

Sustainable business model innovation: Scale development, validation and proof of performance



Makhmoor Bashir^{a,*}, Abdulaziz Alfalih^a, Sudeepta Pradhan^b

^a Department of Business Administration, College of Business and Economics, Qassim University, P.O.Box: 6640, Buraidah, Qassim 51452, Saudi Arabia

^b IBS Hyderabad, IFHE University, Survey No- 156/157, Dontanpally Village, Shankerpally Mandal, RR District, Telengana 501203, India

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ABSTRACT

Sustainable business model innovation (SBMI) has recently drawn great interest among academia and in practice. However, notwithstanding the surge in related academic and non-academic literature, a validated measurement scale for SBMI is not yet available. This study attempts to fill the gap by proposing a scale for SBMI, using an initial sample of 20 respondents (for qualitative enquiry), followed by a quantitative validation (using two sample sets of 130 and 200 SMEs from Saudi Arabia). The findings provided a 10-item scale, conceptualized under three factors, namely: sustainable value proportion innovation, sustainable value creation and delivery innovation, and sustainable value capture innovation. The study provides important implications for SME owners and managers, by highlighting that SBMI will result in enhanced SME performance as well as a competitive advantage.

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Introduction

The World Economic Forum identified environmental and social risks as crucial factors leading to major financial losses and systematic risks globally. The trajectory of global warming is predicted to rise by two degrees by the year 2050, leading to increased spread of infectious diseases, large migration patterns, water shortages and even biodiversity loss (Deloitte, 2020). Growing awareness of environmental concerns like global warming, climate change and melting glaciers are known to exert harmful impacts on the global population (Goni et al., 2021; Chofreh et al., 2020). Organizations need to tackle these new economics and environment-based challenges systematically, holistically, and radically (Bocken & Van Bogaert, 2016), by reconfiguring business models towards sustainable innovation approaches (Boons & Lüdeke-Freund, 2013). This quest in embedding social factors with business model innovation (BMI) processes can be termed sustainable business model innovation (SBMI) (Bocken & Geradts, 2020). In the recent past, governments and environmental bodies have been the main motivators that push organizations towards a more sustainable approach. Organizations must change

their processes for creating, delivering and capturing value, hence becoming more environmentally, socially, and profitably sustainable (Shakeel et al., 2020). Adopting sustainable business models (SBMs) seems the only viable solution to meet such goals (Muñoz-Torres et al., 2019).

Researchers have viewed SBMI from different perspectives, in terms of concept definitions (Geissdoerfer et al., 2018), taxonomies (Lüdeke-Freund et al., 2018), classifying archetypes (Bocken et al., 2014) and dimensions (Joyce & Paquin, 2016). Given its substantive links to topics including business models, BMI, and sustainable company development, SBMI is gaining traction (Shakeel et al., 2020). BMI considers an organization's innovation as an avenue for creating, delivering, and capturing value (Teece, 2010). SBMI considers value in a larger sense - economic, social, and environmental - with a shift in focus away from customers and shareholders towards a multi-party stakeholder (society) (Bocken et al., 2013; Schaltegger et al., 2016; Massa et al., 2017).

Despite widespread interest, the concept of SBMI remains unexplored and at a nascent stage of development (Lüdeke-Freund & Dembek, 2017). SBMI exists as an emergent topic, yet unlike other fields, lacks empirically validated components, while its terminology and definitions can be compared with different fields (Shakeel et al., 2020). Previous studies have sought to incorporate sustainability

* Corresponding author.

E-mail address: m.dar@qu.edu.sa (M. Bashir).

within research through the integration of business models and sustainable development frameworks (França et al., 2017). Bocken et al. (2014) used a triple bottom line concept to formalize the categorization of BMI. Scholars have also extended the scope of business models through the addition of two aspects: social factors and the environment (Joyce & Paquin, 2016). Recently, Shakeel et al. (2020), based on a systematic review, developed an SBMI framework consisting of three components: innovations in sustainable value proportion, creation and delivery, and capture.

Much of the earlier work on SBMI is conceptual and qualitative in nature. Shakeel et al. (2020) call for more research on SBMI to classify its components, and the metrics associated with each component. Despite the importance of the existing measures used to capture SBMI, no commonly agreed and systematically validated measurement instrument for this concept exists. This study attempts to address the lack of measurement through the development and assessment of a novel scale, which could go a long way in advancing research on SBMI. The study contributes to the existing literature on SBMI in the following ways:

First, a comprehensive scale has been developed to measure SBMI. To ensure methodological rigor, the well-accepted scale development procedure of Hinkin (1995) was followed. To start, the literature supporting the conceptualization of SBMI was reviewed, followed by the framework. The initial pool of items was generated using a qualitative pre-test. Next, this pool was validated with a sample of 130 SMEs, and then the final scale was validated using a second sample of 200 SMEs from the Kingdom of Saudi Arabia.

The second contribution of this study lies in its endeavour to enhance the existing literature on SBMI and SME performance. Several studies have investigated the link between BMI and organizational performance (Bashir & Verma, 2019; Foss & Saebi, 2017; Dunford et al., 2010; Zott & Amit, 2008). To the best of the authors' knowledge, this study is one of the first to investigate the relationship between SBMI and performance in SMEs. Third, the study contributes to the extant body of literature on SBMI and competitive advantage. Fourth, the study brings in a new perspective to explain SBMI, viz. the dynamic capability perspective. A firm possessing dynamic capabilities has greater propensity to move towards an effective and sustainable form of business.

The rest of the paper is structured in five sections. The second section covers the extant literature on SBMI. The third section elaborates on the research methodology used for scale development and is divided into four subsections: item generation, content validity, exploratory factor analysis, and psychometric property evaluation. Section 4 highlights the nomological validity assessment. Section 5 contains the discussion, theoretical and practical implications, limitations and directions for future studies.

Literature review

Dynamic capability theory

Success in the global marketplace can be achieved by developing and coordinating a firm's resources to address dynamic situations in the market. A firm can align its resources, including business models (BMs) more effectively, considering consumer requirements in the presence of dynamic capabilities. Such firms need to be flexible, to act on opportunities by making appropriate changes in culture and the organization. Different firms have different sets of dynamic capabilities. One firm may be good at innovation, while another may be good at identifying opportunities and exploiting them. Strong dynamic capabilities signify possession of better resources than competitors, which helps in gaining sustained competitive advantage. Firms with strong dynamic capabilities are able to create or modify resources, assets and capabilities, to address changing market conditions and customer demands. This helps in providing value to the

customer over a longer time horizon. Setting up BMs during the initial phase depends equally on intuition and science (Teece, 2018). It is a part of dynamic capability which cannot be fully routinized (Teece, 2012), e.g., organizational processes. Dynamic capabilities cannot be easily replicated as they are built around history, routines, culture, and unique managerial characteristics (Teece, 2014). This uniqueness acts as a basis of sustained competitive advantage in firms.

Business models

Casadesus-Masanell & Ricart (2010, p. 100) observed that: "Strategy has been the primary building block of competitiveness over the past three decades, but in the future, the quest for sustainable advantage may well begin with the business model". Having rare capabilities helps in creating competitiveness by linking BMs with strategy. BMs "...describe the design or architecture of the value creation, delivery, and capture mechanisms [a firm] employs. The essence of a business model is in defining the manner by which the enterprise delivers value to customers, entices customers to pay for value, and converts those payments to profit" (Teece, 2010, p. 172). A BM essentially identifies customers' latent needs, the resources required to address those needs, and the capturing of value from important business functions (Teece, 2018). It needs to strike a balance between value creation, delivery and capture to be sustainable. BM elements need to be coherent, internally aligned (Ritter, 2014), and in line with the broader model for management used (Birkinshaw & Ansari, 2015). Good BMs are scalable across different market segments and help in differentiating firms from their competitors.

Sustainable business models

A company cannot be considered sustainable if it delivers an eco-friendly product, but uses a technology that harms the environment. The entire process needs to be sustainable, with a focus on surroundings and the entire ecosystem within which a firm operates. The term sustainable business models (SBMs) describes the process of organizations' transformation to more sustainable economic systems (Rashid et al., 2013; Wells, 2013). SBMs are "business models that incorporate pro-active multi-stakeholder management, the creation of monetary and non-monetary value for a broad range of stakeholders, and hold a long-term perspective" (Geissdoerfer et al., 2018, p. 403). Today, such models are widely researched given their potential to provide competitive advantages (Porter & Kramer, 2011; Nidumolu et al., 2009). SBMs have a "global market perspective and take into account new industrialized countries" (Garetti & Taisch, 2012, p. 88). The definitions in extant literature portray SBMs as modifications to BMs, adding features and objectives. Changes can be made in terms of goals and/or value propositions, creation, delivery, and capture intended to create sustainability (Richardson, 2009). These are changes that can be made in the BM, to products and services, or at the base level (Bocken et al., 2014; Bocken & van Bogaert, 2016). SBMs emphasise stakeholder benefits and values, and not only customer/ shareholder value. Most researchers have defined SBMs as modifications to conventional BMs, with added propositions, value creation or value capture (Geissdoerfer et al., 2018). Bocken et al. (2014) categorized SBMs as the base of the pyramid, product-service systems, and a circular business model. Organizational design is a "critical managerial change lever" with the "dynamic capabilities of sensing, seizing, and transforming needed to execute SBMI process" (Minatogawa et al., 2022, pp. 2–3).

The dynamic capabilities framework reflects the interdependence between BMs and strategy. Dynamic capabilities and strategy coalesce to form a sustainable BM, which steers organizational change, and facilitates a level of profits sufficient to maintain and improve organizational resources and capabilities. In firms with dynamic

capabilities, BMs can be modified swiftly and effectively to meet changing market conditions. Dynamic capabilities play a significant role to improve organizational competitiveness by designing BMs linked to strategy. Dynamic capabilities coupled with effective strategies help formulate the BM, which transforms the organization (Teece, 2018).

Business model innovation

Business model innovation (BMI) signifies innovation in creating, delivering and capturing value, thus attracting a customer base and enhancing profitability (Teece, 2010). According to Foss & Saebi (2017, p. 201), BMI reflects “designed, novel, and non-trivial changes to key elements of a firm’s business model and/or the architecture linking these elements”. Technological innovations help corporations to be competitive (Şimşek et al., 2022; Perelygina et al., 2022; Wirtz et al., 2016; Zott et al., 2011) by providing novel products and channels of revenue (Chesbrough, 2010; Massa et al., 2017). Sometimes firms engage in BMI to meet environmental demands (Colovic, 2022). A BM needs to address customer needs profitably (Rumelt, 2012). The capacity of managers to enhance a BM has a fundamental role in dynamic capabilities (Teece, 2007). This signifies designing the initial model, reframing the model, and/or replacing the model over time. A successful BM begins with deep insights into the customer’s needs and by looking into already existing models. Technology is an enabler for novel BMs. In highly developed economies, absolutely novel BMs are improbable, although not impossible. Most “new” BMs are similar to existing ones, and involve a combination of existing models or an improvement on existing ones. Choice of BMs depends upon how strong an organization’s dynamic capabilities are (Teece et al., 2016). For instance, organizations with strong dynamic capability do not hesitate to innovate their BMs, which involves radical changes in resources or activities.

Strategy deals with how a firm will compete (Teece, 2018). One factor leading firms to seek BMI is the emergence of new technology (Kraus et al. 2019; Teece et al. 2016). The concept of dynamic capabilities posits that strategic resources lose value with time, as competitors catch up with them (Teece, 2018). Firms that are able to modify their capabilities better than their competitors are able to gain a sustained competitive advantage (Teece, 2007).

Sustainable business model innovation

SBMI involves “the conceptualisation and implementation of sustainable business models. This can comprise the development of entirely new business models, the diversification into additional business models, the acquisition of new business models, or the transformation from one business model to another” (Geissdoerfer et al., 2018, p. 407). SBMI is one of the ways through which competitive advantage can be produced, by addressing the problems of environment and society simultaneously (Massa et al., 2017). It deals with

changing business practices, by integrating such factors with basic business practice (Costa et al., 2022; Stål et al., 2022; Foss & Saebi, 2017). Predominantly, SBMI can be found in one of four ways: sustainable start-ups; transformation to a sustainable BM; diversifying a sustainable BM; and acquiring a sustainable BM (Geissdoerfer et al., 2018, p. 407). Sustainable start-up refers to new firms where sustainable business models (SBMs) are produced. Any change in an existing business to make it sustainable is known as SBM transformation. An organisation establishing an additional SBM, without major changes in its existing BM, is considered to practise SBM diversification. Changes can also be made simply by integrating/acquiring a new BM into the organization, i.e., SBM acquisition. BMs that aim to be sustainable innovate to produce “significant positive and/or significantly reduced negative impacts for the environment and/or society, through changes in the way the organisation and its value-network create, deliver value and capture value (i.e., create economic value) or change their value propositions” (Bocken et al. 2014, p. 44). Sustainability, although difficult, makes the transformation process more desirable. Technological factors feature significantly in such processes, with innovation being necessary for the alignment of motives with revenue sources in providing sustainability options (Rashid et al., 2013). As stated by Roome & Louche (2016, p. 12), SBMI is a “process through which, new business models are developed by businesses and their managers, how companies revise and transform their business model in order to contribute to sustainable development”. Table 1 presents definitions of SBMI from the extant literature.

Dynamic capabilities provide a feasible explanation for the success or failure of BMIs (Teece et al., 1997; Winter, 2003). Strong dynamic capabilities make it easy for firms to modify their BM (Teece, 2018). For firms pursuing SBMI, dynamic capabilities play a significant role (Inigo et al., 2017). They help to sense, seize, and transform opportunities. For SBMI, reflects awareness of sustainability issues and realizing them as business opportunities (McWilliams & Siegel, 2011). Seizing means using resources to meet sustainability opportunities and create value, by converting them into SBMs. Finally, transforming is the planned conversion of a firm’s capabilities to incorporate sustainability in the BM (Teece, 2018).

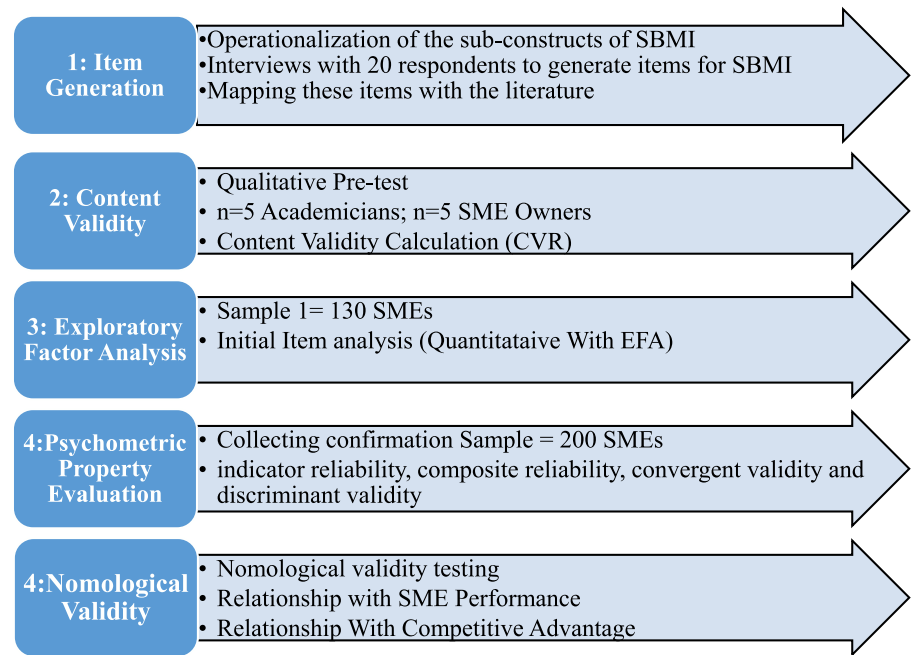
Research methodology

This study follows the scale development procedure suggested by Hinkin (1995), as it is deemed one of the most reliable and widely used scale development processes. It consists of five steps: (1) item generation; (2) content validity; (3) exploratory factor validation; (4) psychometric property assessment; and (5) nomological validity. Items developed were mapped with similar constructs from literature, qualitative insights and a combination of inductive and deductive methodologies were employed (Tanwar & Prasad, 2017). 20 in-depth interviews were conducted. The respondents were SME owners (12), and faculty members (8). Interviews lasted for 40–60 min

Table 1
Sustainable business model innovation definitions.

Stubbs and Cocklin (2008, p.103)	A sustainable business model is “a model where sustainability concepts shape the driving force of the firm and its decision making [so that] the dominant neoclassical model of the firm is transformed, rather than supplemented, by social and environmental priorities.”
Schaltegger et al. (2012, p.112)	Sustainable business models “create customer and social value by integrating social, environmental, and business activities”
Bocken et al. (2013, p.484)	“Sustainable business models seek to go beyond delivering economic value and include a consideration of other forms of value for a broader range of stakeholders.”
Wells (2013, p.65)	A business model for sustainability “would assist in the achievement of sustainability [by] following major principles [...] for sustainability”
Upward and Jones (2015, p.98)	A (strongly) sustainable business model “is the definition by which an enterprise determines the appropriate inputs, resource flows, and value decisions and its role in ecosystems, [in a way that] sustainability measures [which] are those indicators that assess the outputs and effects of business model decisions [...] might be claimed as successfully sustainable.”
Geissdoerfer et al. (2018, p.1219)	“[W]e define a sustainable business model as a simplified representation of the elements, the interrelation between these elements, and the interactions with its stakeholders that an organisational unit uses to create, deliver, capture, and exchange sustainable value for, and in collaboration with, a broad range of stakeholders.”

Fig. 1
Scale development procedure.



on average, and revolved around issues in the implementation of different types of SBMIs across SMEs in Saudi Arabia.

Next, the items generated were structured into a questionnaire for data collection. First, we ran exploratory factor analysis (EFA), to test the factor structure and validate the scale. According to Marsh et al. (2014), EFA is less restrictive than confirmatory factor analysis (CFA), allowing it to load onto respective factors, and cross-load with others, which ensures the robustness of a scale. As per the scale development procedure, EFA was followed by CFA and nomological validity assessment on a second dataset of 200 SMEs (Hinkin, 1995). CFA was conducted using Smart PLS 3 (following Ringle et al., 2005). PLS has become a widely used method to estimate path coefficients with a limited sample size and non-normality over the last decade (Hair et al., 2011). Finally, to check for nomological validity, items for competitive advantage and SME performance were added into the questionnaire. Fig. 1 summarizes the methodology applied in the study.

Step 1: Item Generation

To generate items for the scale we interviewed 20 respondents, comprised of 14 males and 6 females. Of the 20 respondents, eight were PhDs, four were postgraduates, six were graduates and two were diploma holders. 10 were aged between 45–50 years, six were 40–44 years, and four were aged between 35–39 years. SBMI was conceptualized as a three-dimensional construct based on the works of Shakeel et al. (2020). The in-depth interviews generated 12 items: three for sustainable value proportion innovation, five for sustainable value creation/delivery innovation, and four for sustainable value capture innovation. The items in each construct were limited in number, as past research has concluded that increased item numbers reduce respondent validity (Bednar & Westphal, 2006). To enhance face validity, items were mapped to pre-existing works as shown in Table 2.

Step 2: Content Validity

Content validity describes how far measures represent a construct (Haynes et al., 1995). The items shown in Table 2 were checked by an independent panel, consisting of ten experts in the field, to assess face and content validity. Of these 10 experts, five were academicians, and five were SME owners. Taking a cue from Netemeyer et al. (1996), subject specialists were supplied with definitions of each construct. Each item was evaluated against three levels: 'completely

representative', 'somewhat representative', and 'not representative' (Lin & Hsieh, 2011). Each item's content validity ratio (CVR) was in a range of between .75 and 1.00, with nine experts terming all the items essential for the scale. Therefore, the scale's content validity was established (Almanasreh et al., 2019; Bose et al., 2022).

Step 3: Exploratory Factor Analysis

EFA sample

Data were collected from SMEs located in Saudi Arabia for two main reasons. First, SMEs are regarded as the backbone of the whole Gulf region, as they account for nearly 60% of the gross domestic product and 80% of the workforce (PWC, 2016). The context of SMEs is important given the ambitious 2030 vision of the Kingdom, which aims to raise the contribution of SMEs towards GDP to 35% (from 20%). The vision further aims to focus on sustainable solutions for SMEs across the Kingdom of Saudi Arabia (Saudi Vision, 2030, 2016). Therefore, these two factors signify an appropriate research context. The sampling frame used was taken from the general authority of statistics of Saudi Arabia. To widen the scope of generalizability of the findings, a multi-industry sample design was adopted (as suggested by Katsikea et al., 2011). The sample for this study was taken in two stages. In the first stage, we followed a stratified sampling to identify manufacturing and service businesses that had made some sustainable innovations in their BMs in the past five years. Next, SMEs from each stratum were selected based on convenience sampling. We contacted the SME owners and managers by telephone between November and December 2021 to seek cooperation for participation in the study. The respondents were assured of anonymity of identity and confidentiality of their responses. The entire process was scrutinized and approved by the Ethics Committee of Qassim University.

400 questionnaires were distributed to SMEs across different industries. After a few reminders, 140 responses were received by the authors, 10 responses were discarded due to incompleteness, which resulted in a response rate of 32.5%. The final 130 responses were used for factor analysis. Table 3 highlights the demographics of the sample collected. Only those respondents involved in the strategic orientation of their company were recruited. The final sample was a combination of 34.6% senior managers and 65.3% middle management and was considered appropriate as observed in past BMI

Table 2
Mapping items to literature.

Dimensions	Sample Respondent Voices	Generated Items	Item Mapping S: Spieth, P., & Schneider, S. (2016); C: Clauss, T. (2017)
Sustainable Value Proportion	We have been focussing on customers who are environmentally aware/ responsible. (E.g. they want to shift to green products) (SR3)	Our focus has shifted towards (SVP1) customers who seek sustainability	Target customers have changed (S)
	70% of our product portfolio has incorporated sustainability (e.g. Biodegradable products/ recycled products, solar products, rechargeable batteries) in one form or the other. (SR5)	Our products and service offerings have become sustainable over the years (SVP2)	The product and service offering has changed (S)
	We have changed our advertising to incorporate elements of environment responsibility. (e.g. We save more water than we consumer, Bulk of our energy requirements are fulfilled through solar energy) (SR7)	We re-positioned ourselves to be 'sustainable' (SVP3)	The firm's positioning in the market has changed (S)
Sustainable value creation and Delivery Innovation	Shifting our focus to sustainable resources has helped in enhancing the core competences of the firm. (SR9)	We make regular efforts to make our core competencies and resources more sustainable. (SVC1)	The firm's core competences and resources have changed (S)
	Ethical sourcing, efficient technologies and production practices have helped us in being more sustainable (SR17)	We make regular efforts to convert internal value creation activities to be more sustainable. (SVC2)	Internal value creation activities have changed (S)
	We have developed sustainability standards to be followed by our suppliers. (SR16)	We make regular efforts to partner with firms that focus on sustainability (SVC3)	Roles and involvement of partners in the value creation process have changed (S)
	we have been making efforts to localise sustainable supply chains, by shifting from roads to rail or from air to sea.	We make regular efforts to make our distribution channels sustainable. (SVC4)	Distribution has changed (S)
Sustainable Value Capture Innovation	We encourage sustained public engagement by key employees to access and evaluate latent sustainable needs. (SR11)	We make regular efforts to evaluate new competencies that need to be developed to adapt to changing sustainable market requirements (SVC5)	We constantly reflect on which new competencies need to be established in order to adapt to changing market requirements. (C)
	Focus of the firm has shifted to a diverse set of resources, people and investments to be resilient in the long run. (SR19)	We regularly try to replace short-term sources of revenues with sustainable (long-term) recurring revenue models (e.g., leasing) (SRC1)	We recently complemented or replaced one-time transaction revenues with long-term recurring revenue models (e.g. Leasing). (C)
	Focussing on sustainable products have helped us in charging premium price to customers who seek sustainable products. (SR13)	Our profit margins have increased by offering sustainable products (SRC2)	We recently developed new revenue opportunities (e.g. additional sales, cross-selling). (C)
	Regular training of employees and upgradation of machineries has gone a long way in keeping the manufacturing costs low. (SR17)	We make regular efforts to reduce manufacturing costs by incorporating sustainable practices. (SRC3)	We actively seek opportunities to save manufacturing costs (C)
	We charge premium prices for our differentiated market offering (SR7)	Differentiated sustainable products help us in charging higher premiums. (SRC4)	We regularly utilize opportunities, which arise through price differentiation.

studies (Clauss, 2017). 67% of the SMEs were from the manufacturing sector and 32.3% were service based. 60% of the SMEs selected were functional for more than 10 years and 40% were in business for more than 20 years. 87% of the SMEs selected had local market orientation, 6.9% global and 5.4% regional. The ownership structure consisted of 91% private, 3% government and 6% mixed ownership (Table 3).

Exploratory factor analysis

Data were tested for univariate normality. The skewness values ranged between -2 and +2, and kurtosis was between -7 and +7 for all constructs, implying univariate normality of the data (Hair et al., 1998; Yousaf et al., 2020). Next, EFA was conducted based on principal component analysis and varimax rotation, using SPSS 20. The Kaiser-Meyer-Olkin (KMO) value at .85 indicated that the sample was appropriate for factor analysis. Additionally, Bartlett's test of sphericity, based on the X2 value, showed the data's suitability for factor analysis. The findings revealed a 3-factor solution, with 65% variance being explained. However, taking cues from Field (2005) and Hair et al. (1998), items with a factor loading greater than .35 on other factors, and with communalities less than .50 were dropped. This resulted in the removal of two items (SVC5 and SRC4). EFA was run again on the revised list of items, and the findings for factor solution are highlighted in Table 4.

Step 4: Psychometric property evaluation

Sample for CFA

A second set of data was gathered from the same population used in Study 1. SMEs who had not participated in the first survey were used for data collection. Around 600 questionnaires were distributed, out of which 220 were received back. 20 responses were deleted due to missing information, and the remaining 200 were used for analysis, resulting in a 28.5% response rate. This sample contained 40% respondents from top management and 60% from middle management, focussing on managers responsible for setting their company's strategic orientation. The sample consisted of around 64.5% SMEs from the manufacturing industries, while 35.5% represented service organizations. 47% of the firms employed up to 50 people, 19% between 51-100, 15% between 101-150, 10% between 151-200 and 9% employed between 200-249. 65% of the SMEs were up to 10 years old, 18% were 11-20, 9% were 21-30, and 8% were 31-40 years old. 90% of the SMEs selected had a local market orientation, and 93% of SMEs had private ownership. Table 5 provides a snapshot of the sample demographics used for CFA.

Confirmatory factor analysis

Smart PLS 3 was used to check the factor structure in Table 4 and to verify the measurement model, following Ringle et al. (2015).

Table 3
Sample for EFA.

Category	Frequency	Percentage
Position		
Top Manager	45	34.6
Middle Manager	85	65.3
Manufacturing SMEs		
Service Based SMEs	88	67.6
	42	32.3
No. of Employees		
5-50	19	14.6
51-100	24	18.4
101-150	47	36.1
151-200	29	22.3
200-249	11	8.4
Firm Age		
1-10 Years	49	37.6
11-20 Years	36	27.6
21-30 Years	31	23.8
31-40	14	10.7
Market Orientation		
Local	113	86.9
Regional	6	4.6
Global	11	8.4
Ownership Structure		
Private Sector	118	90.7
Government Sector	4	3
Mixed Ownership	8	6.1

Table 5
Sample for CFA.

Category	Frequency	Percentage
Position		
Top Manager	80	40
Middle Manager	120	60
Manufacturing Firms		
Service-Based	129	64.5
	71	35.5
No. of Employees		
5-50	94	47
51-100	38	19
101-150	30	15
151-200	20	10
200-249	18	9
Firm Age		
1-10 Years	130	65
11-20 Years	36	18
21-30 Years	18	9
31-40	16	8
Market Orientation		
Local	180	90
Regional	12	6
Global	8	4
Ownership Structure		
Private Sector	186	93
Government Sector	6	3
Mixed Ownership	8	4

Henseler et al. (2014) suggest that PLS is suitable in checking measurement model specifications. To derive standard error across each estimation within this measurement model, we used non-parametric bootstrapping with 5,000 samples (Hair et al., 2011). The scale was tested for indicator reliability, composite reliability, convergent validity, and discriminant validity. The factor loadings ranged from 0.718 to 0.854, significantly over the recommended indicator reliability cut-off of 0.4 (Bagozzi & Baumgartner, 1994). The composite reliability (CR) findings were between 0.846 and 0.911, which was considerably higher than the 0.6 cut-off value (Bagozzi et al., 1999). The average variance extracted (AVE) across each variable exceeded .50, and most factor loadings were greater than .70, indicating convergent validity (Fornell & Larcker, 1981). Cronbach's alpha, AVE and CR for each construct are shown in Table 6.

Furthermore, discriminant validity can be claimed, as the AVE's square root (Table 7) exceeds diagonal elements for the corresponding row in every construct (Fornell & Larcker, 1981). However, Henseler et al. (2015) found that Fornell & Larcker's (1981) discriminant validity assessment approach fails to uncover discriminant validity for structural equation models based on variance. They therefore put

forward a different approach to assessment: heterotrait-monotrait (HTMT). HTMT is more robust, and has a 0.85 cut-off (Henseler et al., 2015; Rasoolimanesh et al., 2017). Values for all constructs were under this cut-off, implying evidence to support discriminant validity.

Nomological validity

SBMIs in SMEs

BMIs have been demonstrated to lead to higher profits compared to product or process innovations (Ma et al., 2018; Foss & Saebi, 2017; Zott et al., 2011). BMI, being a key resource, makes it easier for firms to make changes in processes, design etc. for cost reduction, higher value creation and growth in performance (Balboni et al., 2019). SBMIs have the added advantage of being more resilient and less risky (Choi & Wang, 2009), and being conducive to diversification and value co-creation (Porter & Kramer, 2011; Nidumolu et al., 2009; Tukker & Tischner, 2006). SMEs can modify their strategies and BMs to create value (Aspara et al., 2010).

SBMIs are highly desired by SMEs across the globe, due to their positive social and environmental effects, propensity for long-term survival (Islam et al., 2022) and profitability (Caldera et al., 2019). According to a Harvard Business Review study, the top 100 worldwide sustainable companies had higher average sales growth, return on assets, profit before taxes, and cash flows than control companies (Whelan & Fink, 2016). Furthermore, mounting evidence shows that companies who were committed to sustainability performed better

Table 4
Rotated component matrix.

Items	Item Acronym	Factor Loading		
		1	2	3
Sustainable Value Proportion Innovation	SVP1	.846		
	SVP2	.710		
	SVP3	.743		
Sustainable Value Creation and Delivery Innovation	SVC1		.861	
	SVC2		.769	
	SVC3		.698	
	SVC4		.769	
Sustainable Value Capture Innovation	SRC1			.793
	SRC2			.710
	SRC3			.810

Table 6
Cronbach's alpha, composite reliability and average variance extracted (AVE).

Dimension	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
SRCI	0.758	0.846	0.581
SVCI	0.771	0.854	0.594
SVPI	0.773	0.868	0.688

Table 7
Discriminant validity.

	SBMI_	SRCI	SVCI	SVPI
SBMI_	0.697			
SRCI	0.904	0.762		
SVCI	0.9	0.719	0.77	
SVPI	0.865	0.682	0.664	0.829

Table 9
Nomological validity.

	β	T Statistics	P Values
SBMI -> CA	0.72	11.956	0
SBMI -> SME_	0.416	5.258	0

than normal during the 2008 recession, resulting in an average of \$650 million in additional market capitalization per company (Whe- lan & Fink, 2016). The process of SBMI broadly intends to reduce adverse environmental and social influence (Faber et al., 2005). Considerable numbers of studies have addressed 'lean thinking', a widely adopted strategic approach used by SMEs in achieving sustainability (Battistella et al., 2018). Co-evolving 'lean and green thinking' in SMEs has led to successful and sustainable business practice, which increases profitability. In SMEs, BMIs are critical (Salavou & Avloni- tis, 2008), as innovation and new opportunities help to improve firm performance and growth (Schneider and Spieth, 2013; Jantunen et al., 2005). This becomes even more crucial for SMEs that focus on internationalization. Such SMEs can innovate by making changes in their product or service offerings and BMs, taking account of the mar- ket to which they intend to cater (Onetti et al., 2012; Child et al., 2017). SME performance across markets depends on how creative and innovative BMs can be (Bianchi et al., 2017). Based on the above arguments we hypothesize that:

H₁: Sustainable BMI leads to better SME firm performance

Competitive advantage allows firms to perform better than compet- itors (Porter, 1980). Cost leadership and differentiation help in gaining a competitive advantage (Lechner & Gudmundsson, 2014). BMI is one way to get differentiated and unique products, through changes in product features and design (Porter, 1980). Cost leader- ship strategies help in performance by a reducing associated costs (Porter, 1980) in SMEs (Parnell, 2008). When SMEs move across geo- graphical boundaries, their BMs need to be modified (Cavalcante et al., 2011; Child et al., 2017) to achieve cross-market sustained competitive advantages (Wirtz et al., 2016), in the face of uncertainty and changing market dynamics (Achtenhagen et al., 2013). Thus, BMI or SBMI stems from organizational strategy (Casadesus-Masanell & Ricart, 2010). SBMI helps SMEs seize new opportunities through bet- ter value creation and delivery (Yang et al., 2017; Evans et al., 2017). An updated and sustainable BMI helps in greater value creation and attracts more customers, in SMEs (Hacklin et al., 2018), facilitating competitive advantage (Bashir & Verma, 2017). Hence, we hypothe- size that:

H₂: SBMI leads to competitive advantage in SMEs

SME performance was measured relative to that of direct compet- itors using a five-item scale adopted from the works of Venkatraman

& Ramanujam (1986). A sample item is: "Relative to our competitors, our financial performance was much better". Measurement of com- petitive advantage took place through an eight-item scale from Lee et al. (2015). The scale has 5 items relating to differentiation strategy, with 3 further items relating to cost-based strategies. A sample item for differentiation is: "We successfully differentiate ourselves from others through cost-effective design: brand, appearance, feature, etc." A sample item for cost-based strategy is: "Manufacturing costs are lower than that of our competitors". Table 8 highlights the list of all the items used to assess nomological validity.

The relationship was tested using the second order measure of SBMI. Before testing the hypotheses, model fit indices were checked, with a standardized root mean square residual (SRMR) value of 0.075, considered a good fit (Byrne, 2013). The results demonstrate that SBMI significantly positively impacted SME Performance ($\beta = .416, t = 5.28$). Further, the relationship between SBMI and com- petitive advantage was also significant ($\beta = 0.72, t = 11.95$) (Table 9). Fig. 2 provides a snapshot of the structural model.

Discussion

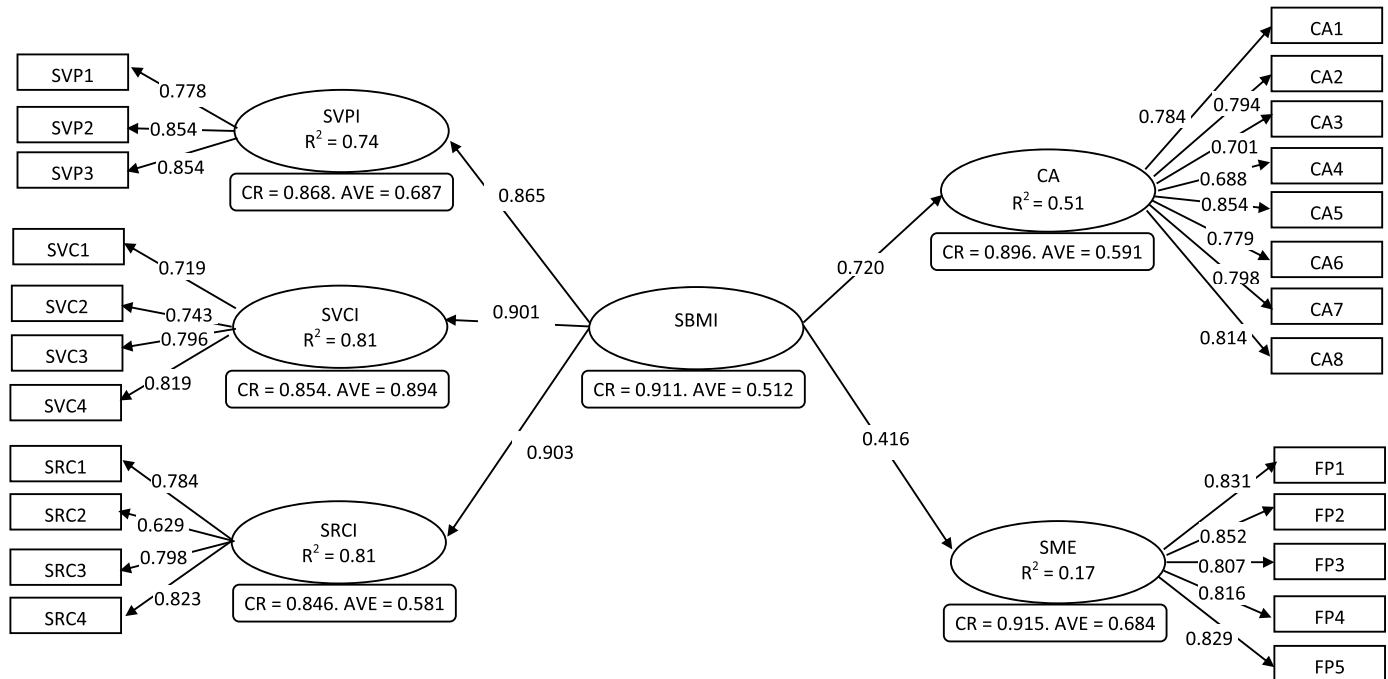
SBMI literature has been attracting interest over the past decade from academicians and managers alike. The importance of SBMI for a firm's profitability and sustainability cannot be refuted. However, despite such widespread interest, the overall concept and empirical validation of the components of SBMI is at a nascent stage and requires further elaboration. This paper has endeavoured to address this issue by developing a reliable and valid scale to measure SBMI. A mixed approach employing qualitative and quantitative stages of enquiry, based on the process followed by Hinkin (1995), was used as a guideline to propose a 10-item, three-dimensional scale for mea- suring SBMI. The three dimensions are: sustainable value proportion innovation; sustainable value creation and delivery innovation; and sustainable value capture innovation. The items for the scale were generated from in-depth interviews from 20 respondents. The items were further validated across two different samples of 130 and 200 SMEs, using exploratory factor and confirmatory factor analysis, respectively. The scale, thus developed, addresses a major gap in existing SBMI research.

We generated three items to measure sustainable value proposi- tion innovation. These are our focus has shifted towards customers

Table 8
Items Used for Nomological Validity Assessment.

S. No.	Construct	Items	Source
1.	SME Performance	Relative to our competitors our financial performance was much better Relative to our competitors, the market share of our organization was much better Relative to our competitors, the sales growth of our organization was much better. Relative to our competitors, the product development of our organization was much better Relative to our competitors, the development of our organization was much better	Venkatraman & Ramanujam (1986).
2.	Competitive Advantage	Our new products and service development offer superior benefits to customers We make great efforts in building a strong brand name We successfully differentiate ourselves from others through effective advertising and promotional campaigns We successfully differentiate ourselves from others through effective design (ex. Brand & store identity) We constantly offer overall differential advantage Internal operation system has decreased the cost of our products Manufacturing costs are lower than that of our competitors We constantly offer low opening costs than our competitors	Lee et al. (2015).

Fig. 2
Structural model.



who seek sustainability; our products and service offerings have become sustainable over the years; and we have positioned ourselves to be sustainable. The results highlighted that these items were significantly consistent across samples, suggesting that these three items can be used to measure sustainable value proportion innovation.

Within sustainable value creation and delivery innovation, four items have significant internal consistency with one another. These are we make regular efforts to make our core competencies and resources more sustainable; we make regular efforts to convert internal value creation activities to be more sustainable; we make regular efforts to partner with firms that focus on sustainability; and we make regular efforts to make our distribution channels sustainable. However, item SVC5 - we make regular efforts to evaluate new competencies that need to be developed to adapt to changing sustainable market requirements - was deleted because of poor factor loading and lack of internal consistency (Field, 2005; Hair et al. 1998).

Furthermore, we used four items to measure sustainable value capture innovation. However, only three items showed high internal consistency with one another. These are we regularly try to replace short-term sources of revenues with sustainable (long-term) recurring revenue models (e.g., leasing); our profit margins have increased by offering sustainable products; and we make regular efforts to reduce manufacturing costs by incorporating sustainable practices. However, item SRC4 was deleted because of poor factor structure. Therefore, it was established that these three items could be used to measure sustainable value capture innovation.

The model was tested for nomological validity, and this presented interesting findings. Research suggests that BMI returns outweigh the returns from innovating in terms of products and process (Massa & Tucci, 2013; Bashir & Verma, 2019). This is because BMI helps firms in reconfiguring one of multiple components within their BM with the changing external environment (Chesbrough, 2010; Sosna et al., 2010). Our results for Hypothesis 1 suggest that SBMI directly and positively affected SME performance. We suggest that in SMEs, reconfiguration of BMI by incorporating sustainability in any of the components of their BMs will enhance profitability. These findings corroborate the findings of Caldera et al. (2019), and Schneider and

Spieth (2013) that the positive social and environmental effects of SBMI might result in a higher chance of profitability.

We posited that SBMI could lead to competitive advantage in SMEs. Rather than innovating at an incremental level, SMEs should reconfigure their BMs by incorporating social and environmental dimensions, which will give them a competitive advantage with respect to their rivals. SMEs with an updated and sustainable BM have greater value creation and attract more customers (Hacklin et al., 2018), which facilitates a competitive advantage (Bashir & Verma, 2017).

Implications for theory

This study extends extant literature in three broad areas: i.e., SBMI, SME performance and competitive advantage. First, a comprehensive measurement scale for SBMI has been developed. Thereby, this study is one of the first attempts to contribute conceptually and methodologically to empirical SBMI research. Previous studies have conceptualized SBMI in a different manner; for instance, Upward & Jones (2016) provide an SBM ontology-based framework. However, their conceptualization fails to integrate sustainability and innovation. Meanwhile, França et al. (2017) created a strategic sustainable development framework. Bocken et al. (2014) developed archetype sets using value proportion, generation/delivery and capture, which are components of BMI. All these conceptualizations have significantly enhanced the body of SBMI research, but most are based on systematic reviews and case-based analysis. This study provided an opportunity to empirically validate SBMI. To develop a scale for SBMI, a rigorous methodological procedure was followed, which promises to aid future empirical studies in this area.

Second, the study has contributed to the extant SBMI and SME performance literature. Several studies have investigated the link between BMI and organizational performance (Bashir & Verma, 2019; Foss & Saebi, 2017; Dunford et al., 2010; Zott & Amit, 2007). To our knowledge, however, this study is one of the first that analyses the relationship between SBMI and performance in SMEs.

Third, the study contributes to the literature on SBMI and competitive advantage. In the current hypercompetitive environment,

business outcomes are quite uncertain. Given the ever-evolving business environment, and changes in customer demands and preferences, firms need to be highly proactive in innovation. BMI has been established to assist organizations in achieving a competitive advantage (Peteraf & Barney, 2003; Amit & Zott, 2012; Bashir, Naqshbandi & Farooq, 2020; Naqshbandi & Kamel, 2017; Teece, 2010).

Fourth, the study is an attempt to explain SBMI using a dynamic capability perspective. The higher the dynamic capabilities in an organization, the greater their propensity to move towards an effective and sustainable form of business. Literature has established that SBMI results in a sustained competitive advantage (Amit & Zott, 2012; Bashir, Naqshbandi & Farooq, 2020). Thus, the study contributes to the existing theoretical base by explaining sustained competitive advantage and SBMI in SMEs through the dynamic capability approach.

Managerial implications

The study offers various practice-based implications, in addition to the scale's relevance for academic research. First, managers can use this scale to identify relevant sustainability issues and stimulate ideas for SBMI. Once ideas for SBMI are identified, this scale can also be used to allocate resources across the three components of SBMI, viz. innovations in sustainable value proportion, sustainable value creation/delivery and sustainable value capture.

Second, managers can use this scale for the general evaluation of their firm's BM during strategic planning. The scale can also be used to extend control mechanisms while implementing SME business strategy. SMEs represent over 70% of worldwide waste pollution (Revell et al., 2010). Therefore, governments globally are placing pressure on SMEs to move towards sustainable BMs. Managers can use this scale as a benchmarking tool, to identify significant sources of competitive advantage of competitor SMEs who follow a sustainable BM. Furthermore, managers can utilize the measurement scale for self-evaluation of their SME's sustainable innovation strategy.

Third, the findings of this study conclude that SBMI results in enhanced SME performance. Therefore, managers should actively look to reconfigure any one component (or all three) of their BMs (innovating in sustainable value proportion, in generating and delivering sustainable value and in capturing sustainable value), by focusing more on sustainable solutions that reduce environmental impact. From the perspective of dynamic capabilities, being flexible with existing resources to meet ever-changing market conditions and customer demands would help in driving sustained profits. The related positive social and environmental effects increase the chances of profitability (Caldera et al., 2019). In addition, it is asserted that adverse impacts on environment and society can be reduced through SBMI (Faber et al., 2005). Furthermore, including the very essence of sustainable practices would help improve corporate reputation, and consequently profitability (Pradhan, 2016; Pradhan, 2018).

Fourth, it is suggested that Chief Strategy Officers should actively consider SBMI within potential competitive advantage sources. Taking cues from the resource-based firm perspective, path dependency and social complexity, which are associated with SBMI, might give SMEs a sustainable competitive advantage (Keiningham et al., 2020; Phangestu et al., 2020; Bashir & Verma, 2019; Barney, 1991). When SMEs pursue internationalization, they make changes to their existing BMs. Therefore, amidst the context of sustainability concerns, selecting an SBMI could prove to be a strategic move by SMEs that intend to internationalize.

Study limitations and further research

The research findings presented should be viewed taking into consideration certain limitations. First, the results of this study are based on samples taken from SMEs in Saudi Arabia, which is

culturally different from most of the world. Research suggests that there might be differences in BMI across cultures like China, which has higher organizational complexity (Clauss, 2017), or across other developed or developing nations. Therefore, future studies should try to validate the framework with a diverse sample from across the globe, to allow generalization of the results. Second, this scale is designed to measure general SBMI. Unique SBMI cannot be captured using this scale. Third, emphasis has been placed on the role of SBMI on SME performance and competitive advantage. However, there can be other factors which influence SBMI: events like the outbreak of COVID-19, industry lifecycle (Sabatier et al., 2012), further regulatory insights with respect to sustainability (Baden-Fuller & Haefliger, 2013; Drucker, 1984) and even competition within industries (Johnson et al., 2008). Future studies should seek to cover these factors.

Declaration of Competing Interest

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

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