

Article

An Integrated Model of the Sustainable Consumer

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Abstract: The term ‘sustainable consumer’ (SC) is used across various knowledge domains, from sustainable consumption, green marketing, sustainability, and social change to social marketing for sustainability issues. However, the term SC lacks a precise definition, which leads to the inaccurate evaluation and measurement of the impact of green marketing or social marketing campaigns on consumption—sustainable or otherwise. This paper develops a framework to clarify the term ‘sustainable consumer’ to assist both scholars and practitioners. The application of systems thinking was applied to the extant literature to theorise the SC. This conceptual paper provides a new framework for theorising SCs: the integrated model of the sustainable consumer (ISMC). This framework emphasises the interconnected relationships of influences within the SC profile to assist scholars in examining SCs within these systems with precision. We contend that, to promote and maintain the desired sustainable consumption for long-term effects, researchers and practitioners should consider the impact not only of the socio-psycho-demographic characteristics but also the connection of the person to the environment and their community, in addition to their worldviews. The framework presented here challenges linear models by proposing a nested, dynamic structure that recognizes the interconnected influences within the sustainable consumer’s ecosystem. The framework also enables a targeted intervention design according to the layer and element and permits more precise evaluations of behaviour change campaigns’ effectiveness.

Keywords: sustainable consumption; green marketing; systems thinking; consumer behaviour; sustainable consumer



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1. Introduction

Increasing consumer concern towards environmental issues, especially climate change, has led to increasing research on how consumers’ pro-environmental values, beliefs, and attitudes relate to sustainable practices. Current studies in sustainable practices have largely focused on individuals’ behaviours (see, for example, Keszey [1], Purcărea et al. [2], and Simeone and Scarpato [3]). This behavioural focus stems from the desire for immediate and direct results [4]. However, focusing merely on changing behaviour can lead to the overuse of one-size-fits-all approaches that target only the individual level, while collective change across multiple levels is needed to transform a community for an overall positive impact. For example, trying to reduce plastic packaging without considering the benefits of the packaging in a consumer’s food consumption journey may increase the amount of food waste [5]. As a result, sustainability campaigns and interventions have left many individuals in different segments unreached, uninterested, or unchallenged [6]. Therefore, identifying the multifaceted constructs of consumer profiles can help environmental campaigns target each segment as well as researchers in accurately measuring the outcomes.

The main challenge of identifying a consumer profile is the vague definition and measurement of a ‘sustainable consumer’ (SC). The term is often used interchangeably with terms such as ‘green consumer’ [7–9]. Similarly, terms like ‘pro-environmental behaviour’, ‘ecological behaviour’, ‘responsible consumption’, and ‘anti-consumption’ are often used

to convey SC behaviour. Also conflated with these terms are ‘sustainable consumption’, ‘sustainable lifestyles’, ‘sustainable living’, and other terms used to connote sustainability. However, these terms are not interchangeable when it comes to the valid measurement of outcomes [10]. For example, a sustainable lifestyle may involve not consuming (e.g., anti-consumption) [11], in which case the terms ‘consumption’ or ‘consumer’ are inappropriately applied. People may live sustainably simply because they have few choices about their consumption behaviours, especially if they are living in ‘bottom of the pyramid’ contexts (see, for example, [12]).

This paper aims to identify the theoretical underpinnings of the framework of the SC construct and its components by following a systems theory approach. It first outlines the theorising process we used, which is based on systems thinking, to create a network of associations, including both connotations and denotations, around the focal concept: the SC. We then outline the literature review used to identify terms in their context of use. Subsequently, we outline how we analysed, examined, and detailed the associations and mechanisms of meaning that are used in extant descriptions of the SC. The analysis of the literature helped clarify the various elements of a new model of a SC, which is outlined in the penultimate section. The final section of the paper discusses the implications and directions for future research that arise because of the new framework.

2. Systems Thinking

For an SC to be identified, we must first take the position that people’s lived experiences and their social and physical environments impact their behaviours. This is because consumers are embedded in an ecological system that consists of actors, acts, and interactions [13]. Within this system, humans are also affected by their own cognitive and metacognitive influences as well as their personal characteristics [14,15]. There has been a growth in research acknowledging the ecological system that underpins sustainable behaviour (e.g., Domegan et al. [16]; Moschis, Mathur and Shannon [14]; Layton [17]; and Mieke et al. [18]). These researchers have facilitated a shift towards a holistic view of human ecosystems and away from individual consumers acting as independent agents making informed decisions about their behaviours [19]. This shift has also expedited a change from designing and implementing ‘interventions’ [20] to creating spaces for collaboration, co-creation, and cooperation between the actors in a system [19].

Taking the perspective that the SC is constructed from a complex embedded social context and the SC’s own cognitive and metacognitive mechanisms, this paper takes systems thinking as the foundation to theoretically construct the SC. Systems thinking was built on the systems theory developed by biologists Bertalanffy [21] and Weiss [22]. Central to systems thinking is the notion of inter-related and interdependent actors. Systems thinking posits that the only way to fully understand something is to understand the activities, interactions, and actors in relation to each other and the whole [23]. Each interactant comes to the system with their own systemic background, and, while individual systems may or may not overlap, the interactions within the system will be influenced by their respective backgrounds [24]. Further, systems are not closed, and external influences will affect the system (e.g., Laimon et al. [25]; Lindridge et al. [26]; and Schoon and Van der Leeuw [27]). Within the scope of this paper, the focus is only the construct within the SC system. Therefore, although we acknowledge the impact of the external influences on the SC system, these influences will not be included in the final framework.

3. Research Methodology

A literature review was used to build a conceptual framework based on systems thinking. Because the profile of an SC cannot be fully explored within an individual context, a systemic conceptual framework, derived from the literature review, enabled us to collect and synthesise the relevant literature that constructed the elements and concepts of the SC.

3.1. Data Collection

We followed the process based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement, with systems thinking as the guiding framework for the literature review. Firstly, a search strategy was developed, using relevant search terms (see Table 1). The search was completed using academic databases from a variety of disciplinary areas (also see Table 1) to ensure the widest coverage of sustainable consumption articles. As sustainable consumption research involves multiple disciplines, using these interdisciplinary databases allowed us to access a diverse array of sustainable consumption studies across various fields. The following inclusion and exclusion criteria were used to ensure that the articles were up-to-date, rigorous, as well as providing transparency for the screening process:

- 1. Full-text, original research in a peer-reviewed journal, and highly cited grey literature;
- 2. Published in English;
- 3. Published during the 2015–2020 timeframe;
- 4. Examine sustainable consumption AND studies with sustainable consumption as the main theme of focus;
- 5. Exclusion criteria—studies were excluded if they were editorials, commentaries, and dissertations.

Table 1. Search strategy for data collection.

Search Terms	Timeframe	Database
sustainability; sustainable consumer; green consumer; ethical consumer; sustainable consumption; green consumption; ethical consumption; sustainable behaviour; green behaviour; sustainable lifestyle; worldview; sustainable community; sustainable policy; education; school; infrastructure; regulation; media; peer influence; family	2015–2020	Google Scholar, SCOPUS, Web of Science, ProQuest, JSTOR

3.2. Data Analysis

Endnote (version 20.4) and Microsoft Excel (version 16.72) were used to review and manage the collected literature. Endnote was used to manage the bibliography, and Excel was used to create a data extraction sheet and the qualitative analysis. Prior to data extraction, from Endnote, we assessed the quality of the papers in accordance with the inclusion and exclusion criteria. Studies were then reviewed based on the exclusion and inclusion criteria by at least two authors independently.

During the first stage of title screening, the titles of studies identified from the search were assessed for inclusion. The titles approved by either author were moved onto abstract screening. In the next stage, the full texts of the abstracts selected in the previous stage were screened for eligibility. Studies were excluded if they were editorials, commentaries, and dissertations. Studies were also excluded if they were not relevant to sustainable consumption. In the event of any disagreements, a third author arbitrated, and a consensus was reached on the study’s inclusion in the review.

In the next step—the data extraction process—the remaining papers were entered into an Excel spreadsheet alongside the authors’ names, the keywords provided by the authors, the abstract (where applicable), and the journal name. Once the data were inserted into the Excel extraction sheet, the data were then categorised into three overarching categories based on the coding framework: (1) a macro-layer, which included values, perspectives on the importance of the environment, and environmental concerns; (2) a meso-layer, which included sustainable community and social capital as well as a connectedness to nature; and (3) a micro-layer, which included constructs such as attitudes, wellbeing, and routines. This involved grouping similar concepts and themes together and assigning them to the appropriate level in the system. Because the coding process could be affected by subjectivity, it was performed by two authors independently. If a disagreement arose or an author was

uncertain about how best to code an article, a third co-author would participate, and a collaborative decision was made.

4. Sustainable Consumers' Personal Characteristics

Attempts to define the SC can be traced over a long period of time, and, although there have been many ways of approaching the issue, a review of extant definitions is summarised in Table 2. There are distinct disciplinary differences between these approaches. Furthermore, some theories account for behaviours, such as buying green products, while others involve the assessment of background characteristics, such as demographics, or more abstract concepts such as attitudes and worldviews. All these approaches have been more or less successful in categorising SC behaviours. However, we do not yet know if these behaviours *define* the SC or if the behaviours are *merely acts* that come about as a result of the socio-ecological system and the extant behavioural infrastructures [13].

There is an underlying assumption underpinning much existing research that attitudes will lead to intentions and intentions will lead to behaviour (see, for example, Chuang et al. [28]; Chwialkowska et al. [29]; and Cleveland et al. [30]). However, the intention–behaviour gap remains a conundrum for sustainability [31–33]. Zaremohzzabieh, Ismail, Ahrari, and Abu Samah's [32] meta-analysis of 90 studies shows that there is a role for attitude in predicting consumer behaviours, but contextual and methodological effects confound the explanatory power of their theory. Consequently, there is still a need for some 'intellectual housekeeping' to open the field to precision when it comes to predicting behaviours. Table 2 illustrates how most definitions or descriptions ascribe agency to the person who acts or behaves in an environmentally responsible, friendly, or conscious way. Thus, these descriptions tacitly posit that an individual can act independently of the influences that are occurring in the context of choice and the person's social ecosystem. However, research also shows that this is not necessarily the case and that systemic factors affect both consumption and behaviours [34,35].

Table 2. Sustainable consumer definitions and descriptions.

Researcher (Year)	Terms	Definition/Description	Factors/Variables as Categoricalised by the Original Author	Action/Person
Berkowitz and Luttermann [36]	Socially responsible personality	Person who is highly involved in their society and many of their specific beliefs and actions are influenced considerably by the culture in which they are embedded	Socio-demographic factor	Action (non-political participation; interest and activities in domestic politics)
Anderson and Cunningham [37]	Socially conscious consumer	Consumers who are more sensitive to and more likely to purchase products geared towards the enhancement of social and environmental welfare	Demographic factors, and socio-psychological factors	Person
Roberts and Bacon [38]	Ecologically conscious consumer	Consumer who purchases (or avoids) products and services that he or she believes to have a positive (or negative) impact on the environment	Environmental values and concerns (ECCB)	Action (resource conservation, recycling, transport behaviour, and sustainable purchase behaviour)
Stern et al. [39]	Environmental activist/Environmental support	<i>Environmental activist</i> —individuals who are committed to public actions intended to influence the behaviour of the policy systems and of the broader population <i>Environmental support</i> —individuals who are sympathetic to the environmental movement and willing to take some action and bear some costs in order to support the movement	Environmental values, beliefs, and norms (VBN)	Action (activism, policy support, transport behaviour, recycling, resource conservation, and purchase behaviour)
Gilg et al. [40]	Green consumer	<i>Committed environmentalists</i> —the most enthusiastic group, the most likely to always compost their waste, and the far more likely to ‘usually’ undertake sustainable activities <i>Mainstream environmentalists</i> —undertake the range of behaviours with the same regularity on the whole as the committed environmentalists, although they are considerably less likely to compost their waste <i>Occasional environmentalists</i> —more likely to either never or rarely undertake sustainable purchasing behaviours <i>Non-environmentalists</i> —the least active, with the majority of individuals never undertaking sustainable activities	Environmental values and concerns, socio-demographic variables, and psychological factors	Person
Hailes [41]	Green consumer	Consumer who associates the act of purchasing or consuming products with the possibility of acting in accordance with environmental preservation	Intention and behaviour	Person
Akehurst et al. [42]	Ecologically conscious consumer	Consumers who seek to consume only products that cause the least—or do not cause any—impact on the environment	Socio-demographic factors, and psychographic factors	Action (resource conservation, recycling, transport behaviour, and sustainable purchase behaviour)

Table 2. Cont.

Researcher (Year)	Terms	Definition/Description	Factors/Variables as Categorised by the Original Author	Action/Person
Cleveland et al. [43]	Green consumer	<i>Activist</i> —engages in public action intended to influence larger populations while protecting the environment, such as involvement in environmental demonstrations and supporting environmental organisations <i>Avoider</i> —boycotts products that are harmful to the environment and living species, such as avoiding the purchasing of environmentally unfriendly products <i>Green consumer</i> —ideal citizen who works towards low-profile sustainable development, guided and motivated by moral ethics and confident of making a difference <i>Green passenger</i> —people who are willing to take public transportation and/or reduce the use of passenger vehicles <i>Recycler</i> —individual who makes any effort to deal with recycled or recyclable products <i>Utility saver</i> —individual who performs any action that minimise the use of utilities	Pro-environmental behaviours	Action (activism, avoidance, sustainable purchase behaviour, recycling, resource conservation, and transport behaviour) and Person
Landon et al. [44]	Sustainable tourist	<i>Localism</i> —tourists who intend to consume local goods and services <i>Willingness to sacrifice</i> —tourists who incur a cost to seek green products and services	Pro-sustainable behaviours	Person
Trudel [45]	Sustainable consumer behaviour	The extent to which decisions are driven by the intention to benefit or limit the impact on the environment	Self-signalling, self-identification, social identification, social influences, and norms	Action
Hosta and Zabkar [46]	Responsible sustainable consumer behaviour	Consumer behaviour that includes considerations of the environment (nature) and the social environment (other people and society) when purchasing a product	Perceived consumer control/effectiveness, personal/social norms, and ethical ideologies/obligation	Action
Haba, Bredillet, and Dastane [7]	Green consumer	Those who engage in behaviours that improve social and environmental outcomes while boosting consumer wellbeing	Consumer behaviour, perception, lifestyle, social-aspects, environmental attitudes, and environmental values	Person

Overall, there are currently three broad approaches that researchers are following to define SCs' characteristics and segment consumers in their studies: (1) socio-demographic characteristics, (2) environmental concerns and values, and (3) psychological factors. Within these three, socio-demographic characteristics are the most used approach to define and segment SCs [36,37,42]. The socio-demographic approach segments consumers according to their characteristics such as sex, age, income, or literacy [47]. Many researchers use more than one approach. For example, Anderson and Cunningham [37] described 'socially conscious consumers' as consumers who not only intend to satisfy personal needs but are also concerned about the welfare of society and the environment (socio-psychological). Based on their post hoc analysis of the responses in their study, SCs belong to a demographic group of females, 40-year-olds, and are a socio-economic class above the average.

4.1. Socio-Demographic Characteristics

Socio-demographic characteristics are relatively easy to research, in that measures such as age, income, education, and location are reportable and objective. Milfont and Markowitz's [48] multilevel perspective on SC behaviour attempts to predict this behaviour based on actors' nation, region, household, and individual characteristics. However, Milfont and Markowitz's [48] dimensions are limited to socio-demographic characteristics such as age, gender, education, and income. Socio-demographic characteristics are beyond the influence of any sustainability campaigns and cannot be changed by interventions [24]; they just 'are'.

The fixed characteristics of socio-demographics characteristics are not helpful in transforming sustainable consumer profiles and, thus, will not be included in the conceptual model. Particularly, campaigns or interventions cannot change a person's socio-demographic characteristics in order to make the consumer be more sustainable [6]. For example, a sustainability campaign cannot change the sex, social class, age, income, or education of a consumer. Furthermore, socio-demographic characteristics have been shown to be inconsistent when used to predict SCs' behaviours (e.g., Ali et al. [49]; Elhoushy and Lanzini [50]; and Luchs and Mooradian [51]). Although there are studies which show that women tend to act in a more environmentally aware manner than men [52], others have found that the relationship between attitudes and the use of environmentally conscious products was more intense in men than in women [53]. Similarly, the relations between income, literacy, and sustainable behaviour have been shown to be mixed [42].

4.2. Environmental Concern and Values

Environmental concern (EC) and values, on the other hand, are commonly defined as the individual's awareness of the environmental problems and their willingness to be part of the solution [54–56]. The EC construct was developed from Weigel and Weigel's [57] theme of two social value dimensions: 'altruistic–egoistic' (or 'pro-social and pro-self') and 'conservative–open to change'. Several authors have correlated EC with environmentally responsible behaviour [58–60]. EC is related to emotions and knowledge as well as to a readiness to change behaviour [61]. EC is a psychographic segmentation approach that explores the personality traits, beliefs, values, interests, and lifestyles of a person to understand the motives behind their actions and behaviours [62]. Such an approach examines the 'why' and 'what' as opposed to the 'who' and 'where' provided by demographic and geographic segmentation.

4.3. Personal Factors

Another commonly used psychographic approach in sustainable consumption research is that of personal psychological factors. Personal psychological factors are personal attitudes and beliefs held by the individual concerning their own sustainable behaviour. There are two major groups of influences relating to sustainable consumption: perceived consumer effectiveness (PCE) and self-efficacy. PCE and self-efficacy both examine the extent to which any one consumer can have an impact on the environment and their ability

to take part in green consumption [40]. It has generally been found that a high level of PCE and self-efficacy results in greater levels of green consumerism [63–65].

Regardless of the differences in approach, most definitions of SC in Table 2 follow the perspective of the internal environmental locus of control (INELOC) model. The INELOC perspective assumes that the SC is operating in a free-choice, individualistic, ‘decision-making’ mode, thereby portraying the SC as a conscious chooser between environmentally sustainable and unsustainable consumption [24]. INELOC has the central idea of the belief that the outcomes of an individual’s life are primarily the results of that individual’s own actions [43]. In studies from an INELOC perspective, researchers do not consider external actors as contributors to individuals’ behaviours [66].

4.4. Worldviews, Values, and Attitudes towards the Environment

Worldviews, values, and attitudes are amongst the most researched areas in SC studies. While worldviews, values, and attitudes provide basic guidance and awareness towards sustainability behaviours, these elements alone do not predict consumer behaviour.

A worldview consists of a person’s approach to and conception of the world. It includes their philosophical stance and how they see life [67]. People’s worldviews are formed based on their cultural and lived experiences. People’s worldviews are often latent (i.e., not directly observable); values and attitudes are more manifest measures that can indicate a particular worldview, both of which have significant bodies of research underpinning them in sustainability research [68].

4.4.1. Worldviews and Perspectives on the Environment

A worldview is one’s way of seeing the world and is acquired over time. It comprises nonrational foundations for one’s conduct, including emotions, thoughts (including attitudes and values), and actions. It provides a coherent but not necessarily logical or accurate way of thinking about the world [69]. A worldview is sometimes called a paradigm, but we have avoided that term in this characterisation of the sustainable consumer because of the connotations associated with the use of the term paradigm in scientific writing (see, for example, Moschis, Mathur, and Shannon [14]). A consumer’s worldview provides them with guidance on the general principles by which they ‘should’ organise their actions within the world: how they are to act and create, and how they can influence and transform the world [68]. Studies demonstrate that worldviews transcend the boundary between human and physical nature and have the potential to map across social attitudes to sustainability [70]. High levels of environmental activism have been strongly linked to values that consider the natural environment to be of great importance in someone’s life [71]. Worldviews have been demonstrably important to environmentalism [71–73]. Theories of worldview in sustainability can be divided into three domains: theories related to the New Ecological Paradigm (NEP) Scale [56], theories related to the VBN model [39], and theories related to attitudes towards the environment, of which there are too many to mention here.

The NEP is one of the earliest models to measure worldview in relation to the environment. The NEP scale was originally designed to assess a new paradigm—a worldview of how mankind interacts with the environment—and not to assess individuals’ values or attitudes towards the environment [68]. Later, Dunlap and Jones [56] revised the NEP scale to become a ‘broad attitude measure’. To address the ability to predict consumer behaviour, Brennan, Binney, Aleti, and Parker [68] recommend a further expansion of measuring worldview to include alternative domains such as values, beliefs, norms, and ECs. The NEP has more than 15,100 Google Scholar citations as of December 2023 and is, therefore, one of the most cited measures used in exploring the SC.

4.4.2. Values, Beliefs, and Norms

A further limitation of existing theoretical frameworks is that they capture the concept of the SC as if consumers do not change over time. However, consumers evolve throughout their life course [74]. As consumers grow and develop, their values adapt as a result of

their experiences [75]. In the early stages of development, values and norms are inculcated through family and close social ties [76]. As emerging adults, values and norms are assimilated from peers and other role models [77]. Values are, therefore, not fixed, and norms are dependent on the social group from whom they are absorbed [78]. Despite the significance of collective values in shaping the behaviours mentioned above, rare attempts to examine an SC in different development stages do not consider social influences on behaviours. For example, the value-belief-norm (VBN) model [39] explains the causal relationship between human values on behaviour with four stages of SC profiles: environmental activist, policy support, environmental citizenship, and private-sphere behaviours [39]. While the VBN model addresses the development stages of consumers as they move towards sustainability, it does not reflect the relationship of consumers to the surrounding social environment. The central theory of VBN is the causal chain of direct influence of values, beliefs, and norms on behaviours. As a result, the VBN model is still built on the INELOC perspective that consumers control their behaviour and that other social influences are excluded. Furthermore, in the VBN causal chain, the outcomes are behaviours that do not always reflect the SC's profile. For example, consumers may reduce waste due to economic reasons (saving money) or health reasons (micro-plastics) rather than environmental reasons. Therefore, the elements in the VBN need to be assessed as an interconnected system rather than as a causal chain effect.

4.4.3. Attitudes

Attitudes are instrumental in motivating sustainable behaviours. Attitudes are a psychological tendency that is expressed by evaluating something positively or negatively [68]: for example, 'I love the environment'. The term 'attitude' involves connotations of orientation towards or away from a notional object. While the constructs of EC and VBN cover several similar elements to NEP (worldview), EC and VBN include other dimensions. For example, EC is commonly defined as the individual's awareness of environmental problems and their willingness to be part of the solution [55,56]. Similarly, the VBN was introduced by Stern, Dietz, Abel, Guagnano, and Kalof [39] to explain the causal impact of human values on behaviour. Whilst both the EC and the VBN do not show a high potential in predicting sustainable behaviours, they do show a consistency in distinguishing consumers with positive attitudes towards undertaking sustainable actions [79,80]. Although there are similarities between these three theories, such as altruistic/egoistic (or pro-social and pro-self) values (EC and VBN) and human domination (NEP), the predictive qualities of these similarities remain unclear [81,82].

Another aspect of attitudes is that of attitude-behaviour alignment, also known as attitude-behaviour consistency, which is when a person's attitude is consistent with their behaviour [83]. Most authors in the attitude-behaviour consistency domain consider human behaviour from a 'rational choice' perspective [68]. In the context of sustainable consumption, 'rational' means choosing environmental options that balance between one's needs and the environment's needs. This may also involve not purchasing or anti-consumption [84].

Major models in the rational choice domain are developed from or related to Ajzen's [83] Theory of Planned Behaviour (TPB) or the closely related Theory of Reasoned Action (TRA) [85]. Although the TPB remains a dominant theory in sustainability's INELOC paradigm, the TPB has limitations in the context of sustainable consumption. For example, consumers with pro-environmental attitudes and intentions do not automatically transform their thoughts into actual behaviour without the relevant external activation [85]. Furthermore, not all the actors in the TPB contribute equally to the desired behaviour. For example, results from Litvine and Wüstenhagen [86] show that personal norms, perceived self-efficacy, perceived behavioural control (PCB), and willingness to pay are major factors directly affecting green behaviour. In that research, attitudes are subordinate to norms and PCB. This is where individuals hold favourable attitudes

towards environmental conservation/protection but continue to behave unsustainably, such as by contributing waste and excessive buying.

4.5. *Routines and Habits Affect the Sustainable Consumer*

Despite the preponderance of research into models that frame consumers as active deliberators, consciously choosing between alternative behaviours, many behaviours are driven by repetition and habit rather than by a conscious consideration of values, beliefs, and norms [87]. Habits are learned dispositions to repeat past responses that are conducted frequently, usually at the same location and time [88]. Generally, habits are less guided by conscious intent [89]. Consequently, understanding the behavioural repertoires of consumers, both considered and habitual, will form an important part of describing an SC. An SC will be willing to disrupt their routines and habits in order to benefit the environment. The disruption of routine is the ability to reflect on old habits, disrupt the habit, and discontinue the habit in order to form new more sustainable routines [87]. Within studies of the disruption of routines, there are two dominant theories: the habit discontinuity hypothesis (HDH) [90] and the self-activation hypothesis [91]. The habit discontinuity hypothesis states that, when a context change disrupts individuals' habits, a change in behaviour is more likely to be deliberately considered [87]. The self-activation hypothesis states that, when values incorporated in the self-concept are activated, they are more likely to guide behaviour in accordance with values [92]. Verplanken, Walker, Davis, and Jurasek [91] provided experimental evidence to suggest that values influence choices and behaviour only when two conditions are met: a value is a part of a person's self-concept, and a value is cognitively activated by changes in context, such as life events and developmental evolution. However, as demonstrated by Lockrey, Brennan, Verghese, Staples, and Binney [13], behavioural infrastructures can be designed to interrupt routines and support the development of new habits. Understanding where there is opportunity to intervene is important for strategies aimed at decreasing the impact of consumer behaviours and, thus, decreasing the reliance on consumers' active cognitive and affective engagement to foster environmentally responsible behaviours.

4.6. *Consumers' Non-Material Wellbeing Influences Sustainable Behaviours*

Materialism is a well-researched concept in the sustainable consumption domain. As opposed to materialism, however, non-materialism is a personal attitude in which the consumer forgoes acquiring and consuming material goods [93]. In contrast to the common assumption about development that increasing human wellbeing leads to increased natural resources consumption, there is a mutually beneficial relationship between wellbeing and sustainable consumption [94]. An increase in material wealth and goods does not correlate to subjective wellbeing after a certain level of possession [95]. Studies have been conducted to examine different approaches to increase wellbeing while reducing the stress placed on the environment by society and vice versa [94]. Additionally, there are certain sub-cultural movements that have a close link with non-materialism, such as mindfulness, voluntary simplicity, and minimalism, which resist high-consumption lifestyles (e.g., Lubowiecki-Vikuk et al. [96]) and seek a sustainable, lower-consumption but higher-quality-of-life alternative [97].

Scholars in psychology have developed a wide array of models to measure non-material wellbeing. The central idea in these different models was introduced by Bradburn [98] as the 'hedonic' balance between positive and negative affect. Yet, Bradburn's [98] model has an emotional focus, which is challenging to conceptualise and measure. The 'hedonic balance' was then developed by Diener et al. [99] to a widely used tripartite model, the subjective wellbeing (SWB) model. Offering a more nuanced approach, the model of psychological wellbeing (PWB) articulates six dimensions that are proposed to engender positive functioning: self-acceptance, environmental mastery, positive relations with others, autonomy, purpose in life, and personal growth [100]. Thus, non-materialism is potentially more indicative of a sustainable consumer than materialism.

4.7. Communities and Behavioural Infrastructures

In addition to personal and individual factors which impact the SC, there are also community influences. The term ‘sustainable community’ conveys two important characteristics related to the study of sustainability: sustainable infrastructure and social capital. Firstly, ‘community’ refers to a geographic area and its infrastructure where people can be connected to each other and that may or may not provide sustainable infrastructure [101]. Secondly, a community also refers to an amorphous boundary that is defined by its social and functional relationships (social capital) [102]. A sustainable community with sustainable infrastructure and a strong social capital enables individuals to perform sustainable lifestyles and their concomitant actions [103]. Therefore, individuals living in a sustainable community have a higher potential to be SCs. However, the converse is also potentially true; if an individual lives within a sustainable community, they may not have a choice about sustainable consumption.

Sustainable infrastructure and the management of a community provide a sustainable behavioural ecosystem, which enables its citizens to translate their worldview into day-to-day sustainable behaviour [104]. To take sustainable actions, individuals must be given the facilities and permission to contribute to the system [24]. The sustainable infrastructure and management of a community enables people to perform basic functions, such as living, working, and receiving their education and healthcare sustainably within the community [102]. There are three sustainability assessment systems (SAS) recognised as global frameworks: Building Research Establishment Environmental Assessment Method (BREEAM) Communities, Leadership in Energy and Environmental Design (LEED) Neighbourhood Development, and the Comprehensive Assessment System for Built Environment Efficiency (CASBEE) for Urban Development [105]. As guidelines designed to establish the infrastructure of sustainable communities, these are very large and unwieldy measures for consumer behaviour research and are, therefore, unlikely to be useful for the measurement of the SC.

Social capital is also important to sustainable living and the formation of an SC's attitudes, values, and worldview. On the principle that “no man is an island” [106], an SC operates within a network of people and processes as well as behavioural infrastructures that facilitate or prevent sustainable consumption behaviours [68]. Putnam [107] (p. 664) defines ‘social capital’ as “The features of social organization such as social networks, norms and social trust that facilitate coordination and cooperation for mutual benefit”. A sustainable community with strong social capital can deliver long-term sustainable living if the members of community have the necessary facilities and support from institutions and individuals [108]. The social capital in a sustainable community enables individuals to participate in their wellbeing and contribute to the development of the community [102]. Social capital is a ‘glue’ and a foundation that ties a community together [109]. Although there are debates regarding the definition and measurement of social capital, most agree that social capital consists of five dimensions: trust, membership and participation, political engagement, shared norms, and informal interactions [110,111].

4.8. Relationship to Nature and the Environment

Connectedness to nature, or individuals' subjective evaluations of their relationships with nature [112], is important to the concept of an SC. Those who enjoy the natural environment are closer to nature and more readily able to see the connection between their actions and the consequences of their actions [113].

The theoretical basis of one's connection to nature comes from the biophilia hypothesis [114,115], ecopsychology [116,117], and psychological research into interpersonal relationships. Expanding self-identity to include the natural environment and experiences of belonging with nature is a key element in defining a connection to nature. A connection to nature can be considered a values-based attitude [118], and it has qualities similar to personality traits, in that it differs between individuals and groups and is relatively stable over time and in different situations but can nonetheless change [119,120]. A connection to nature can also be a state. It can be increased or decreased in the short-term, for example,

with exposure to nature [121]. However, change may require long-term time horizons or repeated exposure [122].

Various studies demonstrate the relationship between connectedness to nature and sustainable behaviour. Individuals with a strong sense of connectedness to nature see nature as an extension of themselves. As a result, they carry out a greater number of pro-ecological, frugal, fair, and altruistic behaviours, which altogether compose sustainable behaviours [123]. In particular, connectedness to nature provides psychological and subjective wellbeing [124]. Connectedness to nature also fosters the forming and sustaining of a sustainable community through shared values and bonding [125]. Studies also show that individuals with a higher level of connectedness to nature tend to have a higher level of altruist values and a higher level of ECs [119,124]. Despite the important and significant role of connectedness to nature, this actor has been excluded in most models predicting sustainable behaviour.

The two commonly used measurements for connectedness to nature (CN) are those put forward by Mayer and Frantz [119] and Nisbet, Zelenski, and Murphy [120] in their Nature Relatedness Scale (NRS). In contrast to the NEP scale, the CN scale and the NRS do not measure one's cognitive belief but one's experiential emotional connection to nature [126]. While sharing a certain level of similarity, the CN scale and the NRS are distinctive. Particularly, the NRS measures emotions at the trait level and considers connectedness to nature as a trait [120]. CN measures the emotional connection that people feel to the nature world, animals, and plants and people's perceived equality between nature and themselves [119]. Therefore, CN is more flexible and can be used to measure both trait and state levels.

4.9. The Sustainable Consumer as a Multi-Dimensional Concept

Current definitions of an SC only look at one dimension and research each individual person (actor) separately as well as each individual's actions (intentions or proxy behaviours) independently. However, in a systems model, sustainable consumption is an outcome of a variety of internal actors and external influences of the SC's behavioural ecosystem. There is no formal mechanism to select appropriate segmentation variables because the segmentation results will likely vary depending on the variables used. Therefore, it is necessary to understand the context of behaviour and the behaviours of the priority group before selecting a range of variables that are to be used to identify meaningful and distinguishable segments [127]. As a result, many one-dimensional measurements cannot precisely measure such complex systems of actors, artefacts, and actions. Furthermore, in systems, there are behavioural infrastructures that provide barriers or facilitators for actions. For example, in the food loss and waste system, cold-chain issues throughout the supply system can lead to food safety issues for the consumer and, therefore, increase waste. However, the consumer has no capacity to change the refrigeration along the supply chain, improve retailer handling, or make delivery trucks go faster to decrease household food waste. Consequently, only looking at individuals' personal characteristics limits the ability to examine where the levers for reducing environmental impacts are within the system. Thus, an SC is not constructed unidimensionally but is rather a multi-dimensional concept consisting of people, organisations, artefacts, mechanisms, and institutions, all of which interact to produce outcomes which affect all the actors in the system—to varying degrees and with varying levels of engagement of the elements. An individual's personal characteristics, while being the focus of much research, have not been helpful in creating behavioural change when it comes to environmental benefit.

The one-dimensional outlook of an SC is due to the focus of SC studies on the behaviour of consumers. Models such as the Theory of Planned Behaviour [83], Motivation–Opportunity–Ability [128], the Green Consumer Purchasing Model [129], or Patterns–Inhibitors–Facilitators [130] focus on explaining the decision-making process of consumers. This results from a focus on more immediate and direct results (changing behaviour) in sustainability rather than on longer-term objectives, such as establishing and maintaining a sustainable lifestyle. However, studies argue that focusing on the cognitive, rational

consumer leads policymakers to inevitably adopt persuasive tactics as the primary social change solution [131,132]. This focus is demonstrably limited in fostering behaviour change. For example, it can lead to a decrease in consumer confidence towards green brands due to false claims and ‘greenwashing’ [131].

In summary, current definitions of the sustainable customer are not apposite to segment, study, and create interventions that may transform the consumer in sustainability. Firstly, there is no shared alignment across sustainability studies on whether an SC is a studied object (i.e., a group of subjects) or merely a purchaser of green products. We argue that the SC is an object, a group of human beings with complex inner and outer systems which cannot be defined, segmented, and measured based on individual behaviours alone. Secondly, an SC is multi-dimensional and cannot be segmented merely in one dimension such as socio-demographic values or ECs. Thirdly, characteristics such as sex, income, or age are not variables and cannot be manipulated in intervention campaigns to transform a consumer into an SC.

The SC needs to be considered from a broader and more systemic perspective to be appropriate for intervention design [24]. Our proposed framework will be helpful for (1) green marketers and social marketers hoping to target consumers at an appropriate stage of consumers’ development towards sustainable behaviour, (2) social marketers hoping to create their strategies according to this target, and (3) academics who want to expand SC studies into a systemic and multi-dimensional approach. To develop the systematic framework to define an SC, we adapt social ecological systems theory, which allows for a combination of scientific disciplines in the approach. In this sense, our proposed model is both transtheoretical and integrative in nature. What follows is an explanation of the theories identified as well as their relationships with each other in the format of a conceptual model. It is our contention that previous measures are insufficient because they do not consider the system in which the sustainable consumer exists. The proposed model forwards a practical set of measurement tools for those wanting to identify and measure the behaviours of the sustainable consumer within a specific context.

5. An Integrated Model of the Sustainable Consumer

Taking a systemic multi-dimensional perspective, we propose a new model called the integrated model of the sustainable consumer (IMSC). Predicting behaviours of an SC requires a multi-dimensional view of the SC. The IMSC illustrates the inter-related relationship of the internal influences within the SC’s system. It consists of three dimensions: macro, meso, and micro. Each dimension has a distinctive role in theorising the SC. The first, basic, and underlying level is the macro-dimension. This involves understanding the societal and consumer perspectives on the environment (including worldview) as well as the constructs of values, beliefs, norms, concerns, and attitudes of a person towards the natural world and the underlying guidance and principles of a sustainable lifestyle and behaviour. The second, the meso-dimension, locates the SC within a sustainable community with consumer connection to the natural world. The connection to the natural world is mediated by the availability and accessibility of a natural environment to the consumer. The meso-dimension is an intermediary between the macro- and micro-dimensions. Finally, the description of an SC is completed with the micro-dimension. This dimension directly motivates the SC’s behaviour. However, this dimension is unstable on its own as individuals’ behaviours are mutable over time and evolve as a result of macro- and meso-dimensional influences. Consequently, these micro-dimensional constructs are insufficient to predict behaviour on their own.

We have presented the model as being three-dimensional in alignment with systems thinking in Figure 1. The model is visualised as a series of nested dimensions in order to portray the systemic nature of research into the SC, as shown in both Figure 1 and Appendix A. It could be portrayed as a linear model, such as the integrated model of behaviour change (see, for example, Dreibelbis et al. [133] and Blanke et al. [134]), as it has some parallels with that model, not least because many have applied the TRA and TPB to research into the SC. However, we feel that linear models imply hierarchies of effects and bi-variate relationships, and this model represents multi-directional and multi-

dimensional influences. We wish to avoid implying linear effects as they are reductive and do not account for the myriad of influences at play in a systems model. The systems model also emphasises the non-binary and widely varied characteristic of SC and their behaviour motivation.

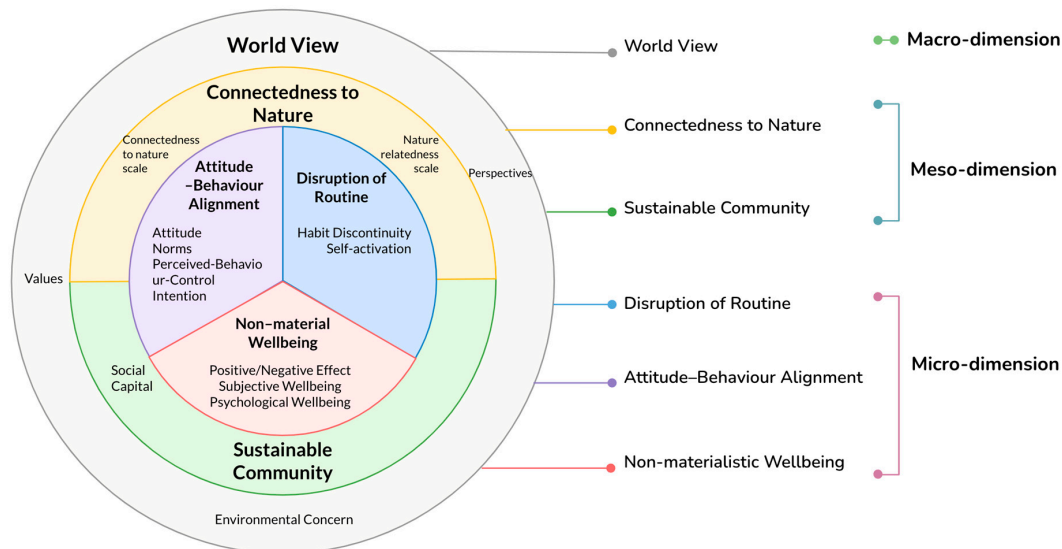


Figure 1. An integrated model of the sustainable consumer.

5.1. The Macro-Dimension of the IMSC

In our framework, the macro-dimension is the boundary of influence on behaviours and includes the consumer's worldview, as shown in Table 3. Although there is a link between worldview and sustainable consumption behaviour, measuring worldview alone is not enough to depict an SC. This is because worldview is not inferred at an individual level but relates to a belief or value system in a broader society [135]. Thus, in our framework, worldview does not link directly to behaviour and does not belong to the personal individual domain. Worldview research using the NEP, for example, technically only measures the environmental orientation of the population, although it has been used widely as a proxy for attitudes [136]. Consequently, we have included additional constructs such as EC and values, which will enable the researcher to fully comprehend the macro-level influences on the SC. While EC and values are personal constructs, they are both established within a societal framework and are not independently formed.

Table 3. The sub-dimensional and potential measures for the macro-dimension.

Worldview		
Values	Perspective (e.g., NEP)	Environmental Concern
<ul style="list-style-type: none"> Altruistic Egoistic Traditional Openness to changes Biospheric 	<ul style="list-style-type: none"> Ecological limits Balance of nature Human domination Ecological catastrophe 	<ul style="list-style-type: none"> Egoistic beliefs and concerns Social-altruistic beliefs and concerns Biospheric beliefs and concerns

5.2. The Meso-Dimension of the IMSC

The meso-dimension consists of influences and actors that surround an individual (as opposed to subjective and internal thoughts). The meso-dimension implies the connection of consumers with the natural world and their community. The meso-layer can be helpful in predicting social behaviours, yet it is only one of the influences in the SC's system.

Additionally, both the sustainable community and connection to nature are less stable than the worldview, as the worldview measures the aggregate societal view.

5.2.1. Sustainable Community

The meso-layer concerns the immediate connection to the community an individual lives in—the sustainable community. Table 4 outlines the measures available in the IMSC for understanding the influence of community-level actors on the SC.

Table 4. Constructs, sub-constructs, and measures for a sustainable community.

Sustainable Community
Social Capital
<ul style="list-style-type: none"> • Trust • Formal membership and participation • Political engagement • Informal interaction • Shared norms

The sustainable community measures are very complex and lengthy and well-beyond the scope of research into what is an individual SC. Future research could establish and validate a refined parsimonious measure for direct community impacts on individuals' behaviours. Additionally, some of these measures are also proprietary and require subscription fees to implement, thereby precluding many applications, especially in the majority of Global South contexts.

5.2.2. Connectedness to Nature

Another important construct within the meso-dimension is that of connectedness to nature (CN). It is added to the meso-layer as the ability to connect to nature is not inherent. Firstly, nature must be available to the consumer [137], and, secondly, the ability to enjoy nature is often learned within a social group [138]. The CN is also a key component of identity, which is formed within the social sphere [139]. However, as CN has strong predictive qualities (e.g., Leung et al. [140]; Dong et al. [113]), it is included in the IMSC as part of the meso-dimensional influences on SCs' behaviours. Table 5 outlines the constructs and measures for connectedness to nature under the IMSC's model.

Table 5. Constructs and measures for connectedness to nature.

Worldview	
Connectedness to Nature Scale	Nature Relatedness Scale
<ul style="list-style-type: none"> • Enjoyment of nature • Empathy for nature • Responsibility towards nature • Awareness of nature 	<ul style="list-style-type: none"> • Nature-related self • Nature-related experience • Nature-related perspective

5.3. The Micro-Dimension of the IMSC

The micro-dimension is an open system of different influences. Each influence is interconnected and can be influenced by other dimensions and other influences within the same dimension. Consumers are embedded in broader social performative practices and are shaped by their personal characteristics, including their attitude–behaviour alignment, routines and habits, and their material wellbeing. Therefore, in the IMSC, these influences on the SC—attitudes–behaviour alignment, routines and habits, and lifestyle—are located within the internal locus of control (INELOC) area. These three influences have inter-relationships. For example, the attitude–behaviour gap can be effectively reduced by enhancing the capacity of individuals to reflect upon these routinised behaviours and re-align them with their underpinning values and intentions.

5.3.1. Attitude–Behaviour Alignment

Attitude–behaviour consistency is an important construct in measuring the SC. Consumers are human beings that are not always rational, and they need to have support and activation or catalysts from outside to act sustainably. However, there needs to be an alignment between their attitudes and their behaviours or intentions in order for them to become an SC. It is quite possible for a person to behave sustainably only because they have no choice. Consequently, attitude–behaviour alignment has been added to the IMSC as a key component of the model. Table 6 outlines the constructs and measures for attitude–behaviour alignment under the IMSC.

Table 6. Construct and measures for attitude–behaviour alignment.

Attitude–Behaviour Alignment	
	<ul style="list-style-type: none"> • Attitude towards the behaviour • Personal norms • Perceived behavioural control (autonomy) • Intention to behave

5.3.2. Disruption of Routine

The disruption of routine is an additional element in the micro-dimension of the IMSC because existing behavioural repertoires often must be updated or significantly changed by the SC if sustainable consumption is to be performed in their lives. The willingness to change long-standing habits consists of two sub-constructs: firstly, habit discontinuity and, secondly, self-activation. Table 7 represents the sub-constructs and the measures for the disruption of the routine construct.

Table 7. Disruption of routine, sub-constructs, and measures.

Disruption of Routine	
Habit Discontinuity Hypothesis	Self-Activation
<ul style="list-style-type: none"> • Context change 	<ul style="list-style-type: none"> • Activation of self-focused • Activation of self-concept

5.3.3. Non-Material Wellbeing

As non-material wellbeing directly reduces the level of personal consumption and has a direct influence on personal habits and behaviours, we included non-material wellbeing in the micro-dimension of the model. Table 8 outlines the non-material wellbeing sub-constructs and measures of the IMSC.

Table 8. Non-material wellbeing sub-constructs and measures.

Non-Material Wellbeing		
Positive/Negative Affect	Subjective Wellbeing	Psychological Wellbeing
<ul style="list-style-type: none"> • Positive affect • Negative affect 	<ul style="list-style-type: none"> • Life satisfaction • Positive emotion • Negative emotion • Cognitive judgements 	<ul style="list-style-type: none"> • Self-acceptance • Environmental mastery • Positive relations • Autonomy • Purpose in life • Personal growth

6. Implications for Theory

Our comprehensive literature review identified some major limitations of current consumer studies in sustainability. Firstly, there is a conflict between conceptualising (input) and measuring (output) the term ‘sustainable consumer’. In particular, previous studies define and segment consumers according to their socio-demographic characteristics (person), yet the same studies measure the SC based on their behavioural characteristics

(actions). Secondly, we also identify the myopia of sustainability research when focusing on elusive sustainable behaviours rather than the SC. Behaviours remain an elusive measure because there are many interdependent influences on the consumer within their behavioural ecosystem that are currently not consistently accounted for in sustainability research. The behaviour of consumers may change depending on the interplay between these elements. For example, an SC may be described by their behaviours (e.g., catching public transport can be construed as sustainable consumption), but choices about those behaviours remains a key criterion for differentiating between sustainable consumption and what comprises an SC. For example, if public transport is unavailable, using such measures may infer that the consumer is not an SC because they do not use public transport. If public transport is the only alternative because the consumer has no other options, we might equally inaccurately infer that we have identified an SC. The act or behaviour is insufficient to describe an SC.

7. Implications for Practice

Our model encourages practitioners to broaden their perspectives and approaches for campaign or intervention development. By using this model, practitioners can design their sustainable consumption campaigns to appeal to different levels of the consumer's sustainable profile. This means not just targeting based on demographic or behavioural factors but considering the consumer's whole system at all three levels—micro (values), meso (community), and macro (worldview). For example, campaigns can target consumers who already exhibit a high degree of environmental concern and a connection to nature. Messaging that resonates with their worldview and reinforces their beliefs about the importance of nature can be particularly effective. For consumers, campaigns can encourage consumers to engage in sustainable behaviours as part of community building. This taps into social capital and leverages peer influence. This strategic targeting ensures that sustainability campaigns are more relevant, more engaging, and ultimately more effective in fostering sustainable consumer behaviours.

The IMSC also provides the synthesis of the measurements used at each level to assist practitioners in conducting robust and comprehensive analyses to assess the impact and effectiveness of sustainable consumption campaigns, enabling a data-driven approach to understanding and enhancing the impact of these initiatives. With such insights, practitioners can design their campaigns for maximum relevance and efficacy, contributing to the broader goal of promoting sustainability in consumer practices.

The IMSC with its dynamic system also implies that consumer behaviour is context-dependent and that actions by marketers or policymakers have variable impacts rather than universal ones. Unlike other models that may assume a one-size-fits-all solution, the IMSC posits that actions taken by marketers or policymakers will not be uniformly effective across all consumers or situations. This is because these actions interact complexly with the multi-layered dimensions of individual consumer profiles. The IMSC, therefore, necessitates strategies that are tailored to align with the complexity of a consumer's system, recognising that what resonates with one individual may not hold the same meaning for another. It encourages a shift from one-size-fits-all policies to nuanced, agile strategies that can adapt to and leverage the specificity of each consumer's system.

8. Directions for Future Research

To ensure that the IMSC can be used as a predictor for sustainable behaviour, future empirical research should aim to establish both convergent and divergent validities. Researchers could use a variety of methods, including observational studies, controlled experiments, and longitudinal studies to see how well the constructs predict behaviour over time. This will involve collecting data on how these constructs operate in real-world settings and analysing their relationships to actual sustainable behaviours. It is also important to test the IMSC across different cultures and contexts to ensure its broad applicability. While we propose a transdisciplinary model, it is not clear if these theories are commensurate with each other. The goal will be to refine the IMSC into a more streamlined model

that accurately predicts sustainable consumption, providing a valuable tool for not only targeting consumer profiles but also predicting their sustainable behaviours.

The IMSC can be further developed to be a dynamic model that demonstrates the mechanism by which consumers evolve through the interaction and transcendence of elements within the system. This aspect of the research could involve exploring the dynamic interplay across three levels within the individual consumer's system. For example, consumers with high environmental values may be the advocates in their immediate communities, such as their families or working environment. Vice versa, if consumers are embedded within a pro-environmental community, they may also have a higher level of connectedness to nature. By understanding these dynamics, the enhanced IMSC model could provide a more detailed map of how sustainable consumption patterns develop and are best encouraged at different phases in the evolution of consumer consciousness towards sustainability.

9. Conclusions

This paper proposes a new conceptual and operational framework to define and conceptualise the SC systematically. Developed from systems theory, our new framework consists of macro-, meso-, and micro-dimensions, which illustrate the inter- and intra-relationships of the SC's behavioural ecosystem. Further research is needed to establish convergent and divergent validities between constructs. The model is extensive, and it is not known if all the elements are predictive of behavioural outcomes. A more parsimonious model might be helpful in predicting sustainable consumption. However, more semantic clarity and measurement precision is needed before we can be sure that the IMSC is both reliable and valid or that the sub-constructs are predictive in any meaningful way. It can be seen in Appendix A that insufficient work has been undertaken in terms of validity. Future research should aim to establish construct validity, including convergent, discriminant, and nomological validity. This necessarily goes beyond internal consistency and reliability, which are inherent in the current measures. In this way, the SC could be adequately theorised and operationalised in terms of manifest observations, allowing both theoretical and observational meaningfulness.

Additionally, although the term SC is multi-dimensional, most studies use it as a one-dimensional term, conflating it with attitudes, beliefs, feelings, values, and behaviours. The SC is described either by their socio-demographic influences or their environmental values. However, we argue that identifying an SC requires a consideration that sustainable consumption occurs in an open system that consists of complex societal, community, and behavioural influences. Based on systems thinking, we introduce a new conceptual model for considering and researching the SC. This framework will allow interested scholars to research sustainable consumption and practitioners to design strategies aimed at consumers that will enhance sustainable consumption. Furthermore, the framework can be applied by social marketers to create solutions that focus on fostering collaborations among market actors rather than a myopic focus on consumers.

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Appendix A

Dimension	Construct	Measure	Items	Citation	Validity	Reliability	Number of Uses/Citations	Validity and Reliability Reported	Validity and Reliability Applicable	Type of Reliability Testing	Alpha Stat
Macro	Worldview	Values-belief-norm (VBN)	Altruistic	Stern, Dietz, Abel, Guagnano, and Kalof [39]	Yes	Yes	3963	Yes	Yes	Internal consistency	Four self-reported consumer behaviours (alpha = 0.72) Three willingness-to-sacrifice items (alpha = 0.78) Seven items of non-activist environmental citizenship actions taken (alpha = 0.77)
			Egoistic								
			Traditional								
			Openness to changes								
			Biospheric								
		Perspective (NEP)	Ecological limits	Dunlap et al. [141]	Controversial	Yes	6138	Yes	Yes	Internal consistency	Coefficient alpha = 0.83
			Balance of nature								
			Human domination								
			Ecological catastrophe								
Environmental concern	Egoistic beliefs and concerns	Weigel and Weigel [57] Roberts and Bacon [38]	Yes	Yes	978	Yes	Yes	Internal consistency Test-retest	Coefficient alpha = 0.85		
	Biospheric beliefs and concerns										
Meso	Sustainability Community	Social capital	Trust	Narayan and Cassidy [142]	Yes	Yes	56,957	Yes	Yes	Internal consistency	Coefficient alpha = 0.89
			Formal membership and participation								
			Political engagement								
			Informal interaction								
			Shared norms								
		Community's sustainability assessment	Sustainable development of communities: ISO 37120 [143]	ISO	No	No	2380	No	No	None	None
			BREEAM Community	BREEAM	No	No	27,100	No	No	None	None
			LEED for Neighbourhood Development	LEED	No	No	12,200	No	No	None	None
			CASBEE for Urban Development	CASBEE	No	No	4150	No	No	None	None

Dimension	Construct	Measure	Items	Citation	Validity	Reliability	Number of Uses/Citations	Validity and Reliability Reported	Validity and Reliability Applicable	Type of Reliability Testing	Alpha Stat
Meso	Connectedness to nature	Connectedness to nature scale	Enjoyment of nature	Mayer and Frantz [119]	Yes	Yes	2342	Yes	Yes	Internal consistency	Coefficient alpha = 0.84
			Empathy for nature								
			Responsibility towards nature								
			Awareness of nature								
		Nature relatedness scale	Nature-related self	Nisbet, Zelenski, and Murphy [120]	Yes	Yes	1550	Yes	Yes	Internal consistency Test–retest	Full NR scale (alpha = 0.87) NR-self (alpha = 0.84) NR-perspective (alpha = 0.66) NR-experience (alpha = 0.8) Coefficient alpha = 0.84
			Nature-related experience								
Nature-related perspective											
Micro	Attitude–behaviour alignment	Rational behaviour	Attitude towards the behaviour	Ajzen [83]	Yes	Yes	94,217	Yes	Yes	Internal consistency Test–retest	Coefficient alpha = 0.85
			Personal norms								
			Perceived behavioural control								
			Intention to behave								
	Disruption of routine	Habit discontinuity hypothesis	Context change	Verplanken and Orbell [90]	Yes	Yes	1797	Yes	Yes	Test–retest	Pre-test coefficient alpha: 0.89 Post-test coefficient alpha: 0.92
		Self-activation	Activation of self-focused	Verplanken and Holland [144]	Yes	Yes	1440	Yes	Yes	Internal consistency Test–retest	Pre-test coefficient alpha: 0.88 Post-test coefficient alpha: 0.91
	Activation of self-concept										
	Non-material wellbeing	Positive/negative affect	Positive affect	Watson et al. [145]	Yes	Yes	43,100	Yes	Yes	Internal consistency Test–retest	Pre-test coefficient alpha: 0.8 Post-test coefficient alpha: 0.77
			Negative affect								
		Subjective wellbeing	Life satisfaction	Larsen et al. [146] Stern, Dietz, Abel, Guagnano, and Kalof [39]	Yes	Yes	18,752	Yes	Yes	Internal consistency	Coefficient alpha = (0.74, 0.93)
Positive emotion											
Negative emotion											
Cognitive judgements											
Psychological wellbeing	Self-acceptance	Ryff [100]	Yes	Yes	17,526	Yes	Yes	Internal consistency	Self-acceptance (alpha = 0.85) Positive relations with others (alpha = 0.83) Autonomy (alpha = 0.88) Environmental mastery (alpha = 0.81) Purpose in life (alpha = 0.82) Personal growth (alpha = 0.81)		

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