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Consumer worldviews and perspectives on environmental sustainability initiatives in the South African supermarket sector

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ABSTRACT

The major South African supermarket chains are important players in the retail sector in Sub-Saharan Africa, which represents one of the fastest growing consumer markets globally. These companies are critical in promoting environmental sustainability initiatives in supply chains, as a means of enhancing the sustainability of production and consumption. However, there is a significant research gap on the visibility and acceptability of environmental sustainability initiatives among consumers in the retail sector in Sub-Saharan Africa. The aim of this study is to elicit the perspectives of South African consumers on environmental sustainability initiatives in the supermarket sector, and understand how their environmental worldviews could influence the perceptions of these activities and ultimately purchasing decisions. Data was collected from consumer surveys in major supermarket chains in South Africa, and the New Ecological Paradigm (NEP) scale was used to elicit respondents' environmental worldviews. Findings show that respondents are aware and supportive of a variety of environmental sustainability strategies in their preferred supermarket stores. Recycling activities were the most observed strategy and decreased packaging activities the least. Although most respondents exhibit pro-ecological worldviews, this is not always translated into better visibility of these initiatives or sustainable purchasing behaviour. We suggest that supermarkets should be nudged to become more active agents of social and environmental change. For this it would be necessary to better understand and influence consumer environmental worldviews, as a means of enhancing the visibility and performance of their environmental sustainability initiatives. Our findings can assist researchers and sustainability managers in better understanding consumer perspectives in emerging economies, and their responses to green initiatives in supermarkets, and the retail sector more broadly.

1. Introduction

Corporate activities, supply chains and consumer purchasing decisions are increasingly receiving attention around the world due to their direct and indirect environmental and social impacts. With the global population projected to reach 8.5 billion people by 2030 (United Nations, 2015), there is a real need to fundamentally restructure the current systems of production, provision, and consumption, to ensure sustainable development within planetary boundaries (UNEP, 2015). According to Zelezny and Schultz (2000), many of the large-scale environmental problems are the outcome of aggregate human behavior, and therefore require large scale behavioral changes for their solution.

Sustainable Development Goal (SDG) 12 champions the wide adoption of sustainable consumption and production principles. The business sector, and retailers in particular, play an important role in shaping consumer behaviour to achieve Sustainable Consumption and Production (SCP) targets (or not). This is due to their privileged position as intermediaries between primary producers, manufacturers, and consumers (Styles et al., 2012; Tang et al., 2016). Retailers are increasingly becoming aware of both their environmental impacts and the fact that environmental sustainability can become an important competitive advantage (Bilińska-Reformat et al., 2018). Accordingly, many retailers have been incorporating sustainability principles into their business management practices (Ruiz-Real et al., 2019). For example, most major retailers have developed Corporate Environmental Sustainability (CES)

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strategies seeking to decrease their internal and external impacts on the natural environment, through internal operations, supply chain management and stakeholder engagement activities (Naidoo and Gasparatos, 2018). Furthermore, consumers are increasingly responding strongly to corporate sustainability information, negatively evaluating companies with poor sustainability policies and orientations (Choi and Ng, 2011). In response to this growing consumer and stakeholder pressure/scrutiny, CES reporting has become a widespread managerial practice (Gallego-Álvarez and Ortas, 2017). At the same time, many businesses have focused on the development, manufacturing, marketing and/or selling of environmentally sustainable products and services to decrease the environmental impact of supply chains and advance cleaner production (Dangelico and Vocalelli, 2017).

Sub-Saharan Africa (SSA) is one of the fastest growing consumer markets in the world (Signé, 2018). Consumer spending on the continent is projected to reach USD 2.1 trillion by 2025, driven by a young and growing population, rapid urbanization, rising incomes and widespread technology adoption (Hattingh et al., 2017). The internationalization of supermarket chains in SSA has been dominated by South African companies (Das Nair, 2017) and the South African retail food sector is highly concentrated as the top five companies, Shoprite Holdings Ltd., Pick n Pay Holdings Ltd., Spar Group Ltd., Massmart Holdings Ltd. (Walmart majority stake), and Woolworths Holdings Ltd., account for approximately 80% of all retail sales, with the remaining 20% coming from the informal retail sector (Ntloedibe and Woody, 2021). Several scholars have suggested that companies can be agents of change because they can mobilise resources (especially funding) to help meet SDG targets (Naidoo and Gasparatos, 2018; Dyllick and Muff, 2016). Given their dominance within the retail sector, South African supermarket companies can play a major role in achieving several of the targets of SDG 12 in South Africa (and increasingly other SSA countries), by improving environmental awareness and action among their customers, suppliers, and employees.

However, while South African supermarket companies are taking progressive steps to reduce their direct and indirect environmental impact, there is a lack of research on these CES initiatives (see Section 2.2 for more details). In fact, there is a general shortage of research on the interface of retailing and CES in developing countries (and particularly SSA), as most past research has focused on developed countries (Tang et al., 2016). It is particularly important to better understand this interface between retailing and CES in the SSA context, considering the rapid urbanization, high prevailing food insecurity and malnutrition (but also rising obesity), and inadequate waste management, which collectively pose major sustainability challenges in the continent (Gasparatos et al., 2020a, b) (see Section 2.2). Another major relevant gap sits on the interface of consumer awareness and green purchasing behaviour, especially how customers perceive and respond to CES strategies (Joshi and Rahman, 2015) (see Section 2.1). Again, although eliciting these linkages is considered particularly important to design appropriate CES strategies, the relevant literature in SSA is very scarce (see Section 2.1 for more details).

The aim of this study is to contribute to the CES literature in SSA (with a special focus on retail), by examining how South African consumer worldviews, awareness and perceptions intersect with CES. We focus on the supermarket sector as it represents some of the most profitable companies in the world (including SSA) and their customers, which are two critical actors in the adoption and success of SCP initiatives. Overall our research seeks to answer three main questions.

- Which CES strategies are visible to supermarket customers (Section 4.2)?
- How do supermarket customers perceive and respond to these CES strategies (Section 4.2)?
- How do the socio-economic backgrounds and environmental worldviews of supermarket customers intersect with their perception of CES and purchasing behaviour (Section 4.3)?

Section 2 identifies the main research gaps and contextualizes the study by summarizing (a) key academic literature on green retailing and green consumerism (Section 2.1), and (b) the CES landscape in the South African supermarket sector (Section 2.2). Section 3 explains the research approach, data collection and analysis methods. Section 4 presents the results of the consumer surveys in relation to the research questions outlined above, and Section 5 critically discusses the main findings in relation to the emerging CES literature on developing countries. Section 6 offers implications and recommendations for enhancing CES effectiveness and future research in this area.

2. Literature review

2.1. Green retailing and green consumerism

Corporations (and retailers in particular), have the necessary insight, knowledge, and resources to effectively address sustainability issues and meet relevant SCP targets (Dyllick and Muff, 2016). Frontrunner retailers tend to assume greater responsibility for enhancing supply chain sustainability, compared to laggard retailers that tend to place the onus of environmental improvement on consumers (Styles et al., 2012). Some of the enabling mechanisms for SCP systems include (a) low material footprint products, (b) product co-design, (c) service provision instead of product ownership, (d) certification and labelling, (e) fair trade, (f) ethical marketing, (g) responsible purchasing, and (h) reducing overall consumption (Lebel and Lorek, 2008). These factors are intricately linked to green supply chain management (which is a critical prerequisite for successful green production strategies) and can reduce the environmental impact of supply chain activities without sacrificing quality, reliability, costs, performance or energy use efficiency (Gotschol et al., 2014).

However, unless green products and services are widely adopted by consumers, their overall effectiveness for environmental sustainability would remain questionable (Dangelico and Vocalelli, 2017). Green marketing is therefore fundamental for the success of these types of products and services. It is mostly associated with the promotion or advertising of environmentally friendly products and services, but it is a rather broader concept that includes product modification, changes to the production process and packaging, as well as changes in advertising (Ghobakhloo et al., 2013).

In this context, retailers have become vital channels for increasing the market share of sustainable products and services (Bartels et al., 2015), as well as awareness of broader environmental issues among their customers. The number of companies developing green products is increasing rapidly and consumers are becoming more interested in them (Kao and Du, 2020). An indicator of advancing product sustainability is that new products have improved environmental performance and/or lower impacts on the environment, when compared to their previous versions (Kashmanian et al., 2011).

However, consumers are also critical in achieving SCP targets. Central here is the concept of 'green consumerism', which emerged after the 1960s. The green consumerism movement views purchasing power as a democratic way in which consumers can advocate for environmental solutions in the marketplace (Trivedi, 2018). This reflects what many scholars have pointed out, that the changes required to solve the current environmental crisis involve changes in individual behaviour (Zelezny and Schultz, 2000). Consequently, the good understanding of individuals' attitudes, motives, beliefs, intentions, and values are essential for both the development and success of appropriate interventions, as well as understanding their failure to produce the desired results (ibid). According to Guckian et al. (2017), pro-environmental attitudes and the intrinsic motivation towards societal helping and sharing are good indications of green consumerism. Therefore, consumers' behaviors and intentions can offer insight and knowledge that inform strategies to encourage green purchasing (Chekima et al., 2016).

In this context a worldview is the set of beliefs about fundamental

aspects of reality "*that ground and influence all one's perceiving, thinking, knowing, and doing*" (Funk, 2001). Environmental worldviews narrow this definition to include only the environmental aspects of an individual's particular way of thinking (Harju-Autti and Heinikangas, 2016). Therefore, environmental worldviews are commonly shared beliefs that give us a sense of how humans should interact with the environment, influencing how we use natural resources and how we interact with nature (ibid). The New Ecological Paradigm (NEP) scale is one of the approaches seeking to measure the change in environmental worldviews among groups of people. The NEP is anchored on belief about the need to enable a shift from a dominant social paradigm (DSP) "*positing endless progress, growth, and abundance to a new environmental paradigm recognizing the limits to growth and the consequences of development for our environment*" (Nooney et al., 2003: 764). Carrete et al. (2012) argue that to effectively change consumer behaviors, understanding the motivators and inhibitors of green consumer behaviour is essential, in order to formulate and design appropriate incentives and stimuli. Therefore, it is important to measure and interpret environmental attitudes to provide insight into human interaction with earth's resources (Wallhagen and Magnusson, 2017). In turn, this knowledge may be used to "*form the basis for promoting more pro-environmental behaviour, which is needed for long term solutions to environmental challenges*" (Wallhagen and Magnusson, 2017: 2).

The above suggest the clear link between the uptake and performance of green initiatives in supermarkets, with consumer worldviews and perceptions. Despite the emerging number of studies exploring such linkages, these tend to be more concentrated in the Global North. Studies in the Global South tend to be less common, especially in the SSA region. Hence there is a clear need for studies that explore these linkages in a comprehensive manner, particularly in the emerging economies of the Global South.

2.2. Landscape of corporate environmental strategies in the South African supermarket sector

As outlined in Section 2.1, there has been a long history of retailer engagement with CES. Although this has mostly happened in developed countries, there is currently a growing interest in developing regions such as SSA. This is linked to the ongoing economic transformation and industrialization across SSA, and the unavoidable intensification of natural resources use (UNECA, 2015). At the same time, the continent is experiencing unprecedented population increase, and is expected to account for approximately 25% of the world's population by 2025 (Paice, 2022). What is more important is that a large fraction of this population enters the consumer class because of poverty alleviation efforts in recent decades (Agyenim-Boateng et al., 2015). These trends are particularly evident in South Africa, which is the most industrialized economy in the continent, and has the third largest consumer spending market (Signé, 2018). Furthermore, there are observed shifts towards cleaner industries and sectors with a low environmental impact (UNEP, 2013). This includes a series of major initiatives in the retailing sector (Jere et al., 2021), including supermarkets (Haywood et al., 2021; Dos Santos et al., 2013).

Supermarkets are important players in the South African retailing sector, as they account for approximately 75% of grocery sales (Agyenim-Boateng et al., 2015). The supermarket sector is well developed compared to other SSA markets (Ntloedibe and Woody, 2021), with the country being the only SSA country to have companies appear on the 'Global Powers of Retailing' report that identifies the 250 largest retailers in the world: Shoprite Holdings Ltd. (No. 86), Spar Group Ltd. (No. 140), Pick n Pay Ltd. (No. 160) and Woolworths Holdings Ltd. (No. 179) (Deloitte Touche Tohmatsu Ltd, 2019). These companies dominate both the retail and supermarket sectors nationally, and increasingly regionally, as the growth and expansion of supermarkets in many parts of SSA is pioneered and dominated by South African supermarket companies (Dakora, 2012). Therefore, these companies have the potential to influence and transform supply chains and the internal operations of other retailers in other parts of the region.

The major supermarket companies in South Africa have mainly focused on three types of activities to decrease their environmental impact and promote sustainability: (a) internal operations, (b) supply chain management and (c) stakeholder engagement. Table 1 below provides some examples of these. Many retailers have incorporated green marketing into their business strategies, with frontrunner companies such as Pick n Pay and Woolworths successfully establishing environmental sustainability as a core element of their branding and business strategies (Pick n Pay Holdings Ltd., 2016; Woolworths Holdings Ltd., 2016). For example, Woolworths has successfully differentiated itself among competitors based on its strategic approach to implementing sustainable business practices (Dos Santos et al., 2013). Additionally, through their extensive networks, South African supermarket chains support the distribution and consumption of certified organic produce in the country (Barrow, 2006). CES frontrunner retailers also offer a wide variety of organic food products and 'greener' cleaning products through their private label brands. To address the environmental impacts of landfilled waste, some of the supermarket chains in the country have promoted recycling activities and packaging reduction strategies through (a) promoting lighter and easier to recycle packaging, (b) integrating recycled materials into manufacturing, and (c) encouraging consumers to avoid/reduce packaging. Additionally, some frontrunner companies are prepared to invest in improving the environmental aspects of their own private label brand products, as they have more control over the manufacturing process. For instance, when it comes to product packaging, Pick n Pay states that "*the challenge is to reduce packaging without compromising the safety and quality of products. We have more control over the packaging of our own brand products, so this is where we are focusing our efforts*" (Pick n Pay Holdings Ltd., 2016:10). Similarly, Massmart Holdings Ltd. State that as part of their environmental supply chain focus, they have "*prioritized products that are potentially vulnerable to exploitation and unsustainable utilisation*" (Massmart Holdings Ltd., 2017: 29). Woolworths seeks to transform its value chains by establishing non-negotiable ethical sourcing strategies (Woolworths Holdings Ltd., 2016), while Pick n Pay has implemented preferential procurement and assists suppliers with achieving compliance with standards (Pick n Pay Holdings Ltd., 2016).

Some South African supermarket companies have also invested extensively in energy efficiency strategies. For example, as supermarket stores account for >90% of the total electricity used, Pick n Pay focused its energy strategy on improving efficiency in refrigeration, lighting and air-conditioning (Pick n Pay Holdings Ltd., 2016). Similarly, Woolworths reportedly saved ZAR 742 million in 2019 (compared to ZAR 608 million in 2018) by implementing various energy efficiency initiatives, including (a) improving energy efficiency through behavioral change, (b) implementing innovative technologies in new stores, and (c) retrofitting existing stores to increase their energy efficiency (Woolworths Holdings Ltd., 2019). Some companies have focused on waste management. Beyond the activities outlined above, some have taken concrete steps towards improving recycling rates and minimizing waste generation, especially related to food. For example, to help address food waste, Pick n Pay donated 1737 tons of food that had passed its sell-by date but not its expiry date to Foodbank SA in 2016 (Pick n Pay Holdings Ltd., 2016). In its 2019 report the company highlighted a 20% reduction in the amount of food waste sent to landfills compared to 2015, by donating unsold food to NGOs (Pick n Pay Ltd., 2019). Moreover, the company stated that by donating more than 1600 tons of food each year, it reduced its carbon footprint by > 5000 tons CO_2e annually.

The above suggest that despite the proliferation of CES initiatives in South African supermarket chains, there are hardly any studies exploring their visibility and the factors that affect it. This is a major knowledge gap considering that South African companies not only dominate the retail sector in parts of SSA but are also frontrunners in CES design and implementation. In this sense they could potentially

Table 1
Examples of CES strategies implemented by South African supermarket companies (adapted from Naidoo and Gasparatos, 2018).

CES category	CES subcategory	CES focus area	Outcome examples
Internal operations	Energy efficiency and GHG emissions reduction	Renewable energy Energy efficient and natural refrigeration systems Carbon footprint	- Solar energy generation reduced carbon footprint by approximately 6000 tons CO_2e (Pick n Pay Ltd.) - Decreased CO_2e emissions from refrigerant gases by 14% over the past financial year (Pick n Pay Ltd.) - Decreased electricity consumption (kWh) by 11% in 2020 (Spar Group Ltd.)
	Integrated waste management	Reduction of food waste Recycling	- Converted 938 656 L of recovered used cooking oil from stores to biodiesel (Shoprite Holdings Ltd.) - 53.5% waste diverted from landfill for recycling (FY 2019) (Pick n Pay Ltd.) - Introduced a 100% recycled plastic carrier bag in 2018 containing no less than 70% post-consumer waste resulting in 4000 tons of used plastic being diverted from landfills annually (40% reduction in associated emissions achieved through production of the bags) (Spar Group Ltd.)
	Water conservation	Reducing water consumption and managing wastewater	- 90% of real-time water monitoring in stores (2018: 89%; 2019: 90%) (Woolworths Holdings Ltd.)
Supply chain management	Sustainable sourcing	Local sourcing Animal welfare standards	- 98% of fresh produce sourced from South African suppliers (2017: 96%) (Pick n Pay Ltd.) - All whole eggs and 100% of liquid and powdered egg ingredients in Woolworths private label products are free range (Woolworths Holdings Ltd.)
	Certification	Sustainable seafood	- 78% of seafood is sourced from suppliers certified by third party certification schemes accredited by the Global Sustainable Seafood Initiative (Woolworths Holdings Ltd.)
	Take-back mechanisms	Recycling	- Coffee cup take-back and recycling pilot scheme in 36 Woolworths stores (Woolworths Holdings Ltd.)
	Transportation efficiency	Energy efficient logistics Reverse logistics	- Increased supply chain diesel efficiency by 80% since 2019 (Woolworths Holdings Ltd.) - Increased reverse logistics by 14% thereby saving 887 tons of carbon emissions (Shoprite Holdings Ltd.)
	Water conservation	Water monitoring	- 90% of real-time water monitoring in stores (2018: 89%; 2019: 90%) (Woolworths Holdings Ltd.)
Stakeholder engagement	Customer engagement	Recycling Reducing plastic use (offering customers alternatives to traditional plastic bags sold)	- 36% of private label packaging now has user-friendly on-pack recycling labels (Shoprite Holdings Ltd.) - Sold 1.7 million reusable bags in FY 2019 (20% increase from previous year) (Pick n Pay Ltd.)
	Staff training	Sustainable seafood	- Trained 2496 employees in sustainable seafood practices (Shoprite Holdings Ltd.)
	Shareholder/investor relations	Membership/signatories/commitments	- Longstanding member of the International Consumer Goods Forum (CGF) (Pick n Pay Ltd.) - Joined the Ellen MacArthur Foundation's New Plastics Economy Global Commitment (Pick n Pay Ltd.) - Listed on the FTSE/JSE Responsible Investment Index Series (Pick n Pay Ltd.) - Signatory to the United Nations Global Compact (Woolworths Holdings Ltd.) - Signatory to the Ellen MacArthur Foundation's New Plastics Economy Global Commitment (Woolworths Holdings Ltd.)

(Source: Pick n Pay Ltd., 2019; Shoprite Holdings Ltd, 2020; Spar Group Ltd, 2020 and Woolworths Holdings Ltd., 2020)

influence the trajectories in other countries. However, there is limited understanding on the comparative visibility of CES activities and the factors affecting them.

3. Methodology

3.1. Research approach

In this study we adopt a sustainability science research lens. Sustainability science is described as a multidisciplinary, purpose bound, normative and action-oriented science (Kates, 2011). As a problem and solution-oriented field (Lang et al., 2012) it focuses on understanding complex human-environment systems and problem-solving efforts to tackle urgent human needs (Clark, 2007). As marketing and consumer research scholars are increasingly producing knowledge to assist social groups that are encountering sustainability challenges or are disproportionately disadvantaged (Figueiredo et al., 2015), understanding the relevance of consumer research and consumer experiences in developing economy contexts is critical (Ungerer, 2014). The literature review outlined in Section 2 shows the significant research gaps in consumer studies in SSA, especially related to consumer attitudes towards corporate environmental activities and their environmental worldviews.

Our study contributes to consumer research associated with SDG 12 targets in SSA countries, namely (1) encouraging large and transnational companies to adopt sustainable practices (especially aimed at consumers) (Target 12.6), (2) supporting developing countries to improve their scientific capacity for more sustainable patterns of consumption and production (Target 12. A), and (3) ensuring access to information and awareness for sustainable lifestyles and sustainable development (Target 12.8). Furthermore, Barker et al. (2019) point to the limited research on the broader values and ideologies that may underpin norms and motivate consumers to adopt behaviors to mitigate environmental impact. Ntanos et al. (2019) state that future research should examine relationships among environmental values, attitudes, motivations, participation, satisfaction, and environmentally friendly behaviors, including the possible effects of the NEP scale in shaping sustainable development initiatives (Section 5.1). Finally, Ogunbode (2013) states that there is a need for further study of the ideological roots of ecological beliefs and how individuals' rationalizations of nature and environmental issues are shaped by their personal, social, and economic circumstances.

Considering the above, this paper focuses on two main aspects of CES in the South African supermarket sector, consumer perspectives on CES activities and the environmental worldviews and concerns of consumers. Fig. 1 summarizes the main research approach and visualizes the methods and flow of information between the different sections.

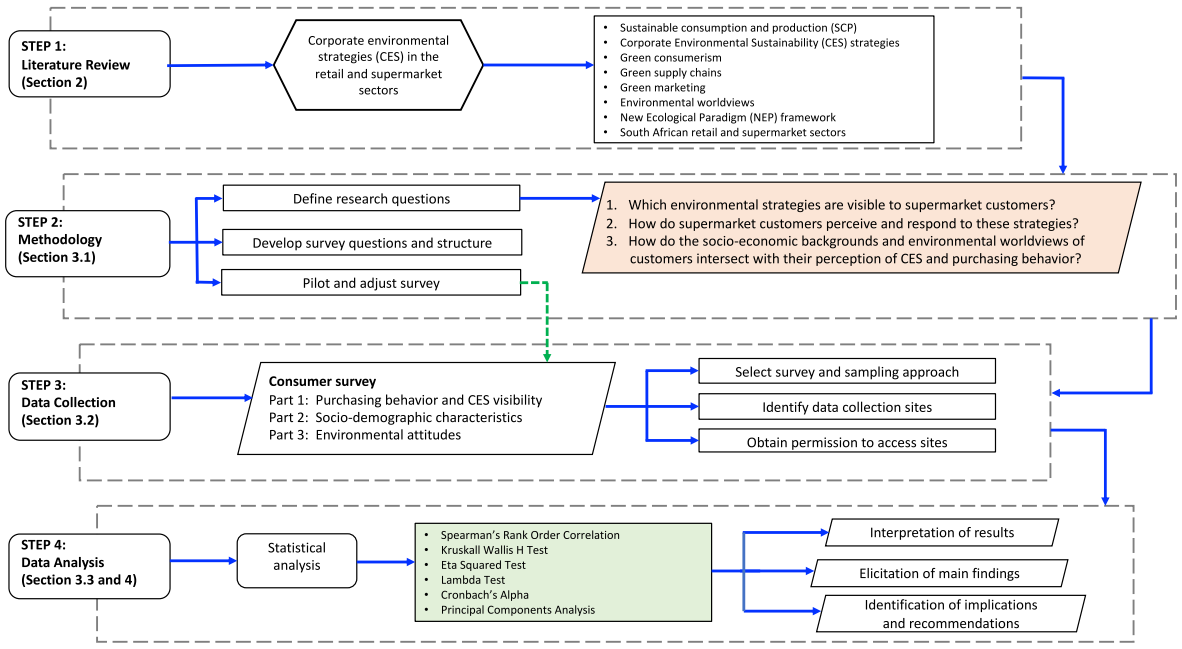

Fig. 1. Flowchart of the research approach.

3.2. Data collection

Most large and medium sized supermarket stores in South Africa are located within large shopping mall complexes or smaller shopping centers, usually reached using private vehicles or public transportation. Due to their vast scale of operations, large supermarket chains enjoy economies of scale (Shunda et al., 2015). Furthermore, efficient management and procurement systems give these companies an additional edge over smaller competitors. Consequently, they are preferred by customers because of lower prices compared to smaller, local and/or family-run supermarket stores, as well as the greater variety and range of products and services they offer (ibid). Additionally, consumers can access various ancillary services and goods at malls and shopping center locations where these supermarket retailers are located (Khare and Rakesh, 2010) (see Table 1).

Considering the prominence of supermarkets in malls and shopping centers for food and household supply purchases, regardless of income and location, medium-to-large sized supermarkets were included in this study. The metropolitan areas selected were Cape Town, Johannesburg, Pretoria and Bloemfontein, major economic hubs in South Africa that contain numerous malls and shopping centers, attracting customers from locations within the city. The selected smaller towns were Harrismith (Free State province) and Verulam (KwaZulu-Natal province), approximately 20 km from the city of Durban (Fig. 2). Consumer surveys were administered at a total of 14 shopping malls and smaller shopping centers randomly selected in these areas (Table 2).

The consumer survey consisted of three parts, namely (a) purchasing behaviour and CES visibility, (b) demographic and socio-economic background, and (c) environmental attitudes using the NEP scale. When looking at the research questions outlined in Section 1, the data from the first part of the survey is used to answer research questions 1–2 (Section 4.2), and the data from all three parts is combined to answer research question 3 (Section 4.3).

The survey was structured and included both close-ended and open-ended questions, but most questions were closed-ended. Before the administration of the consumer survey, permission was obtained from the property management division of each mall/shopping center or from the manager of the supermarket store (in the case of smaller supermarket centers). Customers were interviewed in person at the vicinity of the supermarket. Potential respondents were approached as they were entering or leaving the supermarket store. To allow for some degree of randomization every third or fourth customer was approached. Informed consent was sought after explaining the purpose of the survey and the wider research. The anonymity of the respondent was highlighted to reassure potential participants that the data collected could not be linked to them.

In total 305 completed customer surveys were collected during February and March 2016 (Table 2). Due to the high confidentiality of customer-related information, we could not obtain the exact visitation rates for the specific stores and the cities (for specific companies). Furthermore, when considering the pre-dominance of a car-oriented lifestyle in South Africa it is not possible to properly identify the catchment areas/populations for each store, as the stores receive customers from much wider areas within and outside each city. For these reasons it was not possible to use standard statistical tools to quantify the necessary sample size. Instead, we ensured that the selected sample was enough to achieve a 90% confidence interval across all sites (>273 respondents). We acknowledge that this may affect the generalization of our findings to some degree (see Section 6 for a reflection).

3.3. Data analysis

3.3.1. The New Ecological Paradigm (NEP) scale

The environmental attitudes of the respondents are elicited through the New Ecological Paradigm (NEP) scale (Dunlap et al., 2000). The NEP scale aims at measuring individual beliefs about humans' relationship with the environment, or their ecological worldview (Amburgey and Thoman, 2012). It is a widely used measure of peoples shifting worldviews from a human dominant or anthropocentric view to an ecological one (Van Petegem and Blieck, 2006). Inherent to the NEP is the 'rejection' of what is called the Dominant Social Paradigm (DSP) that claims endless progress, growth, abundance, and attitudes that contribute to environmental degradation, due to the growing recognition of the severity of environmental problems (ibid). The scale has been used in different types of research to analyze the relationships among environmentalism, attitudes, and behaviors (Freire et al., 2021). These include studies on the relationships between the NEP and recycling rates, the NEP and ecologically motivated consumers, and the NEP and personal attitudes and environmental measures (ibid).

For this study the revised version of the original NEP scale developed

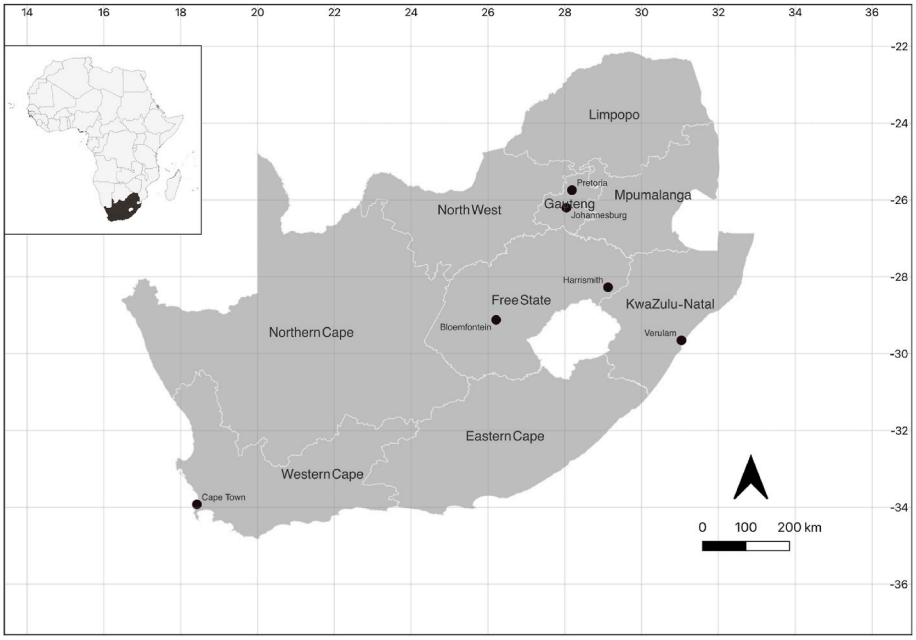

Fig. 2. Map of South Africa showing data collection sites.

Table 2
Data collection sites and number of surveys collected.

Province	City/Town	Area	No. of surveys
Gauteng	Johannesburg	Kempton Park	22
		Oakdene	11
		Soweto	22
	Pretoria	Nieuw Muckleneuk	15
			Total = 70
Free State	Bloemfontein	Langenhovenpark	20
		Helicon Heights	21
		Hospital Park	23
	Harrismith	CBD	50
			Total = 114
Western Cape	Cape Town	Wynberg	25
		Kenilworth	36
			Total = 61
KwaZulu-Natal	Verulam	Waterloo	30
		CBD	30
			Total = 60
		Total surveys	305

Table 3
List of NEP facets and NEP statements under each facet.

NEP FACET	ITEM	NEP STATEMENT
Balance of nature	NEP 3	When humans interfere with nature it often produces disastrous consequences
	NEP 8	The balance of nature is strong enough to cope with the impacts of modern industrial nations
	NEP 13	The balance of nature is very delicate and easily upset
Possibility of an eco-crisis	NEP 5	Humans are severely abusing the environment
	NEP 10	The so-called "ecological crisis" facing humankind has been greatly exaggerated
	NEP 15	If things continue on their present course, we will soon experience a major ecological catastrophe
Anti-exemptionalism	NEP 4	Human ingenuity will ensure that we do not make the earth unliveable
	NEP 9	Despite our special abilities humans are still subject to the laws of nature
	NEP 14	Humans will eventually learn enough about how nature works to be able to control it
Limits to growth	NEP 1	We are approaching the limit of the number of people the earth can support
	NEP 6	The earth has plenty of natural resources if we just learn how to develop them
	NEP 11	The earth is like a spaceship with very limited room and resources
Anti-anthropocentrism	NEP 2	Humans have the right to modify the natural environment to suit their needs
	NEP 7	Plants and animals have as much right as humans to exist
	NEP 12	Humans were meant to rule over the rest of nature

by Dunlap and Van Liere in 1978 was used. The revised NEP scale has 15 statements or items (refer to Table 4 for the items in chronological order). However, each of the 15 NEP items can be grouped into sets of three to represent five hypothesized subscales of an ecological worldview (Dunlap et al., 2000). These five subscales, or facets, are (a) *the fragility of nature's balance* (items 3; 8; 13), (b) *the possibility of the occurrence of an ecological crisis* (items 5; 10; 15), (c) *rejection of the exceptional position of mankind (anti human exemptionalism)* (items 4; 9; 14), (d) *recognition of the boundaries/limits of growth* (items 1; 6; 11), and (e) *anti-anthropocentrism or against human domination over nature* (items 2; 7; 12) (refer to Table 3).

Respondents were asked to indicate their level of agreement with each of the 15 NEP statements on a 5-point Likert scale. The eight odd numbered items are worded so that agreement indicates a pro-ecological view, and the seven even numbered items so that disagreement indicates a pro-ecological worldview (Dunlap et al., 2000). Therefore, agreement with the eight odd numbered statements indicates a pro-NEP or pro-environmental orientation. Conversely agreement with the seven even numbered items indicates a pro-anthropocentric or dominant social paradigm (DSP) orientation. Responses were scored from 1 to 5 for the eight odd numbered items (strongly agree = 5, agree = 4, unsure = 3, disagree = 2, strongly agree = 1), while the seven even numbered items were reverse scored to account for the difference in wording of statements (strongly agree = 1, agree = 2, unsure = 3, disagree = 4, strongly agree = 5). A total score of 45 represents the boundary between endorsement of a pro-environmental perspective and a human-dominance perspective (Rideout et al., 2005). In other words, people scoring below 45 tend to be more in favour of the Dominant Social Paradigm (DSP) worldview (or anthropocentric worldview), while those who score above 45 tend to be more in favour of a

pro-environmental or NEP worldview. Based on the findings of their NEP analysis, Dunlap et al. (2000) state that it is appropriate to treat the scale as a single, coherent construct, as well as a multidimensional construct.

3.3.2. Statistical analysis

All data were entered into an Excel 2013 spreadsheet and imported into SPSS version 25 for analysis. To check for associations between variables in the consumer survey four main types of statistical tests are used.

- Spearman's Rank-Order correlation to test for correlations between NEP scores and ordinal variables such as (1) ranking of factors when purchasing a product or service (e.g., price, quality, brand reputation, environmental impact), (2) importance of considering environmental impacts when purchasing a product/service and (3) the likelihood of buying a more expensive, but environmentally friendly product;
- Kruskal Wallis H tests to test for differences in medians between NEP scores, purchasing behaviour, and awareness and perceptions of CES;
- Eta squared tests to test for associations between nominal and scale variables. In particular, for testing for associations between NEP scores and socio-economic data;
- Lambda tests to identify associations between nominal variables (e.g. associations between socio-economic variables, shopping behaviour, and awareness and perceptions of CES (categorical data).

Additionally, Cronbach's Alpha was used to test for internal consistency within a set of variables. A Principal Components Analysis (PCA) with Varimax Rotation was conducted for all 15 NEP items to investigate the dimensionality of the NEP scale i.e. to determine the pattern of responses from participants.

4. Results

4.1. Socio-demographic characteristics and environmental attitudes of respondents

Data on the socio-demographic characteristics of respondents are obtained from the second part of the consumer survey, and information about the environmental attitudes from the third part (see Section 3.2).

In terms of socio-demographic characteristics, the average age of respondents was 39 years old (range 17–89 years) and 51% of respondents were male. Fifty per cent of respondents were single, 43% were married and 7% were divorced or widowed. Most respondents (64%) had children, with an average of 2.28 children per respondent. The highest level of education for most respondents was a high school diploma (41%), followed by a college diploma (18%) and a bachelor's degree (18%). Seventy-six per cent of respondents stated that they had total household monthly incomes below 30,000 ZAR (2046 USD), with most respondents (38%) falling in the 0–9999 ZAR (0–682 USD) income bracket (1 ZAR = 0.0682 USD[1]).

In terms of environmental attitudes, the average NEP total score for the entire sample is 53.21 (SD = 7.44), with a minimum score of 28 and a maximum score of 72. Most respondents (85%) have a NEP score greater than 45, which suggests a more pro-ecological (pro-NEP) worldview (Section 3.3.1). Table 4 shows the mean values for each NEP item and the respective standard deviations. The highest pro-NEP responses were recorded for item 15 (mean = 4.72; SD = 0.72), item 7 (mean = 4.66; SD = 0.87) and item 5 (mean = 4.66; SD = 0.82). The lowest pro-NEP responses were recorded for item 6 (mean = 1.35; SD = 0.85), item 4 (mean = 2.25; SD = 1.36) and item 14 (mean = 2.26; SD = 1.44). The lowest consistency within the sample, in terms of the highest standard deviations, is for item 12 (SD = 1.72), item 2 (SD = 1.66) and item 10 (SD = 1.56). The highest consistency, in terms of the lowest standard deviations, is for item 15 (SD = 0.72), item 9 (SD = 0.79) and item 5 (SD = 0.82).

Table 4
Mean scores and standard deviation for each NEP item.

NEP	NEP Statement/Item	Mean	SD
1	We are approaching the limit of the number of people the earth can support	4.04	1.27
2	Humans have the right to modify the natural environment to suit their needs	2.44	1.66
3	When humans interfere with nature it often produces disastrous consequences	4.43	1.02
4	Human ingenuity will ensure that we do not make the earth unliveable	2.25	1.36
5	Humans are severely abusing the environment	4.66	0.82
6	The earth has plenty of natural resources if we just learn how to develop them	1.35	0.85
7	Plants and animals have as much right as humans to exist	4.66	0.87
8	The balance of nature is strong enough to cope with the impacts of modern industrial nations	3.28	1.55
9	Despite our special abilities humans are still subject to the laws of nature	4.53	0.79
10	The so-called 'ecological crisis' facing humankind has been greatly exaggerated	3.56	1.56
11	The earth is like a spaceship with very limited room and resources	3.76	1.44
12	Humans were meant to rule over the rest of nature	2.80	1.72
13	The balance of nature is very delicate and easily upset	4.48	0.91
14	Humans will eventually learn enough about how nature works to be able to control it	2.26	1.44
15	If things continue on their present course we will soon experience a major ecological catastrophe	4.72	0.72

The mean scores for each NEP subscale suggest that respondents highly agree with the possibility of a looming ecological crisis (mean = 4.31, SD = 1.22), while agreeing to a lesser extent with an anti-exemptionalism stance (mean = 3.01, SD = 1.64) (Fig. 3). Fig. 4 shows the percentage distribution of responses for all NEP items. Cronbach's alpha was used to measure internal consistency of responses for the 15 NEP items, obtaining a coefficient value of 0.62. While values above 0.7 are considered desirable, studies with lower alpha values (between 0.47 and 0.61) cite reasons related to interpretation and understanding of the scale items due to the sensitivity of the scale to sociocultural attributes (Reyna et al., 2018). Removal of certain NEP items does not significantly affect the alpha value.

(SA=Strongly Agree, MA = Mildly Agree, UN=Unsure, SD=Strongly Disagree).

A PCA with Varimax Rotation was conducted for all 15 items (Table 5). Five factors have Eigen values > 1, with a Kaiser-Meyer-Olkin coefficient of 0.655 ($p < 0.001$). The five components combined explain 54% of the variance in the data, which suggests the multidimensionality of the NEP scale as at least 5 NEP dimensions identified.

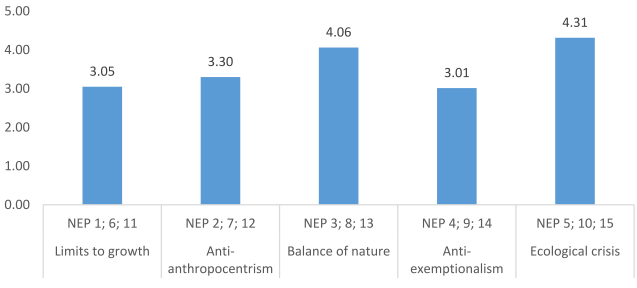

Fig. 3. Mean scores for each NEP subscale.

[1] Average ZAR to USD exchange rate for 2016 (Exchange Rates UK, 2021) obtained from https://www.exchangerates.org.uk/ZAR-USD-spot-exchange-rates-history-2016.html.

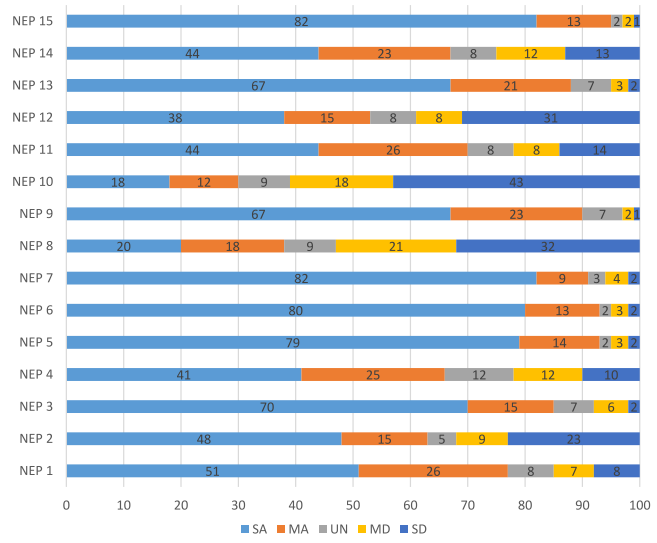

Fig. 4. Distribution of responses for each NEP item (in %).

4.2. Consumer purchasing behaviour and perspectives on CES

Data on consumer purchasing behaviour and perspectives on CES activities is obtained from the first section of the consumer survey (see Section 3.2). Here we focus on the following research questions as outlined in Section 1: (a) which CES strategies are visible to supermarket customers, and (b) how do supermarket customers perceive and respond to these CES strategies (Section 4.2).

Most respondents shopped at Pick n Pay stores (54%), followed by Shoprite (28%), Spar (12%), Woolworths (4%), Massmart/Game (1%) and other smaller 'local' supermarket stores (1%). The main reasons for selecting these supermarkets as their preferred choice were (a) low prices (37%), (b) ease of access to the supermarket (28%) and (c) quality of available products (14%). Approximately 63% of respondents stated that they were aware of CES activities undertaken by their preferred supermarket to mitigate negative environmental impacts. The CES activities most identified were (a) recycling activities (53%), (b) sale of environmentally friendly or 'green' products (38%), (c) consumer awareness initiatives (36%), and (d) the sale of organic foods (36%) (Fig. 5).

Respondents were asked to rank the importance of price, quality, brand reputation and environmental impact when purchasing products or services, using a 5-level Likert scale (1 = very little importance and 5 = extremely important). Product/service quality was ranked as the most important factor, with an average score of 4.59 (SD = 0.68), followed by price (4.26, SD = 0.99), brand/company reputation (3.93, SD = 1.15) and environmental impact (3.24, SD = 1.36). This shows that within our sample environmental concerns rank rather low as an influencing factor in purchasing decisions when compared to product price, quality, and brand reputation.

Further, respondents were asked to rank the importance of environmental considerations when making purchasing decisions, using a 5-level Likert scale (1 = not at all important, 3 = somewhat important and 5 = extremely important). The average score was 3.45 (SD = 1.09). Respondents were also asked about the likelihood of purchasing a more expensive product or service, if it was in some way better for the environment, when compared to an ordinary product/service they usually buy (1 = not at all likely, 3 = somewhat likely and 5 = extremely likely). The average score obtained was 3.40 (SD = 1.18). The results suggest that the consideration of environmental impacts might play a moderate role in influencing consumer purchasing behaviour, which may decrease significantly when associated with a higher premium.

Table 5
Principal components analysis of NEP items.

NEP Items	Facets	Factors				
		1	2	3	4	5
8	The balance of nature is strong enough to cope with the impacts of modern industrial nations	**0.734**	0.033	0.005	0.227	0.031
2	Humans have the right to modify the natural environment to suit their needs	**0.732**	−0.028	−0.077	−0.069	−0.059
14	Humans will eventually learn enough about how nature works to be able to control it	**0.658**	0.058	0.186	−0.060	0.042
10	The so-called 'ecological crisis' facing humankind has been greatly exaggerated	**0.634**	0.077	−0.020	−0.013	0.037
12	Humans were meant to rule over the rest of nature	**0.404**	0.154	0.043	**0.373**	**−0.364**
1	We are approaching the limit of the number of people the earth can support	−0.055	**0.789**	0.154	−0.060	−0.013
5	Humans are severely abusing the environment	0.205	**0.591**	**−0.423**	0.024	−0.198
15	If things continue on their present course we will soon experience a major ecological catastrophe	0.083	**0.551**	−0.096	0.092	0.216
3	When humans interfere with nature it often produces disastrous consequences	0.181	0.124	**−0.568**	0.097	**0.384**
6	The earth has plenty of natural resources if we just learn how to develop them	0.279	0.091	**0.557**	**−0.460**	0.017
11	The earth is like a spaceship with very limited room and resources	−0.030	0.434	**0.546**	**0.315**	−0.002
4	Human ingenuity will ensure that we do not make the earth unliveable	**0.359**	−0.149	**0.468**	0.112	0.044
7	Plants and animals have as	0.045	0.020	0.050	**0.829**	0.107

(continued on next page)

Table 5 (*continued*)

NEP Items	Facets	Factors				
		1	2	3	4	5
9	much right as humans to exist Despite our special abilities humans are still subject to the laws of nature	−0.017	−0.003	0.033	−0.025	**0.801**
13	The balance of nature is very delicate and easily upset	0.080	0.183	−0.144	**0.382**	**0.545**

Note: Coefficients with values > 0.3 have been highlighted in bold letters to show strong loading patterns for each component.

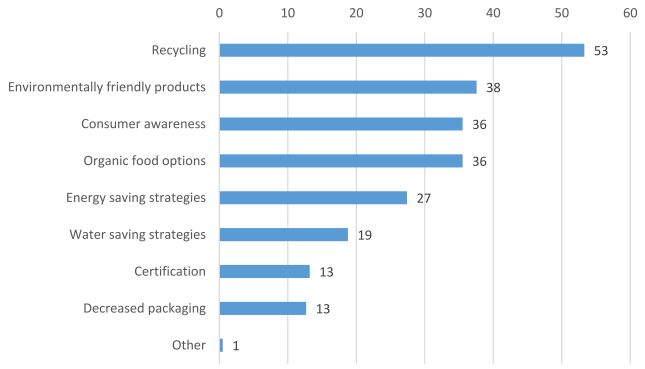

Fig. 5. CES activities identified by respondents (in %, n = 193).

When asking respondents if they would be willing to change to a different supermarket company (with factors such as affordability, accessibility and quality remaining the same), if it were doing more to reduce its environmental impact, 87% responded positively. When explaining their answers, most respondents stated that they are concerned about the negative impacts on the environment and would like to contribute to mitigate these impacts in some way. Those not willing to change were either very satisfied with their current supermarket or did not think that changing would make any difference to the environment. Almost all respondents (99%) stated that by adopting CES strategies, supermarket companies could have a significant positive impact on the environment. Most respondents ascribed this to the fact that retail companies have a strong influence on their customers and could therefore raise consumer awareness and help change customer behaviour. Respondents who disagreed (1%) stated that consumers are ignorant about environmental issues and therefore do not care about activities that could help the environment. One respondent suggested that because retailers do not manufacture products, their CES initiatives would not have a significant positive impact on the environment.

4.3. Effect of socio-demographic characteristics and environmental attitudes on CES visibility and purchasing behaviour

In this section we combine data from all three parts of the survey to answer the third research question. We elicit how the socio-demographic characteristics and environmental worldviews of supermarket customers (Section 4.1) intersect with their perception of CES and purchasing behaviour (Section 4.2).

For analysis of associations between variables we tested for all possible relationships between variables, but below we present only the results that were statistically significant. To test for associations between socio-demographic characteristics and ordinal (ranked) variables, such as ranking of factors considered when making purchasing decisions (price, quality, brand, environmental impact) and NEP items, we conducted Kruskal-Wallis H tests. Post-hoc analysis reveals statistically significant differences in rankings for affordability (χ^2 (1) = 5.384, p = 0.020) between male (142.60) and female respondents (163.89). The consideration of environmental impacts on purchasing behaviour is statistically different for respondents who have children (160.70) and those who do not (138.95), (χ^2 (1) = 4.624, p = 0.032). Lambda tests show a significant but weak association between education level and reasons for choosing a supermarket (Λ = 0.088, p = 0.021). Further analysis reveals that for 45% of respondents with a high school diploma, affordability is the main factor influencing their choice of supermarket, while for 46% of respondents with bachelor's degrees accessibility is the main reason.

Eta squared tests are performed to check for associations between age and shopping preferences, as well as age and awareness/perceptions of CES (Table 6). The highest percentage of variation in the dependent variables accounted for by age (independent variable) is for preferred supermarket chains and the reasons for shopping at preferred supermarket chains. Tests indicate a moderate strength of association between age and preferred supermarket chains, i.e., approximately 28% of the variance in respondents' preferred supermarkets can be explained by age. Similarly, approximately 19% of the variance in respondents' reasons for shopping at their preferred supermarket chain can be explained by age. Spearman's Rank Order correlation is used to test for correlations between age and ordinal variables. There is a statistically significant, but weak, positive correlation between age and consideration of environmental impact during purchasing decisions (r_s (303) = 0.212, p < 0.0005).

Furthermore, Eta squared tests show very weak associations between NEP scores and education levels, as well as NEP scores and income levels. Approximately 7% of the variance in NEP scores can be accounted for by income levels, and 5% by education levels. Weak associations are also found between NEP scores and variance in preferred supermarkets (15%), awareness of CES supermarket activities (15%) and willingness to change to a more environmentally friendly supermarket company (14%) (Table 6). When testing for correlations between

Table 6
Results of Eta Squared association tests.

Independent variable	Dependent variable	Eta value	Eta squared value	Percentage variation
Age	Preferred supermarket	0.526	0.28	28%
	Reason for selecting preferred supermarket chain	0.433	0.19	19%
	Awareness of CES activities at preferred supermarket chain	0.416	0.17	17%
	Willingness to change to a more-environmentally friendly supermarket chain	0.399	0.16	16%
	Perception of linkage between retail CES activities and positive environmental outcomes	0.367	0.13	13%
NEP Total Score	Preferred supermarket	0.383	0.147	15%
	Reason for selecting preferred supermarket	0.305	0.093	9%
	Awareness of CES activities at preferred supermarket	0.387	0.150	15%
	Willingness to change to a more-environmentally friendly supermarket chain	0.379	0.144	14%
	Perception of linkage between retail CES activities and positive environmental outcomes	0.243	0.059	6%

NEP scores and ordinal data, a statistically significant, but weak negative correlation was found between NEP scores and brand/company reputation when buying a product/service, r_s (304) = −0.127, $p < 0.05$. These results suggest that respondents' NEP scores (and therefore environmental worldviews) do play a role, albeit a small one, in purchasing decisions and perceptions of CES strategies.

5. Discussion

5.1. Synthesis of findings

Most respondents were aware of the CES strategies adopted by supermarket chains in South Africa (Section 4.2), and these CES strategies tend to be the ones that are highly visible such as recycling schemes, the sale of green products and environmental awareness campaigns, rather than those related more to the operation of the supermarket chains and individual stores (e.g. energy/water efficiency measures) (refer to Naidoo and Gasparatos, 2018). This visibility of only a few/specific types of CES initiatives can have implications on the willingness of supermarket companies to adopt certain CES strategies, awareness levels of consumers, and level of customer support for these initiatives, especially in terms of purchase (Section 5.2). For example, Scott and Vigar-Ellis (2014) found that actions with regards to environmentally friendly packaging are less evident, and that South African consumers had limited knowledge of what environmentally friendly packaging is and how to differentiate it from normal packaging. Results from our study show that a relatively small percentage of respondents cited awareness of CES activities related to decreased packaging (Section 4.2).

Respondents indicated that the main reasons influencing their decision to shop at specific supermarket chains were low prices, good accessibility, and the quality of available products/services. In fact, environmental concerns rank quite low in relation to the purchase of individual items/services when compared with quality and price (Section 4.2). The importance of product price, quality and availability has been identified in other studies eliciting the factors influencing green purchasing behaviours, especially in developing countries (Nekmahmud and Fekete-Farkas, 2020; Biswas, 2016; Carrete et al., 2012). Although average scores on self-reported environmentally friendly behaviour were relatively high, self-reported pro-environmental purchasing behaviour is not strongly associated with actual purchasing behaviour, in that consumers' willingness to pay for green products does not automatically materialize in real-life purchasing situations (White et al., 2019; Moser, 2016; Joshi and Rahman, 2015). Nonetheless, the vast majority of respondents felt that CES efforts in the retail sector could help improve environmental conditions (Section 4.2). This shows that within our sample, CES activities are strongly associated with an improvement in overall environmental quality. Respondents also stated that they were willing to change their supermarket to help bring this about. Even though companies may not necessarily see this behaviour being played out in supermarket stores with most of their customers, it is this willingness to change, or rather the acknowledgment that there should be a change in one's own purchasing behaviour to improve environmental conditions, that can be viewed as positive feedback from supermarket customers. This acknowledgment of some level of personal responsibility and a need for change and action can motivate South African retailers to rethink their CES strategies. In particular, how they engage with their customers to improve awareness of environmental issues, as well as understandings of the importance and long-term implications of the CES initiatives companies choose to adopt.

The analysis of individual NEP items and facets can provide deeper insights into the underlying environmental assumptions of participants, connections with the broader socio-economic contexts, and how these may intersect with purchasing behaviours and CES promotion. Participants generally agreed with the possibility of an ongoing ecological crisis, need for there to be a balance with nature, and need to adopt anti-anthropocentric behaviours. A study by Ogunbode (2013) used the NEP scale to measure environmental attitudes among Nigerian students and found similar findings on the fragility of nature's balance and the possibility of an eco-crisis facets. The author refers to (1) the environmental worldviews of Africans being underpinned by both normative and pragmatic bonds with nature, (2) environmental concerns centred on human advancement and well-being, and (3) the impact of a strong religious disposition among respondents. Several participants in our survey referred to their religious beliefs when agreeing with item 12, "*Humans were meant to rule over the rest of nature*", which contributed to the low average score (stronger anthropocentric worldview) for this statement and the limits to growth subscale. Therefore, while overall most participants support pro-NEP worldviews, respondents also hold pro-DSP worldviews related to human intelligence and innovation not making the planet unliveable, the availability of unlimited natural resources, and humans being able to learn to control nature. These findings identify the challenges linked to understandings of what constitutes threats to the environment, the limits of nature's rehabilitative capacity, and how much of a role technology can play in preventing ecological disasters. The above suggest a customer base that on the one hand understands the importance of protecting the natural environment and shows some pro-environmental attitudes, but on the other hand these are not necessarily strong or overt. This creates important implications on how to promote awareness of environmental issues within the retail sector. As discussed below, this also has major implications for mismatches between corporate expectations and consumer behaviour (Section 5.2), as well as the successful promotion of broader SCP initiatives (Section 5.3).

5.2. Mismatches between corporate expectations and consumer behaviour

As outlined in Section 2, there are frontrunner supermarket companies in South Africa that are adopting multiple CES strategies. These companies seek to attract a niche group of customers who are able and willing to pay extra for greener products. To a certain extent they have been successful in establishing and maintaining their own brand of green range products, which compete with more established and/or cheaper brands. However, Gunn and Mont (2014) state that the willingness of some large supermarket retailers to influence consumer choices through promoting sustainable products or removing unsustainable ones may be at odds with their profit seeking goals. For example, Woolworths, a supermarket company with a strong organic food focus catering more for the more well-off South African consumer (Ntloedibe, 2017), can afford to produce its own brand of green products to sell at a premium. However, competing companies such as Shoprite, which caters to the lower end of the consumer market (ibid), may not be able to do the same (or to the same extent) due to their more price conscious consumers. In emerging economies, it is therefore essential to provide lower-priced alternatives for the low-income segments of the market which constitute most of the population (Carrete et al., 2012).

Our findings suggest that there is often a disconnect between what companies have to offer and how much consumers are willing to pay for green products. Environmental concerns ranked low as determinants of consumer purchasing behaviour, whereas the quality and price of products were ranked as the two most important factors driving consumer choices. Similarly, a study by Biswas (2016) on shoppers at large retail outlets in India found that product price, quality and performance, and availability have the highest impact on consumer's intentions to pay a green price premium. This raises the question of whether there is misalignment in the way that companies view consumer demand and how product related CES strategies are marketed, particularly in emerging markets. Green products are commonly perceived as being priced higher than their standard, non-environmentally friendly equivalents (Moser, 2016), while consumers attach greater importance to price than environmental attributes, generally preferring low priced green products (Joshi and Rahman, 2015). Therefore, if the price of a green product is higher than their expectations, "*it will undermine the*

effect of their green attitude and increase the attitude-behaviour gap in green purchasing" (Joshi and Rahman, 2015: 138). Additionally, most respondents fell within very low household income brackets. Therefore, in developing economy contexts, it is likely that most consumers would prefer not to buy such products simply because of the cost difference. This is when factors such as affordability, quality and brand reputation/loyalty outcompete the environmentally friendly characteristics of products and services. For example, Young et al. (2010) state that consumers generally have their personal favourite brands which they prefer over green brands. Additionally, consumers often view sustainable product options negatively, perceiving them as being of lower quality, less aesthetically pleasing and more expensive (White et al., 2019). Therefore, while frontrunner companies invest significantly in developing and marketing their own environmentally friendly products, they could still lose market share to competing, well-established products. Furthermore, factors affecting the decision to purchase a green product will vary depending on the product. For example, discussions around barriers to buying organic food revolve around issues of price, but also access, availability, visual product quality and presentation, mistrust of organic food in supermarkets, eating habits and lack of cooking skills (Padel and Foster, 2005).

Companies with a more well-off consumer base such as Woolworths, can sell their green product options at a premium, as customers are tightly attached to these brands, and may be willing to pay the extra premium. On the other hand, the best strategy for retailers with more price conscious consumers, would be to associate (or co-brand) the environmental benefits of products with higher product quality. For example, companies can combine product attributes related to quality (i.e. durability, taste, health effects, efficacy etc.) with green attributes (e.g. recyclable packaging, organic farming, sustainable certifications etc.), and focus particularly on the quality aspects of the products in their marketing campaigns. This could appeal more to consumers' purchasing criteria for quality products and consequently influence them to consider buying products that have higher quality but are essentially green. This strategy is also supported by Roberts and Bacon (1997), who suggest that to elevate ecological compatibility in the hierarchy of buying criteria, marketers should stress that their products are comparable with regards to price, quality, and convenience, with the added benefit of ecological compatibility. Marketing campaigns geared at familiarising consumers with these brands, preferably at no expense to them, would help in this respect.

5.3. Promotion of SCP initiatives in the supermarket sector

Our results highlight the importance of understanding the associations between consumer socio-demographic characteristics, their environmental attitudes, and how these influence consumer perceptions and behaviour. To varying degrees, socio-demographic characteristics such as age, gender, marital status, income, and education levels, and whether respondents have children, affect respondents' perceptions of CES activities, their purchasing behaviour and environmental worldviews. Respondents with children ranked consideration of environmental factors when considering a purchase higher than those who did not have children. Similarly, female respondents ranked price as a stronger factor when considering a purchase than males. A study by Heyns et al. (2014) on the acceptance of green wines in South Africa found that females perceive green wines to be significantly better for health than males do. Furthermore, more females were willing to pay a higher price for green wines than males. Disparities such as these should be further studied to better understand differing consumer green purchasing priorities and their broader sustainability concerns. Our results suggest that overall consumers are more pro-environmentally inclined and have a positive view of the impact of supermarket CES activities, which has positive implications for SCP initiatives within the sector.

Analysis of the five NEP facets can help identify which specific aspects of an ecological worldview respondents are more mindful of and which they are not. This information can inform the development of CES strategies and how they are marketed and explained to consumers. For example, in this study participants scored low on NEP items related to humans being able to resolve environmental problems because of our advanced capabilities, and the earth having limited natural resources. Therefore, water saving related CES strategies for example, could focus on the consequences of the recent devasting drought in South Africa, during which a National State of Disaster was declared, to emphasize the 'limits of our ingenuity' and the potential disastrous consequences of not conserving scarce resources. Saha and Kuruppuge (2016) assert that knowledge of environmental issues is a significant predictor of environmentally friendly behaviour. Therefore, raising awareness of environmental problems among customers is now seen as part of the supermarket company's social and environmental responsibility, especially environmental issues that are closely related to the products sold and the natural resources retailers consume as part of their operations. An example of a CES initiative that tackles public awareness of declining resources is the supply chain and consumer outreach work undertaken in collaboration with WWF SASSI. The organisation has developed several tools to help consumers choose sustainable seafood options (refer to http://wwfsassi.co.za/tools/) and has partnered with the top four South African supermarket companies to encourage sustainable sourcing of seafood. These types of CES activities require the participation of multiple supply chain stakeholders and tackle numerous sustainability issues, including habitat destruction, overexploitation, and livelihood issues, which are particularly relevant to developing countries. Consequently, they are critical in establishing successful, long term CES initiatives within the supermarket sector, as well as achieving broader SDG 12 targets, especially because considerable focus is placed on helping consumers understand the environmental implications of their product choices.

6. Conclusions and recommendations

For this study we conducted a survey with South African supermarket chain customers to understand their purchasing behaviour and the visibility of CES strategies, as well as the factors affecting them. The results suggest the variable visibility of different CES strategies, as well as a certain disconnect between what sustainable products companies are offering and customers' willingness to purchase. Below we offer some recommendations on how to enhance the effectiveness of CES efforts in supermarket chains. We acknowledge that the sampling method may affect the generalisation of the results to some degree. In this sense, our findings should be seen as a point of reference for future studies that have access to more comprehensive information on customer visitation rates to help determine the study sample in a more statistically robust manner.

Given the multitude of environmental issues we face, consumers are increasingly checking what the companies they patronize are doing to help solve these problems, particularly where and how the products they purchase are sourced. Therefore, supermarket companies in particular risk being named and shamed if they are not considered to act appropriately by their stakeholders. Decreasing their total ecological footprints is becoming a key objective, especially for the more progressive companies that lead in CES initiatives, and this involves persuading their suppliers, manufacturers, and customers to consider the entire life cycle of products. This requires strong collaborations with organizations such as WWF SASSI (WWF, 2021), consumer associations, environmental watchdogs etc. Furthermore, strategies to influence consumer preferences, improve visibility and awareness, and change DSP worldviews such as choice editing, nudging and priming should be prioritized. Case study research on the outcomes of such initiatives, especially in emerging economies, is needed to assist companies to develop and replicate successful strategies at different levels of the supply chain.

Additionally, through resourceful marketing and use of their customer data (including sales data and socio-demographic data

obtained from shopper loyalty card programs), companies can increase visibility of their CES initiatives to their customers and improve awareness of environmental problems. While 'knowing thy customer' has in the past been focused on getting the customer to buy more and indiscriminately, the supermarket company is now being nudged into the position of a change agent, responsible for creating and marketing healthier and environmentally friendlier options, as well as decreasing their pollution output and use of natural resources. Although these are by no means easy objectives to achieve, customers, shareholders and watchdog organizations will continue to demand that more is done.

Finally, to change consumer (and consequently supply chain stakeholder behaviour), understanding consumer environmental worldviews and related psychology is important. Better understandings of these can help identify levels of concern for different environmental aspects and ultimately which issues consumers need more clarification on, as highlighted in this study (Section 5.3). Furthermore, similar studies on perceptions of CES initiatives and buying behaviour in SSA and other emerging economy contexts are needed to design, implement and normalize long term SCP actions in supermarket value chains. South Africa's supermarket companies dominate the retail sector both within the country and SSA (Section 2). They therefore represent major actors in pushing the SCP agenda to their upstream and downstream supply chain stakeholders. Consequently, the further development and success of their CES strategies is essential in changing the way consumers and other supply chain actors respond to urgent environmental challenges in the region.

CRediT authorship contribution statement

Merle Naidoo: Conceptualization, Methodology, Formal analysis, Investigation, Resources, Data curation, Writing – original draft, Writing – review & editing, Visualization, Project administration, Funding acquisition. **Alexandros Gasparatos:** Conceptualization, Methodology, Writing – review & editing, Supervision, Funding acquisition.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

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