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Sustainable meat consumption intentions: conceptualisation, scale development and validation

Zahra, Sadaf, McCarthy, Breda, and Chaiechi, Taha.

Abstract

Purpose: This research proposes and validates a new, comprehensive scale of sustainable meat consumption intentions (SMCI) from the consumer's perspective in Pakistan.

Methodology: The SMCI scale was developed in four phases, following a mixed-methods approach. Phase 1 was used to generate a pool of items through an extensive literature review and seven focus groups. Phase 2 established the face and content validity of the items. Phase 3 resulted in scale purification in study 1 (n=222), followed by study 2, using exploratory factor analysis (n=412) to derive an initial factor structure, along with reliability assessment and confirmatory factor analysis (n=310) to test the theoretical structure. Phase 4 validated the results (n=355).

Findings: The results from the three studies yielded a 10-item, three-dimensional SMCI scale: 'meat attachment', 'meat curtailment' and 'organic meat purchase'.

Practical implications: Meat consumption has negative externalities and is expected to increase in emerging markets. This study presents a scale for measuring consumers' sustainable meat consumption intentions. It is recommended that marketing practitioners and policymakers promote organic meat certification labels and highlight reduced meat consumption's health and environmental benefits.

Originality/Value: No study at present fully measures the dimensions of sustainable meat consumption in Muslim market segments and emerging economies. The creation of the SMCI scale is an important academic contribution, one that identifies three facets of consumers' SMCI.

Keywords Exploratory factor analysis (EFA), sustainable meat consumption intentions (SMCI), SmartPLS, meat curtailment, scale development, emerging economy

Paper Type: Research Paper

1. Introduction

The production and consumption of meat are associated with negative externalities (Bonnet et al., 2020). Livestock farming disproportionally affects climate change and exploits land, water and energy resources much more than the cultivation of plant-based foods (Bschaden et al., 2020; Mogensen et al., 2020; Sahakian et al., 2020). Meat consumption also poses health risks such as cardiovascular disease, stroke, and certain forms of cancer (Apostolidis & McLeay, 2019; Cliceri et al., 2018; de Boer et al., 2017). A paradigm shift in dietary patterns is warranted, particularly in emerging markets, where demand for animal products is rising due to the expanding middle-class (Gerber et al., 2013). However, attempts to influence consumer behaviour have been hampered by the lack of instruments capable of measuring sustainable meat consumption intentions, particularly in emerging markets.

Research that addresses cultural contexts and differences between emerging and developed countries is scarce (Bangsa & Schlegelmilch, 2020). Sustainable behaviour is influenced by multiple motives, which vary across national contexts (Bangsa & Schlegelmilch, 2020; Nguyen et al., 2019). For instance, Muslim consumers look for Halal products produce under Islamic laws (Al-Kwifi et al., 2019), and meat substitutes such as cultured meat will be rejected if they are considered contradictory to Muslim religious practice (Hamdan *et al.,* 2021). Proposals to reduce meat consumption tend to encounter barriers since they often conflict with socio-cultural values and symbolic meanings attached to meat (De Bakker & Dagevos, 2012; Macdiarmid et al., 2016). For instance, research shows the pervasiveness of the link between red meat consumption and national identity, social status, prestige and masculinity (Bogueva et al., 2017). Any effort that seeks to promote meat reduction will have to overcome barriers that are both personal (e.g. attitudes towards meat) and more systemic or cultural (e.g. religious beliefs) (Lentz et al., 2018).

This study presents a scale for measuring consumers' sustainable meat consumption intentions in an emerging economy and addresses a research gap in the literature. Pakistan is a prime country in which to conduct research, since it has a large Muslim population and a rising middle-class, which is driving a rapid increase in meat consumption (Sohaib and Jamil, 2017). Since it is characterised by cultural differences from the West, sustainable meat consumption scales are likely to differ in character from those developed in other countries.

2. Literature Review

2.1 Sustainable consumption intentions and gaps in existing measurement scales

Assessment of consumer sustainable meat consumption intentions (SMCI) requires a valid and reliable instrument. In the literature, two core aspects of intention can be identified: (1) the curtailment of meat consumption in one's everyday diet and (2) the purchase of less, but better quality meat, such as organic or free-range meat (de Boer et al., 2014). A substantial literature on sustainable food consumption exists, and the determinants are wide-ranging, including health and animal welfare concerns (Graça *et al.,* 2019), an environmental concern that shapes attitudes and purchase intentions (Nguyen et al., 2021) and food safety concerns (Yang, 2020). However, SMCI is not fully captured in existing measurement scales (see Table I). Three scales relate to green products in general (Armitage & Conner, 1999; Balderjahn et al., 2013; Minton & Rose, 1997). The remaining three are explicitly focused on meat consumption intentions (Graça et al., 2015, 2016; Nguyen et al., 2017; Pham et al., 2019). However, most scales are developed in Western contexts, where socio-cultural norms differ markedly from emerging markets.

Insert Table I Here

3. Methodology

3.1 The scale development process

This section describes the scale development process, which follows established procedures advocated in the literature (Churchill, 1979; Clark & Watson, 2019; Netemeyer et al., 2003; Saleem et al., 2018). Table II presents the research design. The determinants of sustainable meat consumption were based on intention models from the social psychology literature, such as the theory of reasoned action and the theory of planned behavior (Ajzen, 1991), which have proven successful in predicting and explaining behaviour across a wide variety of domains (Yousafzai et al., 2010). The approach was deductive, i.e., a priori identification of scale items based upon theory. The goal was to generate a clear conceptualisation of target constructs, as recommended by scholars during the scale development process (Clark & Watson, 1995). Later on, an inductive approach was adopted, based on qualitative input from expert respondents in the field and focus groups were used to generate a pool of items. Having an over-inclusive initial pool of items is a key stage in scale development (Clark & Watson, 1995). Qualitative research was followed by three sequential studies to assess the reliability, convergent, discriminant and nomological validity of the newly developed scale (Blunch, 2013).

Insert Table II Here

3.2 Phase 1 Conceptualisation of sustainable meat consumption intentions (SMCI)

Sustainable consumption is viewed as ethical consumption (Schaefer & Crane, 2005), where the act of producing and consuming products is based on social and environmental concerns (Kushwah et al., 2019). Although encouraging consumers to eat meat more sustainably is critical for future sustainability (Nguyen & Johnson, 2020; Rahman & Luomala, 2020), a commonly agreed-upon definition of sustainable meat consumption remains elusive in the literature. Sustainable food consumption is a more general term that captures consumers' intentions and decision making by considering individual needs (taste, price and availability) and social responsibility factors (environmental safety and fair trade) (Ferraris et al., 2019; Hwang et al., 2020; Vainio et al., 2018; Vermeir & Verbeke, 2008). When buying meat, consumers generally consider various product attributes (e.g., organic, free-range, fair trade products, low carbon footprint) and sustainable dietary patterns (e.g., meat curtailment) (Verain et al., 2015). Sustainable meat consumption demands a protein transition, where consumers prefer an alternative or plant-based protein diet (Paloviita, 2021) and replace the whole animal-based product with plant-based protein (Hwang et al., 2020; Paloviita, 2021; Śmiglak-Krajewska & Wojciechowska-Solis, 2021). Environmentally friendly consumption also referred as sustainable consumption, encapsulates the motivation to buy organic meat rather than conventional meat due to health and animal welfare (Burnier et al., 2020; Chang & Watchravesringkan, 2018; Nguyen et al., 2021). Sustainable meat consumption intention can be defined as a plan to decrease per capita meat consumption, potentially mitigating GHG emissions (Austgulen, 2014; Lacroix & Gifford, 2020). In the food literature, sustainable meat consumption can be achieved through three interlinked strategies. First, 'efficiency' is defined as the optimised use of resources (e.g. land, water, energy) for meat production and animal feed. Second, the consumer's responsibility to change the amount of food consumed, which is just enough for ideal health, is called 'sufficiency'. Third, 'consistency' is related to the motivation to protect the animal's welfare (Allievi et al., 2015; Pohjolainen et al., 2016).

A deficiency in the current literature is that scales fail to include cultural norms, such as various foods' social and cultural importance for different social groups and societies (Cheah et al., 2020; Mohr & Schlich, 2016). Thus, the present research attempts to address SMCI from a broader perspective, illustrating how cultural values and moral norms can inform meat consumption in an emerging market such as Pakistan.

3.3 Phase 2 Qualitative study for the generation of items and content validity

This study follows the guidelines for scale development outlined in the literature (Dias et al., 2016; Saleem et al., 2018). Firstly, a deductive approach is used, where literature from 1990 to 2019 on sustainable consumption, ethical consumption, organic/green consumption and pro-environmental behaviour, was used as a reference for further analysis. This time frame was chosen since sustainability-oriented research became popular in the early 1990s, and the current study started data collection in 2020. Articles were downloaded from several databases such as Science Direct, Emerald, Taylor & Francis, ProQuest, etc. We focused on those studies that proposed a scale to measure meat consumption or meat attachment, sustainable consumption intention and organic food purchase intention. As a result, six studies were selected and analysed (see Table I).

An inductive approach was then adopted, and seven semi-structured focus groups were held. Ethical approval for the study was obtained from the authors' university. Each focus group consisted of key informants, four from academia and two marketing managers from the livestock industry or grocery stores. Contact with interviewees was made through e-mail. A purposive sampling technique was employed. A total of 24 males and 18 females between the ages of 35 to 50 years were interviewed. A gift voucher was offered as an incentive and a token of appreciation for participating in the research. Each focus group lasted 45-60 minutes and was conducted via Zoom, an online video conference platform. The questions were related to sustainable meat consumption, motivations and barriers to change. All focus groups were audio-recorded. Although the focus groups were held in the English language, Urdu's native language was used in a few cases. The conversations were transcribed into English by an English-speaking expert, following the translation/back-translation guidelines proposed by Sousa and Rojjanasrirat (2011).

After that, the transcript was analysed using Leximancer v. 4.5 (Smith & Humphreys, 2006). It is beyond the scope of this paper to describe the qualitative research findings in detail. However, five themes: 'meat', 'consumption', 'buy', 'religion', and 'brand' emerged with several underlying concepts. The themes highlighted the significant aspects of SMCI, including core themes and linking concepts. As a result, a pool of 78 potential items related to SMCI (where 'meat' does not include fish) was generated. Before data collection, the derived items' content validity was checked for relevance and clarity of wording. Three experts from marketing (including one from academia having expertise in consumer behaviour and sustainable

marketing) were called upon to act as content validity experts. The process led to minor revisions in the composition of some of the statements to remove vagueness; eight items were deleted due to redundancy and colloquial ambiguity, leaving 70 items.

3.4 Phase 3 Reliability and validity assessment

Three rounds of data collection were carried out from 27 March 2020 to 25 July 2020 to fine-tune the multi-item scale and validate the measures. For ease of reference, the studies are termed: study 1, study 2 and study 3.

3.5 Participants and procedure

Qualtrics software used to generate an online survey link to collect data to measure and validate the new scale. Data was collected from meat consumers in eleven cities covering four provinces to capture regional variations and traditional food cultures. The survey link was published on the websites of three grocery stores that have branches nationwide as well as five meat shops in each city. Respondents were requested to indicate their responses on a 7-point Likert Scale (1= "strongly agree" to 7 = "strongly disagree"). An incentive, the chance to win a 32 GB tablet, was used to increase survey participation rates. The demographic profile of consumers from the three independent studies is presented in Table III.

Insert Table III Here

3.6 Quantitative study for scale purification (study 1)

Before conducting the actual study, a pilot survey was administrated to refine items through statistical analysis. Study 1 survey consisted of 78-items (70 items plus 8 items related to respondents' descriptive information). Analysis of data was conducted using IBM SPSS 25.0. Out of 320 collected surveys, 98 responses were incomplete, leaving 222 responses for statistical analysis. After analysing demographics, the inter-item correlation of the initial pool of items, a key stage in the scale development process, was calculated (Clark & Watson, 1995). The process resulted in a final 38-items scale (Table IV), having satisfactory corrected item-total correlations greater than 0.40 (Hair et al., 2010).

Insert Table IV Here

3.7 Scale refinement (study 2)

The study 2 survey consisted of 8 items about demographics and 38 items related to the SMCI scale derived from study 1. 1150 respondents started to fill the survey, and 722 completed all questions (63% completion rate). The survey relied on self-reported data collected from a single source, so there was a chance of common method variance (CMV) bias. Therefore, Harmans' one-factor technique recommended by Richardson et al. (2009) was applied to access the CMV bias. An un-rotated EFA explained 21.3% variance of the initial 38-items less than the majority (50%) of the variance, indicating no threat of CMV bias (Sreen et al., 2018; Yang, 2020). After that, consumer responses were randomly split into two sub-samples using the random sample selection utility to access the convergent and discriminant validity (Kumar, 2014; Pan et al., 2017).

3.8 Exploratory Factor Analysis (EFA) and dimensionality assessment

EFA is generally used to measure the facets of a new construct (Hair et al., 2010), such as SMCI. Since the underlying dimensions of SMCI might be correlated, a series of principal component analyses (PCA) with varimax rotation was processed, in line with similar studies (Gupta & Agrawal, 2018; Netemeyer et al., 2003; Saleem et al., 2019). Kaiser-Meyer-Olkin (KMO) test was used to measure the sampling adequacy of 412 responses; the KMO value (0.708>0.05) was acceptable (Kaiser, 1974). Bartlett's Test of Sphericity assesses correlations between variables, indicating a significant result ($p < 0.001$). Initially, those items were sequentially deleted, having communalities less than 0.50 (Kaiser, 1960), further based on factor loading <0.60 or cross-loading >0.50 to maintain accuracy (Hair et al., 2010; Hair et al., 2012). After several iterations, ten items converging on three factors remained in the SMCI scale. All factors had Eigenvalues greater than one and explained 59.015% of the total variance, exceeded the suggested criteria of 50% (Hair et al., 2010). Cronbach alpha (α) measures internal consistency within each dimension, confirms the scale's reliability (Nunnally, 1994). Table V summarises the results of EFA. The theoretical conceptualisation of SMCI and items associated with each factor directed each dimension's name: organic meat purchase, meat attachment, and meat curtailment intentions. The dimension names were given based on the previous literature and suggested by field experts (see Appendix A1).

Insert Table V Here

4. Results

4.1 Empirical justification of structure of SMCI construct (study 2)

Literature shows partial least squares-structural equation modelling (PLS-SEM) is a reliable technique to identify causal relationships between items and respective latent variables through SmartPLS 3.3.2 (Ringle et al., 2015; Sultan et al., 2020). Measurement models can be reflective or formative, depending on the construct's nature, the direction of causality and characteristics of indicators used to measure the construct (Coltman et al., 2008). A reflective structure means items are a function of the latent variable, and indicators cause a change in the latent construct in a formative structure (Rodríguez-Entrena & Salazar-Ordóñez, 2013). Theoretically, SMCI explained in a reflective-formative structure: three dimensions, meat attachment, meat curtailment and organic meat purchase intentions, were reflected through their respective items, and SMCI was formative through underlying dimensions. Moreover, change in any dimension tends to bring change in SMCI. In behavioural science literature, such conceptualisation of higher-order constructs is very popular and proposed by many researchers (Flatten et al., 2011; Mas'ud et al., 2017; Saleem et al., 2018).

4.2 Convergent and discriminant validity

In the literature, average variance extracted (AVE) and Heterotrait-monotrait (HTMT) ratio of correlations among first-order constructs was used to measure convergent and discriminant validity. Table VI represented acceptable values of AVEs greater than 0.5 (Clark & Watson, 1995; Flatten et al., 2011) and HTMT values less than 0.85 (Amaro & Duarte, 2016; Henseler et al., 2015; Kline, 2011). Hence, newly developed scale SMCI maintained convergent and discriminant validity.

Insert Table VI Here

4.3 Coefficients of higher-order model

After validity and reliability establishment, higher-order model of SMCI, showed all three dimensions are statistically significant at $p < .01$ (meat attachment: $\beta = 0.342$, organic meat purchase: $\beta = 0.595$, and meat curtailment: $\beta = 0.464$). Model fit was based on three assumptions. Firstly, outer loading (>0.70) of first-order latent variables confirmed the theorised associations (a formative measure of SMCI) (Hair et al., 2010). Secondly, HTMT estimates also established and lastly, variance inflation factor (VIF) was used to measure multicollinearity. All three subscales have VIF values less than the cut-off value of 5 (Hair et al., 2012; Henseler et al., 2015). Results show SMCI measured unique aspects through three

subscales (dimensions) and VIF results also predict that multicollinearity is least likely to pose any problem for study findings (Hair et al., 2012; Henseler et al., 2015) (Figure 1).

Insert Figure 1Here

4.4 Phase 4 Assessment of nomological validity of SMCI scale (study 3)

Study 3 used to measure nomological validity. The survey was based on ten additional environmental concerns (EC) and environmental knowledge (EK) items. According to Fryxell and Carlos (2003), EK is defined as a person's knowledge about collective responsibilities necessary for sustainable development. EC can be elaborated as the degree to which individuals are motivated to change environmental protection behaviour (Mostafa, 2009). A hierarchical component model (HCM), also called a higher-order construct, was utilised through a two-stage approach based on two steps: embedded two-stage used measurement model to verify reliability and validity. The structural model confirms nomological and predictive validity at disjoint two-stage (Becker et al., 2012; Sarstedt et al., 2019). In the embedded two-stage step, all indicators of lower-order components are associated with higher-order components (Lohmoller, 1989). To specify the relationships between antecedent (EK, EC) and the higher-order components (meat attachment, meat curtailment and organic meat purchase intentions), SMCI treated as a mediator. Instead of analysing the direct relationship between antecedent and higher-order component, which is zero by design, scholars evaluate the antecedent's total effect on higher-order components (Figure 2). The lower-order components' estimation and measurement model assessment draws the direct relationships between two antecedent (EK and EC) and SMCI without higher-order components in the disjoint step. The latent variable scores (LVS) obtained from the repeated indicators approach used to create and estimate the model. The results reveal a significant effect on SMCI with related constructs (Table VII). Also, to measure path coefficients, bootstrapping method with 5000 resamples employed (Hair et al., 2014; Quoquab et al., 2019). For this purpose, predictive relevance (Q2) was calculated using the blindfolding procedure and obtained a value of 0.072>0, confirmed the model's sufficient predictive power (Fornell & Larcker, 1981). The goodness of model fit (GoF) means to validate a model (Henseler & Sarstedt, 2013). A Square Root Mean Residual (SRMR) score of less than 0.09 is considered a good fit for the model (Hu and Bentler, 1999). This model fits well with an SRMR score of 0.084.

Insert Table VII Here

Insert Figure 2 Here

5. Discussion

The present study proposes a new, culturally sensitive scale (SMCI) and validates it in an emerging market, Pakistan, which may help mitigate the negative impacts of meat consumption. Theoretically, this study provides empirical evidence to prove the relationship between first-order and second-order components based on theory. Previously, researchers needed to use various scales to measure different facets of consumers' sustainable meat consumption intentions, such as meat attachment (Graça et al., 2015), behavioural intentions to consume 'green' products by Chen et al. (2014) and Zhu et al. (2013), and intentions to reduce meat consumption, measured by Povey et al. (2001).

The SMCI scale captures patterns of behaviour that are broadly similar across emerging and developed markets. Organic meat purchase intention is the most significant dimension of SMCI. This can be seen as a positive sign from a sustainable food policy perspective and presents an opportunity for the livestock industry to grow the organic food market. Previous studies have shown that knowledge about organic food, along with health consciousness, indirectly affect purchase intentions in developing countries (Pacho, 2020). Furthermore, consumers who are concerned about the environment are likely to formulate positive consumer attitudes towards organic meat, influencing purchase intentions (Nguyen et al., 2021). Organic food is generally highly valued for its perceived health benefits (Ditlevsen et al., 2019). Our scale corroborates the findings of other scholars, with items such as 'I prefer to buy organic meat due to my health concerns' and 'I know if I buy organic meat, it is a step towards sustainability'. Therefore, we tentatively conclude the factors that influence sustainable meat consumption are common to affluent, middle-class urban consumers across cultures, consistent with the citizen-consumers concept and fitting the cultural logic of globalisation (Grosglik, 2017). Regarding policy implications, a focus on co-benefits, health and sustainability, and use of organic meat certification labels may help nudge consumers towards meat curtailment and consumption of higher quality, organic meat. Hence, organic meat could be used as a 'sufficiency' solution (Pohjolainen et al., 2016).

Studies report challenges in convincing people to reduce their meat consumption, due to the low willingness to reduce meat consumption (Hartmann & Siegrist, 2017). Consumers

generally hold positive attitudes towards meat, which is seen as pleasurable, social, traditional, and a source of essential nutrients (Austgulen et al., 2018; Bogueva et al., 2017). Scholars highlight that consumers rationalise their meat consumption and use psychological defenses, such as the 4Ns, the belief that eating meat is natural, normal, necessary, and nice (Piazza et al., 2015). Our scale captures some of these barriers and is similar to previous studies (Graça et al., 2015), with items such as 'my meal is incomplete without meat', 'I am attracted to more meat dishes' and 'I can't reduce meat from my diet. The findings suggest that decreasing meat consumption will be a challenge for some consumer segments, regardless of the level of economic development. This is an interesting finding, supporting the view that there is a great diversity of eating patterns across countries (Newby and Tucker, 2004) and some countries are more meat-centred than others (Dagevos, 2016).

Our scale captures the influence of social norms on behaviour, such as 'I feel motivated when I see that other people also reduce meat from their diet'. Social feedback is relevant in driving behavioural change (Nyborg et al., 2016). There is consensus in the literature that taste, health, social influences and ethical concerns are key motives for eating or avoiding meat, and a variety of marketing tactics, interventions and policies are needed to transform consumers' meat consumption habits and achieve a more sustainable food system (Elzerman et al., 2015; McBey et al., 2019; Stea & Pickering, 2018; Vainio et al., 2018). Concerning implications for practice, advertising campaigns that appeal to social norms may be needed to change entrenched dietary habits and reach broad target groups. To influence those consumer segments that like the taste of meat and are strongly attached to meat, government agencies could resort to 'hard' policy measures such as increasing taxes on meat products, as recommended in the literature (Bonnet et al., 2020). However, taxation is controversial and may face opposition from meat producers, politicians and consumers (Edjabou & Smed, 2013).

Studies show that environmental concern plays a role in consumer food choices (Cheah et al., 2020; Tucker, 2018). Providing information to consumers on the environmental benefits of eating less meat can influence behaviour (Bschaden *et al.,* 2020). However, scholars argue that only a small minority of the population express concern (Sanchez-Sabate & Sabaté, 2019) and some studies report a low level of environmental consciousness regarding meat (Pohjolainen et al., 2016). Our scale captures this external factor, with items such as 'By eating meat, I engage with an industry responsible for significant environmental damage' and 'I know my meat consumption habit harms the environment'. The presence of a relatively strong environmental consciousness within the scale is a promising sign. Surprisingly, animal welfare concerns do not feature in the final scale, which conflicts with studies highlighting ethical

issues around current livestock systems, such as animal slaughter and factory farming, that influence consumers' choices (Hwang et al., 2020), and animal welfare is a convergent value across cultures (Estévez-Moreno et al., 2021). We suggest that moral appeals that are oriented towards animal welfare may not work well in Pakistan. However, future studies should conduct cross-cultural comparative studies that examine factors that may amplify or reduce the effectiveness of cause-related campaigns, as recommended in the literature (Ferraris et al., 2019).

6. Conclusion and future research directions

The current study addresses one of the most pressing problems causing climate change: the production and consumption of meat. The contribution of this study is threefold: first, it contributes to the sustainable food marketing literature by revealing the three distinct dimensions of SMCI. Second, this study used a rigorous scale development process to measure the consumers' SMCI. Third, the newly developed scale, SMCI, is culturally sensitive and assists policymakers in formulating marketing strategies to decrease meat consumption in an emerging market context.

The study has some limitations. Firstly, the sample consisted of residents in cities only, so future researchers should consider including the non-urban population and using segmentation approaches. Secondly, the study was conducted in Pakistan, a single country. Since sustainable food consumption intentions are increasingly recognised as context-specific, with their unique characteristics in various cultures (Halder et al., 2020; Kapelari et al., 2020; Qi & Ploeger, 2019), cross-cultural analysis using several emerging markets is warranted. Thirdly, the study focused on intentions rather than behaviour, and intentions are likely to overestimate actual purchase tendency (Kyoko & Christine, 2010; Sudbury-Riley & Kohlbacher, 2016). It is recommended that future studies focus on measuring and tracking behaviour, using methods such as the food diary approach (Lacroix & Gifford, 2020).

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Figure 1. Higher-order (reflective-formative) model of SMCI

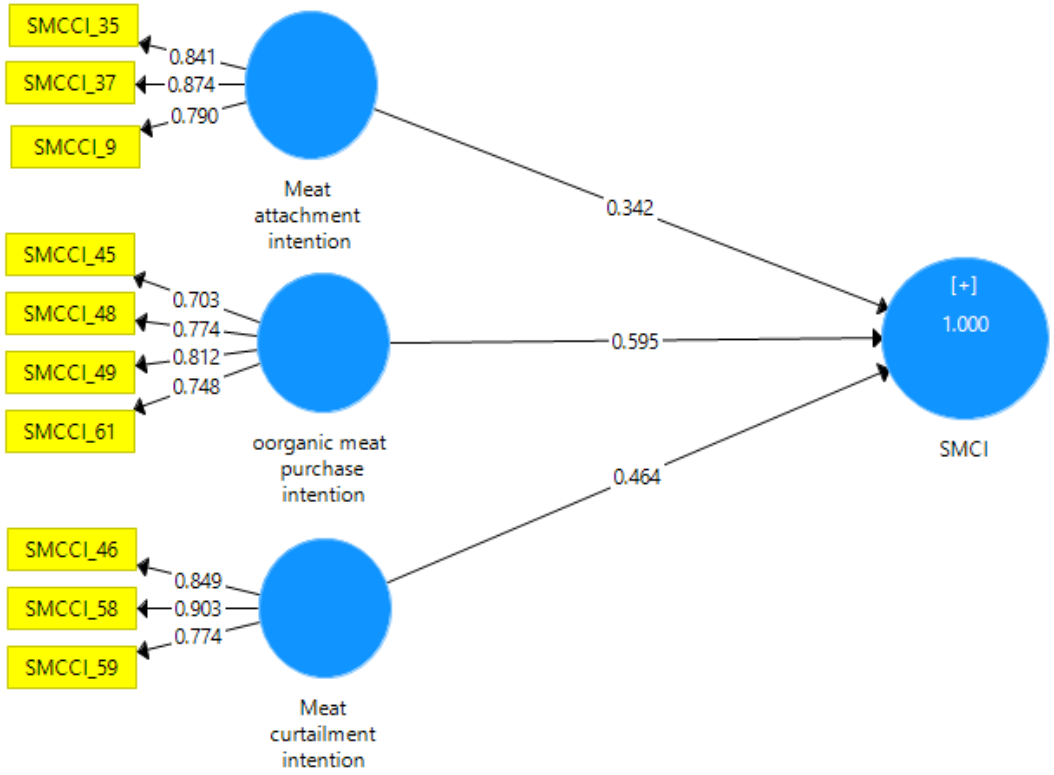

Table I. Summary of existing measures of sustainable consumer intentions

Sr. #	Scale Name	Developed by	Setting	Description	Remarks
1	Behavioral intention	(Minton & Rose, 1997)	South Carolina	Six items measure intentions towards environmentally friendly products	The focus is only on choosing, searching and disposing of green products.
2	Green Purchase Intention	(Armitage & Conner, 1999)	UK	This scale consists of three items that measure intention, planning and purchase of green products.	Focus is only on purchase-related intention; it fails to measure sustainable purchase intention.
3	Consciousness for sustainable consumption	(Balderjahn et al., 2013)	Germany	The 19 items scale has three dimensions (i.e. economic, social, environmental having 10, five, four items, respectively)	All the items only measure the sustainable consumption of industrial products.
4	Meat attachment questionnaire (MAQ)	(Graça et al., 2015)	Portugal	The 16 items scale consisted of four dimensions (*i.e.* hedonism, affinity, entitlement, dependence). This scale supports three ways to understand meat consumption and substitution psychology: theory building, methodology improvement, practice, and policy modification.	Items are particular to measure the positive bond towards meat and justification of meat-eating.
5	Moral disengagement in meat questionnaire	(Graça et al., 2016)	Portugal	The scale has five dimensions (i.e. means-end justification, desensitisation, denial of negative consequences, diffused responsibility and reduced perceived choice)	MDMQ justify eating or not eating meat but fails to measure the future intention about meat consumption.
6	Purchase intention	(Pham et al., 2019) and (Nguyen et al., 2017)	Vietnam	This scale-based on 4-items measured intentions related to	The focus of this scale only captured the organic meat purchase intentions

	purchasing organic meat.	fail to measure the other aspect of sustainable meat consumption intentions like curtailment of meat from the diet.

Table II. The research design of the study

Phases		Details
Phase 1	Conceptualisation and description of the construct and a pool of items generated	Deductive approach: a comprehensive literature review of those studies having scales related to sustainable consumption or meat reduction, or plant-based protein consumption. Inductive approach: seven focus groups were conducted.
Phase 2	Expert review for content validity	78 items generated after content analysis. Three experts from sustainable marketing research judge items for the content and face validity. 70 items retained after review.
Phase 3	Quantitative study: Reliability and validity assessment	Study 1 (n=222) Exploratory factor analysis (EFA) conducted for further reduction of items. 38 items retained for the next step. Study 2 (n=722) split into two half; the first half (n1=412) utilised to conduct EFA to reduce the number of items and explore the underlying structure. 10 items retained and converging into 3 factors. The second half (n2= 310) used confirmatory factor analyses (CFA) to access a newly developed scale's convergent and discriminant validity.
Phase 4	Finalisation of scale	Study 3 (n= 355) utilised to run a structural model to test and established the nomological validity of SMCI.

Table III. Demographic profile of the samples

Variables	Category	Study 1 (n=222)*	Study 2*** (n=722)*	Study 3 (n=355)*
Gender	Male	58.1	44.5	42.8
	Female	41.9	55.5	57.2
Marital status	Married	51.4	58.7	57.7
	Widowed	1.3	4.8	4.8
	Divorced	0.9	3.7	3.1

	Single	46.4	32.7	34.4
Age group	18-27	44.6	23	24.5
	28-37	39.2	29.6	40.8
	38-47	10.4	25.5	20.8
	48-57	3.6	17.9	11.0
	58 and above	2.2	4	2.9
Income per month in Pakistani Rupee (PKR)	Less than 25000	8.6	5.3	6.8
	25000-49,999	25.2	12.5	11.8
	50,000-74,999	23.9	15.8	15.8
	75,000-99,999	15.3	19.1	19.7
	100,000-124,999	10.4	15.1	12.7
	125,000-149,999	4.1	9.3	8.7
	150,000-174,999	1.8	6.5	6.8
	175,000 and more	5.9	9.3	10.1
	Prefer not to say	5.0	7.2	7.6
Education level	Primary (year 5)	1.5	2.2	1.7
	Middle- Matric (Year 10)	5.0	6.8	7.0
	Inter- Bachelors	22	32.8	25.1
	Master- PhD	42.2	36.6	44.5
	Professional education	29.3	21.6	21.7
Grocery shopping responsibility	Sole responsibility	21.6	26.3	25.9
	Joint responsibility	56.8	51.4	53.5
	No responsibility	21.6	22.3	20.6
Employment status	Landlord	0.9	4.8	3.4
	Own business	7.2	14.3	11.8
	Unemployed	10.8	7.8	7.3
	Employed, part-time	9.9	6.8	7.6
	Employed, full-time	59.0	44.7	47.3
	Student	12.2	21.6	22.5
Household structure	Adult household (living alone)	2.7	4.2	5.1
	Adult household (living with a spouse/no kids)	11.7	8.3	9.0

	Adult household (kids have left home)	1.4	1.2	2.0
	Young families (youngest child at home between the age of 0-5 years)	16.7	14.4	14.9
	Middle families (youngest child at home between the age of 6-12 years)	8.6	15.1	14.9
	Older families (youngest child at home between the age of 13-18 years)	7.7	6.0	7.0
	Mature families (youngest child at home over the age of18 years)	14.9	13.9	13.2
	Joint Family system**	31.1	37.0	33.8

*Values shown in percentages, ** extended family arrangement consisting of many generations living in the same house, ***Before splitting the data into two half.

Table IV. Corrected item-total correlation – pilot study (n=222)

Retained items	**Description**	**Correlation (Final iteration)**
SMCI 5	My religion guides me to eat a sustainable (balanced) diet.	.513
SMCI 6	I do not care about the environment when buying meat; I know God will protect the environment. (R)	.510
SMCI 8	If I knew about the adverse effect of excessive meat consumption, I would reduce meat consumption.	.418
SMCI 9	I can't reduce meat from my diet.	.683
SMCI 10	I prefer to include vegetables in my diet since being healthy and fit is important to me.	.461
SMCI 11	I know the importance of meat substitutes for good health	.410
SMCI 13	I am conscious of my fitness, so I reduce meat from my diet	.500
SMCI 15	Before purchasing meat, I read the nutritional chart on the package.	.513
SMCI 23	The custom to serve traditional meat dishes like tikka, sajji, roast, steak etc. for guests stops me from reducing meat consumption	.519
SMCI 24	If I reduce meat consumption, people will consider me inferior.	.543
SMCI 26	My society does not allow me to reduce meat from the diet.	.463
SMCI 27	I think organic meat consumption will protect the environment for future generations.	.477
SMCI 31	My parents force me to eat meat, to show their love and affection	.497
SMCI 33	Sustainable meat consumption can help to control poverty	.497

SMCI 35	My meal is incomplete without meat	.638
SMCI 37	I am attracted to more meat dishes.	.630
SMCI 39	There is a divine power who cares about the environment.	.501
SMCI 42	I reduce the meat-based diet by adding meat substitutes to my food plan.	.581
SMCI 44	I would reduce meat consumption if other people also do so.	.483
SMCI 45	If I have a choice, I prefer to buy organic meat	.583
SMCI 46	I know my meat consumption habit harms the environment	.626
SMCI 47	To avoid health problems (i.e. high blood pressure, heart disease, cancer, uric acid etc.), I reduce meat from my diet	.422
SMCI 48	I prefer to buy organic meat due to health concerns	.437
SMCI 49	I know organic meat consumption is a step towards sustainability.	.471
SMCI 50	Laws that ban selling meat three days a week can limit my choices and personal freedom	.546
SMCI 51	Reduction of industrial meat production will threaten jobs for people like me.	.500
SMCI 52	Sustainable meat consumption will provide a better place for my children and me.	.515
SMCI 53	I believe in a divine power, who will manage all things, so there is no need to reduce meat from the diet.	.690
SMCI 55	I eat the meat of those animals that pollute the environment less.	.495
SMCI 56	I want to change my diet patterns, but society will not accept me.	.531
SMCI 58	By eating meat, I engage with industry responsible for significant environmental damage.	.519
SMCI 59	I feel motivated when I see that other people also reduce meat from their diet.	.574
SMCI 61	I would like to pay more for organic meat for a quality life.	.408
SMCI 62	If I had to kill animals, or even see animals' blood or the killing process, then I would probably stop eating meat	.557
SMCI 63	I would like to buy organic meat as a responsible consumer.	.579
SMCI 64	I can reduce the quantity of meat from my plate to protect the environment for future generations.	.523
SMCI 65	I prefer to buy meat with sustainability labels	.579
SMCI 66	By changing my food consumption habits, I can contribute to environmental solutions.	.524

Table V. Factor structure of the proposed SMCI scale* (*n*=412)

Items	Description	Communalities	Factor 1	Factor 2	Factor 3
SMCI 48	I prefer to buy organic meat due to my health concerns.	0.659	0.796		
SMCI 49	I know if I buy organic meat, it is a step towards sustainability.	0.614	0.751		
SMCI 61	I would like to pay more for organic meat for a quality of life.	0.540	0.720		
SMCI 45	If I have a choice, I prefer to buy organic meat.	0.513	0.703		
SMCI 35	My meal is incomplete without meat	0.757		0.869	
SMCI 37	I am attracted to more meat dishes.	0.728		0.844	
SMCI 9	I can't reduce meat from my diet.	0.596		0.763	
SMCI 58	By eating meat, I engage with industry responsible for significant environmental damage.	0.783			0.871
SMCI 46	I know my meat consumption habit harms the environment.	0.665			0.812
SMCI 59	I feel motivated when I see that other people also reduce meat from their diet.	0.551			0.728
Cronbach Alpha (α)			0.754	0.778	0.743
Eigen Values			3.015	1.947	1.530
Variance explained			21.305%	19.254%	18.456%
Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy					0.708
Bartlett's test					0.000
Total variance Explained					59.015%

Note: *Principle component analysis conducted with Varimax Rotation.

Table VI. Properties of higher-order 10-items SMCI model (n=310) (Reflective –formative model)

Latent variable	Indicators	Outer loading	AVEs	α	Coefficients	CR	A	B	C
A. Meat attachment intention (MAI)			0.698	0.784	0.342	0.874	***1.064***		
	SMCI_35	0.841							
	SMCI_37	0.874							
	SMCI_9	0.790							
B. Meat curtailment intention (MCI)			0.712	0.797	0.464	0.881	(0.085)		***1.140***
	SMCI_46	0.849							
	SMCI_58	0.903							
	SMCI_59	0.774							
C. Organic meat purchase intention (OMPI)			0.578	0.756	0.595	0.845	(0.314)	(0.442)	***1.207***
	SMCI_45	0.703							
	SMCI_48	0.774							
	SMCI_49	0.812							
	SMCI_61	0.748							

Notes: [a]Path Coefficients are all significant at $p < 0.01$; items on the diagonal in bold and italic are VIF; Values in parenthesis are HTMT; CR: Construct reliability; AVE: average variance explained; α: Cronbach alpha.

Table VII. Nomological validity (higher-order level)

Hypothesis	Path coefficient(β)	SD	P-values	t values	Decision
EK-SMCI	0.318	0.048	0.000	6.593	Supported
EC-SMCI	0.187	0.052	0.000	3.587	Supported