-based environmental campaign called Umganda was instrumental in the success of the ban (Behuria, 2019; Macintosh et al., 2018; McLellan, 2014).
	In Guinea-Bissau, there was a lack of community support owing to a lack of awareness and consultation. In Kenya, Nairobi's Burma Market was shut down owing to non-compliance with the ban (Behuria, 2019; UNEP, 2018a).
Green consumerism	Demand for environmentally friendly paper bags increased by 40% in California (Stephenson, 2018; Taylor and Villas-Boas, 2016).
	Use of plastic bags developed from biomass increased in Italy (UNEP, 2018a).
	The use of reusable shopping bags increased in Rwanda (Behuria, 2019).
	A lack of cheaper and convenient alternatives to SUPBs cited in Rwanda.
	Lack of suitable and cheap alternatives led Cameroon nationals to smuggle plastic bags from neighbouring countries. In Mozambique, shoppers were directed to use inconvenient alternatives such as baskets made from grass and coconut trees (UNEP, 2018a).
Plastic litter	In 2008, Rwanda's commercial capital Kigali was one of the nominees of the cleanest city award by UN Habitat (Behuria, 2019).
	Sao Paulo, Brazil recorded a 70% reduction after one year (UNEP, 2018a).
	In Bhutan, Guinea-Bissau, Ethiopia, Niger, Tanzania and Somalia no noticeable effect due to poor implementation (Nielsen et al., 2019).
	In China, the rollout of the PBB resulted in 49% reduction in plastic bag consumption after 4 months (He, 2012).
	In 2011, a ban in Italy resulted in 50% reduction in use of plastic bags (Nielsen et al., 2019).

PBB: plastic bag ban; SUPB: single-use plastic bag.

articles also points to the importance of developing strict implementation guidelines and enforcement of the ban. For example, the success of Rwanda's PBB is attributed to sound leadership, since the ban was linked to the country's Vision 2020. Its implementation involved a $150 fine or one year's imprisonment for carrying a plastic bag, and luggage searches at ports of entry (Behuria, 2019).

The literature also highlighted the unintended consequences of PBB. In particular, PBB was found to have the effect of transferring plastic bag consumption from the regulated public sphere to illegal private spheres (Njeru, 2006; Stephenson, 2018). According to Heidbreder et al. (2019), pressuring citizens to comply with PBB has the effect of triggering the moral hazard of unobservable behaviours, such as illegal dumping. Further, instances of the smuggling of plastic bag imports were cited in Rwanda and Zimbabwe (Behuria, 2019; Chitotombe, 2014). There are also concerns that the ban has triggered the unethical behaviour of opportunistic retailers and entrepreneurs who sell shopping bags using unsubstantiated environmental claims (Stephenson, 2018; Taylor and Vilas-Boas, 2016). The PBB has also been contested on health grounds. For instance, Klick and Wright (2012) note that reusable bags need to be thoroughly washed to minimise the bacterial contamination of groceries. The PBB is also criticised for imposing a monitoring and enforcement burden on national governments, often with hefty costs (Stephenson, 2018). The PBB, according to Wagner (2017), has also resulted in the increased consumption of non-banned plastic bags in retail sectors such as clothing, which has the effect of negating the intended gains.

Another key finding from the literature is a lack of consensus on the rationale for a PBB. In view of growing evidence that the age of plastics is still with us, EuroCommerce (2014), Stephenson (2018) and Behuria (2019) argue that a ban will not succeed with weak waste management infrastructure, institutions and without support from strong social norms. The high cost of ban enforcement and monitoring also makes a ban unsustainable in the long term (EuroCommerce, 2014; He, 2012). To address this, He (2012) suggests that the challenges attributed to plastic bags, such as littering behaviour and pollution, can be easily changed through education and engagement. Findings from environmental psychology can be used to develop behavioural change strategies. Regulations have the inherent challenge of crowding out

Table 5. Unintended consequences of plastic bag bans.

Consequences	Consequences – specifics
Economic challenges	Job losses, disinvestment in the plastic industry. Internationally, ban was estimated to affect 62,000 companies, 1.45 million job losses and US$350 billion revenue loss (Karlaite, 2016).
	Kenyan Association of Manufacturers reported a 60–90% job loss in the plastic industry (Behuria, 2019).
	Juiping Huaqiang Plastics, a leading plastic manufacturing company in China laid off thousands of employees (He, 2012).
Hygienic problems	12 people were reported dead in San Francisco from *E. coli*, a foodborne bacteria related to the use of unwashed reusable shopping bags (Klick and Wright, 2012).
Profiteering by retailers and entrepreneurs	Entrepreneurs such as Gahaya Links, Bonus industries and SRB Investments in Rwanda, Earthwise Bag Company in California, Bobmil Industries and RAMCO in Kenya were accused of profiteering from alternatives such as reusable bags (Behuria, 2019; Stephenson, 2018; Taylor and Villas-Boas, 2016).
	The proliferation of reusable shopping bags with unsubstantiated environmental claims in Kenya, China and Uganda (Behuria, 2019; He, 2012; Njeru, 2006).
Plastic bag black market	Smuggling of plastic bags from countries without bans was reported in Rwanda, Kenya and Zimbabwe (Behuria, 2019; Chitotombe, 2014; Njeru, 2006).
	National governments losing tax revenue due to the growth of plastic bag black market (Behuria, 2019; Chitotombe, 2014; Taylor, 2019).
	In Bangladesh, the ban was offset by the introduction of various types of plastic bags (Newmann et al., 2015; Synthia and Kabir, 2015).
Civil and industry disobedience	Plastic bag ban led to 21.1% increase in shoplifting in Hawaii, California (Thompson, 2015).
	Manufacturers and retailers resist the ban. In China, 80% of retailers in rural regions continued providing plastic bags for free (Braun and Traore, 2015; He, 2012).
	Lawsuits prohibited Indiana, Florida, Missouri, Iowa, Michigan, Minnesota, Arizona, Texas and Mississippi from implementing the ban (Nielsen et al., 2019; Stephenson, 2018).
	EuroCommerce, PlasticsEurope and Kenya's National Environmental Authority lobbied against the plastic bag ban (Behuria, 2019; Knoblauch et al., 2018).

intrinsic behaviour, thereby diluting individuals' sense of responsibility to engage in good citizenship behaviours (He, 2012). France, Finland, Indonesia and Luxembourg achieved reduced plastic bag litter levels through the use of voluntary initiatives (Larsen and Venkova, 2014). For instance, France reported a decrease in the use of SUPBs from 10.5 billion in 2002 to 800 million in 2013 through the use of voluntary initiatives that focused on promoting reusable shopping bags. Similarly, a plastic bag deposit-refund scheme proved to be effective in Indonesia (Heidbreder et al., 2019). Rather than banning plastics, EuroCommerce (2014) suggests the importance of developing robust policies to promote a circular economy based on key pillars such as green growth, enhancing recyclability and green reverse logistics. In this regard, extended producer responsibility proved to be effective in Denmark (Larsen and Venkova, 2014).

Implications of the study

This study has contributed to the literature on plastic bag governance by reviewing the extant literature on plastic bag bans. The study managed to identify the considerations, benefits and unintended consequences of PBB implementation. The study's findings have several policy implications. The uncoordinated nature of PBB implementation was apparent in the literature reviewed. Since plastic bag litter is now regarded as a global environmental problem, this study argues that the first step in addressing this challenge is to bring about a global treaty tasked with harmonising plastic bag policies. This approach has the potential to reduce plastic bag leakages through illegal imports across national borders (Taylor, 2019). The envisaged treaty will be instrumental in managing the transboundary nature of plastic bags (Clapp and Swanston, 2009). The proposed treaty could be modelled on the tenets of the Conference of the Parties (COP) on Climate Change. The approach adopted by the European Commission to harmonise plastic bag policies through Directive 2015/720 for European Union members may be used as a foundation to form a coordinated global response.

Plastic bag litter is a typical example of a 'missing market' problem (Heidbreder et al., 2019). In order to manage plastic bag litter effectively, policy-makers need to assign rights to manufacturers by way of extended producer responsibility. This approach, which was effective in Denmark, has the effect of fostering sustainable manufacturing practices. The unsubstantiated environmental claims used to market alternatives to plastic bags, such as paper bags and reusable bags, are a recurring concern in the reviewed articles. To address this concern, policy-makers should insist on conducting life cycle assessments to confirm the environmental properties of bags that are promoted as environmentally friendly. This will go a long way in providing conclusive scientific proof of the suitability of alternatives to plastic bags. The need for stakeholder engagement was also highlighted in the reviewed articles. To gain stakeholder support, policy-makers could consider engaging in public-private partnerships, providing incentives and subsidies to promote the adoption of green technologies, and investing in consumer education and awareness campaigns. The high level of compliant behaviour in Rwanda is attributed to a

comprehensive awareness campaign that was rolled out prior to the enforcement of the ban (McLellan, 2014).

The lack of conclusive data on plastic bag consumption before and after the implementation of a ban was noted in the reviewed articles as the major challenge in assessing the impact of bans. In the absence of such data, policy-makers are unable to evaluate policy effectiveness. To address this challenge, policy-makers could insist on a mandatory disclosure by manufacturers and retailers of such statistics as part of their reporting systems. This can be done by developing a comprehensive plastic bag information system that tracks the production, consumption and disposal metrics. Owing to the limited success of PBBs in several countries, as noted in the reviewed literature, policy-makers could consider moving away from coercive measures such as bans, and instead adopting initiatives that inculcate a sense of responsibility in manufacturers, retailers and consumers in the form of voluntary initiatives. European countries that have achieved impressive results using voluntary initiatives include France, Finland, Germany, France and Austria (Kasidoni et al., 2015). An interesting case is that of Finland, where the voluntary initiatives of retailers were effective in reducing plastic bag litter without needing the support of any national legislation (Larsen and Venkova, 2014).

Limitations

As with any study, this one is not without its limitations. One of them is to do with the limited number of articles reviewed, mainly because there is not much research on plastic bag bans. While in many countries talks on banning SUPBs are common, actual implementation lags behind. As more countries take the bold step of implementing such bans in future, more reviews to uncover the range of lessons from different countries are recommended. Another limitation of the study is that, in reviewing the articles, consideration was not given to the country in which each study was conducted. This limits the extent to which the findings could be used to shed light on the differences in the considerations, benefits and consequences of banning plastic bags arising from factors such as the characteristics of individual country and/or country groups; for example, the differences between developed and emerging countries. Future reviews could compare the findings from different countries and/or country groups for more insights into the banning of plastic bags. This study focused only on plastic bag bans, and this limited the researchers' ability to gain a comprehensive understanding of plastic bag policies. Thus future studies could consider conducting a systematic literature review of the impact of plastic bag taxes, levies and voluntary initiatives. The study was also limited by the unavailability of data on the impact of plastic bag bans. In instances where data was available, it often existed in aggregated form that encompasses all plastic litter. Future studies could seek to address this by exploring the possibility of developing a comprehensive information system to track the production, consumption and disposal of plastic bags and disaggregate plastic litter by type. The development of such a system would assist policy-makers in tracking non-compliance and enforcing accountability.

Conclusion

The study sets out to understand the considerations, benefits and unintended consequences associated with the implementation of plastic bag bans. The complexity of managing plastic bag litter owing to its transient nature was a recurring theme in the literature reviewed. In the Global South constituted mainly by developing countries, lack of suitable alternatives to SUPBs, limited state capacity to monitor and enforce the PBB and the thriving black market were identified as the major challenges for effective implementation of the ban. In developing countries that have implemented the PBB such as Rwanda, South Sudan, Tanzania and Kenya, the promise of ecological modernisation and green economic growth that precipitated the ban is yet to be realised due to lack of funding to support the production of alternatives to SUPBs and recycling, stressing the need for financial incentives for manufacturers. The study notes the need by developing countries to develop effective waste management systems before rushing to implement plastic bag bans. In the Global North, constituted by European and North American countries, the implementation of the ban was constrained by the structural and instrumental power of plastic manufacturers, the lobbying by EuroCommerce and PlasticsEurope for business-oriented solutions and voluntary initiatives.

The study also underscored the need for a global treaty to address the transient nature of plastic bag litter. Literature reviewed recommended such a treaty to move away from the symbolic gesture of targeting only plastic shopping bags to considering the environmental impact of all forms of plastic such as straws, foamed plastics, plastic bottles and caps. Criticism levelled against alternatives to plastic bags such as paper bags and reusable bags mainly because of the use of unsubstantiated environmental claims was a main concern. To address this concern, the use of independent life cycle assessments in order to verify the claims for such bags is recommended. There was also general consensus in extant literature that the end of plastic shopping bags is not nigh due to their utilitarian benefits, and that a PBB is coercive and punitive. In view of this, literature reviewed recommended the promotion of a circular economy focused on ecological modernisation that capacitates companies to engage in sustainable plastic bag manufacturing and recovery strategies such as recycling. Community-driven approaches such as voluntary initiatives as opposed to PBB are proposed as an alternative policy tool as they proved to be effective in Chile, Finland and Luxembourg. Such initiatives, when driven by communities, have proved to be effective in promoting environmental citizenship and reducing the cost of regulation enforcement by the government.

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Appendix 1. Examples of countries with a PBB.

Country	Policy framework	Outcome(s)	References
Argentina	In 2012, SUPBs were banned in Buenos Aires and Mendoza.	A sustained reduction in the use of SUPBs was reported.	Larsen and Venkova (2014)
Australia	The state of South Australia and the Northern Territory imposed the ban in 2009, followed by Tasmania in 2013.	The ban was effective in promoting the use of reusable shopping bags.	Zero Waste Scotland (2015)
Bangladesh	In 2002, SUPBs were banned in Dhaka, the capital city of Bangladesh.	The ban was countered by the emergence of different varieties of plastic bags. The ban was perceived by consumers as unfair, as other cities were exempted.	Synthia and Kabir (2015)
Berlin	Ban on import, production, sale and use of non-biodegradable plastic bags in 2018.	Impact: Information not available.	UNEP (2018a)
Bhutan	Single-use plastic bags were banned as one of the efforts to enhance the Gross National Happiness index.	Poor implementation and monitoring affected the success of the ban. The ban was reintroduced in 2005, but monitoring and compliance remains a challenge.	Larsen and Venkova (2014)
Burkina Faso	Ban on production, import, marketing and distribution of non-degradable plastic bags in 2015.	Impact: Information not available.	UNEP (2018a)
Cameroon	Ban was imposed in 2014 on non-biodegradable plastic bags.	Impact: Owing to lack of inexpensive alternatives, plastic bags appear to be smuggled from neighbouring countries. Incentives given for clean-ups.	UNEP (2018a)
Canada	The ban was imposed in the City of Thompson, Manitoba, and in Fort McMurray, all in 2010.	The ban reduced the consumption of plastic bags by almost 50%. A proposed ban in Toronto in 2013 was scrapped by the court.	Larsen and Venkova (2014)
Cape Verde	Ban on the importation, sale and use of plastic bags in the capital city in 2017.	Impact: Information not available.	UNEP (2018a)
China	A countrywide ban of ultra-thin plastic bags under 0.025 mm was imposed in 2008	A 66% drop in SUPB use was reported, but the ban achieved limited success in Beijing and rural areas owing to poor enforcement and the thriving informal sector, which continued to sell SUPBs.	He (2012)
Côte d'Ivoire	Ban on the importation, sale and use of plastic bags less than 50 µm in 2014.	Impact: Information not available.	UNEP (2018a)
Eritrea	Ban on importation, production, sale and distribution of plastics in 2005.	Impact: Blockage of drains decreased.	Larsen and Venkova (2014)
Ethiopia	Ban on importation, production and sale of bags less than 30 µm in 2007.	Enforcement unclear.	UNEP (2018a)
Gambia	Ban was implemented in 2015.	Ban on importation was a success in the first phase, but there were reappearances after a political impasse.	UNEP (2018a)
Guinea-Bissau	Ban on the use of plastic bags.	Law not strictly followed. Strong resistance from both consumers and retailers.	UNEP (2018a)
India	Legislation passed in 2002 to ban plastic bags of less than 20 µm thick. In 2005, a ban was also imposed on plastic bags of less than 50 µm.	Poor implementation and enforcement affected the effectiveness of the ban.	Xanthos and Walker (2017)
Italy	Outright ban of SUPBs with effect from 2011.	The regulation has not been fully enforced owing to litigation by retailers and plastic bag manufacturers.	Larsen and Venkova (2014)
Kenya	Manufacturing and importation of SUPBs banned in 2007.	The ban was marred by poor enforcement. The ban was reinstated in 2011 and more recently in 2017.	Larsen and Venkova (2014)
Mali	Ban on production, import and sale in 2015.	The ban was adopted in 2012, but it has yet to be implemented.	Behuria (2019)
Mauritania	Ban on manufacturing, use, importation in 2013.	Ingestion by grazing animals reduced.	Larsen and Venkova (2014)
Niger	Ban on production and importation implemented in 2015.	Impact: Limited owing to poor enforcement.	UNEP (2018)

(Continued)

Appendix 1. (Continued)

Country	Policy framework	Outcome(s)	References
Rwanda	Use of plastic bags of less than 100 µm was outlawed in 2008.	The ban was effective in reducing the use of SUPBs. Rwanda was awarded the prestigious United Nations Scroll of Honour Award for its commitment to curbing plastic bag litter.	Larsen and Venkova (2014)
Senegal	Ban on plastic bags of less than 30 µm in 2016.	Impact: Data not available.	UNEP (2018a)
South Africa	Ban on plastic bags of less than 30 µm.	Lack of enforcement owing to industry resistance.	McLellan (2014)
Taiwan	In 2003, supermarkets were banned from issuing free plastic bags.	Resulted in significant drop in SUPB consumption. However, in 2006, food service operators were exempted from the ban.	Larsen and Venkova (2014)
Tanzania	Ban on plastic bags and bottles announced in 2006.	Ban has not been implemented. Latest ban issued in 2016, but implementation has not taken off.	UNEP (2018a)
Tunisia	Ban on the production, importation and distribution of SUPBs in major supermarkets, and levy on thicker ones of more than 50 µm in 2017.	Impact: Data not available.	UNEP (2018a)
Uganda	Ban on lightweight plastic bags of less than 30 µm.	Enforcement was weakened by lobbying by manufacturers and retailers.	Behuria (2019)
USA	A total of 132 states, cities and counties, including California, Los Angeles, Alaska, Colorado, Hawaii, Illinois, Massachusetts, Oregon, North Carolina, New York and Washington, DC, imposed a plastic bag ban.	The ban was effective in reducing the use of SUPBs in California and Hawaii. In some areas, such as Alaska and Massachusetts, manufacturers of plastics are challenging the ban.	Larsen and Venkova (2014)
Zimbabwe	Ban on plastic bags of less than 30 µm and levy on thicker ones in 2010.	Implementation difficult owing to poor enforcement and resistance from informal sector.	Chitotombe (2014)

PBB: plastic bag ban; SUPB: single-use plastic bag.