

Article

Sustainable Business Model and Corporate Performance: The Mediating Role of Sustainable Orientation and Management Accounting Control in the United Arab Emirates

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Abstract: This study aimed to investigate the mediating role of management accounting control systems (MACS) and sustainable innovations orientation (SIO) in the relationship between business model innovations (BMI) and overall corporate performance. A total of 355 managers drawn from different types of manufacturing firms in the United Arab Emirate (UAE) participated in the study, and the collected data were analyzed using Partial Least Square Structural Equation Modeling (PLS-SEM) to test the structural model with the aid of Smart PLS 3. The findings from the study revealed that BMI does not directly influence SIO but has an indirect effect through MACS. Moreover, this study revealed that MACS mediate the relationship between BMI and financial performance. In addition, the argument that SIO influences overall corporate performance was supported with our findings. Finally, it was established in this study that MACS and SIO partially mediate the relationship between BMI and environmental performance as well as BMI and employee performance.

Keywords: business model innovation; frugal innovation; management accounting control systems; sustainable innovation orientation; PLS-SEM; United Arab Emirates



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1. Introduction

As a result of the dynamic and competitive nature that characterizes today's business environment [1], most companies have begun searching for an innovative business model as a strategy to achieve the objectives of their firm [2,3] with the aim of improving company performance [4,5], while some authors are of the opinion that this is for value creation [6,7]; Ballot et al. [7] and Camison and Villar-Lopez [4] believe that this is for technology development and for the achievement and sustainability of competitive advantages [3,8]. In recent times, the issue of business model innovation (BMI) within the context of how firms innovate their ideas has gained tremendous attention from both academics and practitioners [1,9] and has also considered in regard to how to provide a solution to scarce resources, i.e., "frugal innovation" [10]. Meanwhile, over the time, the concept of BMI has been perceived from different dimensions among managers and researchers [10,11]. However, Teece's [8] definition of a business model has been the most acknowledged definition, and it refers to a business model as "... the design or architecture of the value creation, delivery, and capture mechanisms of a company ...". Velu [12] was of the opinion that a business model plays a significant role in the survival of a company, which Maletic et al. [11] corroborated, stating that that it assists the firm in defining how values are created and captured by the firm from its customers.

Meanwhile, some studies have analyzed the degree of possibility of maximizing the favorable influence of a business model while decreasing the risks involved with technolog-

ical development so as to have a deeper understanding of the determinants of sustainable and frugal innovations [13]. The issue of sustainability has gained momentum that is essential for an organization's stakeholders as well as in academic disciplines [2,14], in which its significance as a key determinant for innovation has been identified by many authors [2,7,12]. Rantala et al. [15] agreed with Varadarajan [14] that the attention attracted by organizational sustainability has been on the increase among academics and academic and industrial organizations, yet it continues to be more of a theoretical consideration than an empirical one. This is evident in some previous studies on sustainable development discourse that investigated the significance relationship between sustainability and innovations [16,17]. Sustainable innovation has been recognized as an essential determinant for business and society changes for some time [1,11] and this is in response to the increase in the complexity of the environment under which firms are operating. Similarly, frugal innovation is focused on the development of lower-priced but appropriately functional products that meet the needs of consumers with limited purchasing power in resource-constrained emerging countries. Despite considerable attention to sustainable innovation drivers at the firm level [17], there is little or no empirical knowledge on the mediating role of sustainable innovation on business model innovation and corporate performance focusing on frugal innovations, which are among the lapses to be addressed in this study.

As a result of the suggestion in the literature that sustainable innovation possibly improves a firm's financial performance [18], the call for management account control oversight of development and innovation has been increasing [18]. In previous research, it has been argued that a "management accounting control system (MACS)" has the potential to impact the success of firms that are innovative in terms of firm performance [19,20]. Bisbe and Malagueño [20] described MACS as a sequence of guidelines employed by managers to make genuine information for "decision-making, planning, monitoring and evaluating and, ultimately" available in order to ascertain that the goals set out by the firm are achieved. The classification of MACS as either "contemporary or traditional" in reference to the characteristic and result differences was undertaken by Chenhall and Langfield-Smith [21]. The balanced scorecard is an example of contemporary MACS that not only utilizes "financial indicators" but also "non-financial indicators", offering a holistic approach to moderate the internal processes within a firm strategy mechanism [21]. Meanwhile, the budgetary system, which is an example of traditional MACS, is focused on "operative and internal control". In addition, Chenhall and Langfield-Smith [21] observed that information made available by the budgetary system to implement "recently developed new manufacturing processes" lacks usefulness. Even though efforts have been made to understand the link between BMI and corporate performance, the relationship has not been studied through the understanding of the sustainability-oriented innovation that is receiving a great deal attention among practitioners and academics so as to ensure the sustainability of corporate performance. Thus, an improved knowledge of the relationship between BMI and corporate performance through SIO and MACS would not only contribute to the literature on the business sustainability but would also contribute to the roles played by SIO and MACS. Surprisingly, these have not been empirically investigated in the literature.

The United Arab Emirates (UAE) is not an exception to the scenario of complex competitive business challenges that are being played out in today's business environment, among which are unsubsidized manufacturing costs, severe regulative restrictions on corporations, a growing demand for sustainable business practices, and competitive threats [22]. Sharma [22] observed that despite the fact that manufacturing companies in the UAE are diverse and of large sizes, these challenges have been severely undermining the performance of the sector. In view of these challenges, this study posits some questions in reference to manufacturing companies in the United Arab Emirates (UAE) such as the following: Will there be a relationship between business model innovation and sustainable innovation orientation? Will sustainable innovation influence corporate performance? Would MACS mediate the relationship between business model innovation and sustainable innovation orientation? Our study aims to investigate the mediating role

of the sustainable innovation orientation of manufacturing firms in UAE and MACS in the relationship between business model innovation and corporate performance. Our study is significant in two ways: first, it extends the framework for the “sustainable innovation orientation” (SIO) and the outcomes as they have been developed by Varadarajan [14] by adding business model innovation as the precedent for SIO and MACS as the mediating variable in the relationship. Second, the empirical investigation of the drivers of SIO will be examined to determine their influence on corporate performance (which is the outcome).

The remainder of the paper is structured as follows: The next section theorizes about the business model innovation relationship with sustainable innovation orientation as it influences the frugal innovation and overall corporate performance, and we also develop hypotheses. Instrument development, data collection, and method of data analysis are explained in Section 3. The subsequent section (Section 4) presents the results of the measured item properties, hypotheses testing, and empirical findings, which are further discussed and summarized in the conclusion in Section 5.

2. Literature Review and Hypotheses Development

2.1. Business Model Innovation

For some time now, the attention of academics, stakeholders, and practitioners has been focused on business model innovation (BMI). This could be termed as an emerging research area, which is significant to the approach of enhancing the sustainability and the business sustainability of organizations [11,17,23]. BMI is often termed as a “structural template” that describes the manner of how an organization develops their business [24], interacts with different systems, and the configuration of firm’s logic as a whole [9]. An integrative definition of BMI was offered by Sorescu et al. [25]; (p. 54) as “... a well-specified system of interdependent structure, activities, and processes that serves as a firm’s organizing logic for value creation (for its customers) and value appropriation (for itself and its partners)”. Yang et al. [26] observed that in contrast to “technological or service innovations”, new products/services are not necessarily discovered by BMI, rather, it uses a novel way of creating and delivers existing products/services and also devises a new means of value capturing from it. In addition, Boons and Ludeke-Freund [17] were of the opinion that BMI can become a determinant of competitive advantage while creating and delivering value to customers.

One of the significant factors in the development of societal activities and the success of business firms in the long term has been identified to be sustainability [11,15]. According to Boons and Ludee-Freund [17], a sustainable business model can be defined as the one “that creates competitive advantage through superior customer value and contributes to the sustainable development of the company and society”. Foss and Saebi [27] observed that self-manifestation through BMI can occur within a change of business model components (single or multiple) or within the framework that links them. Several fields of study have focused their attention on BMI, for instance, entrepreneurship [28], strategic management, and innovation [25], and Schneider and Spieth [29] applied it in the study of information systems. As a result of the multi-dimensional nature of BMI, significant efforts have been made in recent times to describe BMI from multiple dimensions [30] rather than only focusing on single indicator. The idea of looking at BMI from multiple dimensions has contributed significantly to some studies that have comprehensively and empirically investigated BMI [30]. The contributions to BMI from researchers exist in two parts. On the one hand, it focuses on the description of BMI [31], and on the other hand, it focuses on components of BMI [9]. Rodrigues, Molina-Castilo, and Svensson [30] observed that reasons why firms pursue BMI differs, as it entails the company to redefine and re-strategize its resources and capabilities with the aim of goal and objective achievement. Bade-Fuller and Haefliger [32] added that in the process of innovating a business model, it is important for the companies to create a definition of value capturing and to transform that same idea into revenue increment and cost reduction.

In developing a serious business model that will ensure business opportunities that will be sustainable, it is imperative to note that the achievement of sustainable business can not only be achieved through innovations in “technologies, product or service” but also through BMI [23,33]. Girotra and Netessine [24] observed that BMI is more advantageous in improving an organization’s sustainability compared to technological innovations. As it has been observed that manufacturing companies in UAE are facing some challenges similar to every other company, the investigation of business model innovations in respect to solution and service provisions within the manufacturing sector looks promising. It is imperative that the stakeholders in the future develop solutions and different innovation types that are targeted towards addressing these challenges. As observed by Girotra and Netessine [24], only technological innovation might not be enough, and the development of BMI is also necessary, which is the reason why this study is investigating the influence of BMI on organization performance through a “sustainable innovation orientation”.

2.2. Sustainable Innovation Orientation

The definition and conceptualization of a “sustainable innovation orientation” (SIO) has been attempted by different scholars [1,14]. The array of definitions has caused the description of SIO to remain a moot topic. For instance, Siguaw, Simpson, and Enz [34] observed that “innovation orientation” is conceptualized in the literature as a firm’s characteristics that are wide in scope and includes the entire firm and all of its functional parts instead of as a single functional part. The view of Siguaw, Simpson, and Enz [34] implies that a firm’s “actual behavior or behavioral predisposition” should be the focus in defining SIO. From the perspective of a “behavioral construct”, Varadarajau [14] described the SIO as the extent of involvement of a firm relative to the “inter and intra-organizational” activities with particular “organizational activities” that spans through numerous firm functions targeted at new “products, processes, and practices” development and at making adjustment to the existing “product, processes, and practices”, with the aim of reducing the influence of its operations on the natural environment. On the other hand, SIO was viewed from the angle of “behavioral predisposition”, as the level of a firm’s relative commitment to the both the activities within and outside of the firm within a particular role that spans through several firm roles and is geared in the direction of developing new “product, processes, and practices” with the aim of significantly reducing the influence of the firm’s operations on the natural environment [11,14]. Meanwhile, in recent times, scholars have argued that the innovation activities of firms in emerging countries are quite distinct and that they sometimes cannot be fully explained by existing concepts. For instance, innovation according to Dosi [35] is believed to be persistent, irreversible, and path-dependent, which could possibly influence the relative competitive power of some firms. Some studies observed that structural rigidity could impede some firms from innovating for customers with quite different needs, which is a result of insufficient “Research and Development (R&D)” capabilities for building high-tech innovative products [36–38]. In view of this, some scholars have argued for frugal innovation, which is mainly focused on achieving dramatically lower costs to meet the expectations of resource-constrained consumers, with a secondary focus on providing functionalities and features that are adequate to meet specific needs [10]. According to Zeschky et al. [39] and Wan et al. [40], the main aim of this kind of innovation is to provide a very low price with adequate quality to serve resource-constrained customers. In an emerging economy, for instance, this lower price is achieved by using low-cost local materials or services through the building of innovative manufacturing processes and by focusing on the basic minimum functionalities expected by the target customers and their specific circumstances [39,40].

It is apparent from the literature that SIO is described as the organizational capacity to adopt novel ideas and to successfully implement these ideas in the development of new “products, processes, and practices” to be at an acceptable standard that will not be detrimental to the natural environment [11,14,17]. This implies that SIO places emphasis on social and environmental issues without jeopardizing the interest of the unborn generations.

Even though SIO is relatively new, it has not been exhaustively investigated empirically. Veronica et al. [1] posited that it is going to be a significant force to drive change both in business and society. This is an indication that SIO not only influences the enhancement of corporate performance that could lead to competitive advantage but also impacts sustainable development. In understanding the drivers for the SIO, Varadarajau [14] demonstrated that from an institutional theory perspective, “firm-related factors and industry-related factors” are the main drivers. The study highlights some firm-related factors such as “size, globalization, reputation and slack”, while industry-related factors are the “relative environmental impact of the industry, sustainability initiatives of firms in upstream supplier industries and downstream customers industries, and size of end users’ customer base”. In a similar vein, Varadarajau proposed “sustainable process innovations performance, sustainable product innovations performance, environmental performance, marketing performance, financial performance, and employees’ performance” as the outcome of the SIO. Thus, this study will empirically investigate these propositions with the data from manufacturing companies in the UAE.

2.3. Management Accounting Control System

Management accounting control systems (MACS) have been differently conceptualized in accounting literature [41]. MACS, according to Anthony (1965) cited in Lopez-Valeiras et al. [41], was described as the procedure followed by managers to ensure the efficient and effective use of firm resources to achieve the accomplishment of the firm’s objectives. Similarly, another author defined it as a control system that enables the assessment of business performance by the senior management so as to provide motivation for the unit of the firm that performs creditably for performance sustainability [42]. In line with these definitions, the idea of having a control system involves business agreement objectives between different cadres of management; the evaluation of performance against the outlined objectives; and providing feedback on the evaluation so as to recommend either incentives or sanctions as they are deemed fit. Moreover, another definition of MACS was given in the literature as official “information-based” procedures that an organization’s managers use to preserve or to modify the organizational activities framework [19]. Dunk [18] and Langevin and Mendoza [43] observed that the definition in the literature includes “planning systems, reporting systems, and monitoring procedures” which are anchored in information use. In a nutshell, MACS make data available to managers, which will assist them in assessing individual and organizational interest and if the benefits for the stakeholders have been achieved [43]. The literature suggests that “benchmarking, balanced scorecard, cost accounting and budget system” are the most used control systems because the trends in “competitor sales, market share or volume” are being assessed and monitored by these control systems, in which the information that is gathered can be used to evaluate the “competitor’s market strategy” [41]. Lopez-Valeiras et al. [41] were of the opinion that a balanced scorecard enables management to have a comprehensive framework that assists them in company strategy assessment in a coherent manner.

Traditional financial measures are being supplemented with management control systems with measures from an additional three dimensions, which are “those of customers, internal business process, and innovation and learning” [41]. As for the budget system, Dunk [18] described it as the incubating stage in which the method and measurement of the goals are agreed upon by the stakeholders. The study further stated that the control system includes actual output measurements in which the predesigned measurement instruction is being conducted by the monitor. In addition, the cost of production is captured by cost accounting through the assessment of the input cost at every stage of production. The evaluation and the recording of the cost of production individually and the differences between the planned and actual costs are also included in cost accounting. In their studies, Horngren, Foster, and Datar [44] found that MACS inhibit investment in product innovation; however, Dunk [18] found that MACS positively influence the product innovation and corporate performance relationship under a planning framework, while

Bisbe and Malagueno [20] were of the opinion that it would influence the relationship under the interactive use.

2.4. Hypotheses Development

2.4.1. Business Model Innovation and Sustainable Innovation Orientation

The literature has suggested that business sustainability cannot only be achieved through innovation in technology, product, or services but with the innovation of a business model [23,24]. Hence, a “system-based approach” was proposed by Veronica et al. [1] for business model analysis that is embedded in the “socio-technical context” so as to offer a novel understanding of dynamism and sustainability transition management. Their study demonstrated that the movement from one period to another involves a significant rearrangement and reorganization of both the technical aspects and the social elements of systems. In this regard, systems are described in “dynamic co-evolutionary terms” that influence the interrelationships between various stakeholders, institutions, and infrastructures and that shape systemic change [15]. The study of Qi et al. [16] demonstrated that the key to the success of an organization in its ability to adapt to changes in the environment. This implies that the innovation of a business model would assist a firm in the adaptation of its system to new environmental situations so as to improve their approach of people management and work organization [23].

Sousa-Zomer and Miguel [23] made a submission in their study that BMI that consisted of a social component that is capable of enabling the close involvement of customers and that can also assist in the alteration of their unsustainable consumption behavior. The study demonstrated that a business model conceptualizing to focus more on the achievement of social and environmental benefits instead of economic benefits has the potential of lowering environmental costs such as lower energy consumption and less waste generation. The study further that a model focusing on technological innovation could be of the most benefit in water as a result of the services and technology requiring less resources and less waste generation [23]. In reference to the study of Gebauer and Saul [45], the achievement of economic goals is not only the outcome a business model, but it is also essential for organizations that are aiming to highly prioritize the protection of the natural environment, public welfare, and who wish to uphold social values. In view of these understandings, our study deals with innovation in business management as motivation for the changes in the internal and external environments of firms and to illustrate the values that can be accrued when stakeholders adopt a sustainable innovation orientation. Thus, we believe that the sustainable innovation orientation of a firm is likely to be influenced by the business model innovation adopted by the organization. Therefore, we propose the following hypothesis:

Hypothesis 1 (H1). *A positive relationship exists between BMI and SIO.*

2.4.2. BMI, MACS and SIO: The Links

It is apparent to note that using a sustainable orientation and BMI individually does not necessarily warrant effective positive changes in corporate performance [1,2,12]. This is because important aspects of the innovation process itself, such as commercialization, are deemed to be in constant need of proper management [12], meaning that commercialization is the last pivotal step in innovation that can prove to be ineffective if it is not properly managed. Thus, the benefits of a sustainable orientation for the entire production process can be exploited by having effective managerial tools. Most importantly, the organization must possess a better understanding of these aspects, implications, and benefits of a sustainable orientation [43]. Moreover, there are also suggestions that reveal that an understanding of a sustainable orientation is necessary in order to have a better understanding of the competitive environment [11].

Looking at the above discussions, it is therefore imperative that organizational strategies must be realigned to encompass marketing and innovation capabilities. This establishes an important synergy between MACS and a sustainable orientation [18,20]. Based

on the sustainable orientation point of view, MACS help to provide insights into key issues that need to be addressed as well as into the current position of the firm. Additionally, the use of MACS is regarded as a position to strongly reveal the dominant stakeholders of a company and their related needs [19]. Either way, there is possible mediating role of MACS in the relationship between BMI and sustainable orientation.

Meanwhile, BMI and sustainable orientation make it feasible for firms to adopt and implement the required differentiation strategy. This is important because it helps the firm to devote attention towards special product characteristics that are essential to customers. However, the successful implementation of this strategy requires a proper understanding of the competitive situation so as to convince customers of the benefits of the sustainably reoriented product features [11]. It is believed that a lot of customers and retailers are presently in need of more details regarding sustainably reoriented products [16]. This is important because it causes firms to acquire important feedback about important product features in a timely manner [11]. Thus, the introduction of new products is strongly determined by the firm's market orientation. Benchmarking can thus be used to reinforce the effective use of market orientation to support the introduction of new products by drawing lessons from other successful companies [41]. In doing so, firms can gain a better understanding of the demanded products and services and how they contribute towards enhancing customer value. That is, MACS use budgets and cost accounting strategies to reinforce the effectiveness of differentiation strategies [41]. However, there are arguments that contend that MACS cannot be tailor-made to match diverse and complex business environments [11]. As a result, the following hypotheses are formulated.

Hypothesis 2 (H2). *A positive relationship exists between BMI and MACS.*

Hypothesis 3 (H3). *A positive relationship exists between MACS and SIO.*

Hypothesis 4 (H4). *MACS mediate the relationship between BMI and SIO.*

Hypothesis 5 (H5). *MACS positively influence financial performance.*

2.4.3. Sustainable Innovation Orientation: Drivers and Outcomes

Even though sustainable innovation is still new and has not yet been exhaustively and empirically explored, Maletic et al. [11] opined that it is a significant force that will drive change in business and society at large. Meanwhile, the factor that drives SIO still remains empirically unexplored. Some studies opined that SIO is being driven by internal resources [8,16,46]. The study of Varadarajau [14] highlights size, globalization, and reputation and slack as the firm-related factors that drive SIO. The study opined that more institutional pressure, especially from the stakeholders, will be on a large firm than the relatively smaller firms. This view corroborates the study of Haanaes et al. [47], which found that a larger percentage of big firms tend to embrace sustainability than smaller firms. As for globalization, Varadarajau [14] posited that global firms are often challenged with different institutional pressure urging them to show how committed they are to the sustainability of the environment where they operate.

Firm reputation was described by Brown et al. [48] as the "set of corporate associations that individuals outside an organization believe are central, ensuring and distinctive to the organization". It was argued in the study of Varadarajau [14] that reputation management by firms and the protection of their brand are among the factors underlying the "corporate social responsibility" (CSR) of firm activities. Hannaes et al. [48] noted that firms with a favorable reputation in terms of sustainability are at advantage of receiving other benefits, such as the penetration of a new market, as well as attracting and retaining the best brains. Organizational slack is the fourth indicator of firm-related factors identified by Varadarajau [14]. It was described by Bourgeois [49] (p. 30) as "that cushion of actual or potential resources which allows an organization to adapt successfully to internal pressures for adjustment or to external pressures for change". Some previous studies have examined

the role of slack in relation to sustainable innovations [14]. Their studies suggest that while the slack allows managers to market their green market, the benefits do not seem to be immediate. Drawing from the literature, it shows there is a possible relationship between the firm-related factors and the firm's sustainable innovation orientation [14].

Moreover, the relative environmental impact of industry, the sustainability initiatives of firms in upstream supplies industries and downstream customer industries, and the size of the end user customer base are grouped and theorized as the industry-specific factors that drive SIO. Though each of the factors has been examined individually by previous authors, for instance, the relationship between the relative environmental impact of an industry and sustainable innovation [16,47,50] and sustainability initiatives of firms in upstream supplies industries and downstream customer industries [50], the firm and industry-related factors are only theorized by Varadarajau [14], and no empirical study has been conducted yet. It is on these grounds that we are proposing two factors as the drivers for SIO.

Furthermore, collaboration between a firm and external parties has been identified by some authors to be beneficial to the innovation process [16,50]. Ayuso et al. [51] stressed that the achievement of SIO is driven by firm-related factors (such as balancing stakeholder interests and internally integrating their knowledge). This implies that the ability to use and share information with the stakeholder so as to capitalize on their knowledge could possibly help the organization in adapting to the external environmental changes in order to gain a competitive advantage in the market where they operate [14]. Meanwhile, Jorna [52] observed that there is a challenge in measuring the significance of firm-related factors as a driver for SIO, as the study found that SIO is not only driven by firm-related factors but also by their interactions with the firm's "internal and external stakeholders". Therefore, it is imperative to have a better understanding of the determinants of SIO. In view of these, we propose the following hypothesis:

Hypothesis 6n (H6). *Sustainable innovation orientation is positively influenced by (a) industry-related factors and (b) firm-related factors.*

In reference to the resource-based view (RBV) [54] and the extension (organizational capabilities) by Amit and Schoemaker [55], both theories lend credence to the positive relationship between SIO and product and process innovation performance. Varadarajau [15] corroborated the argument and posited that a high level of SIO over a certain period of time could lead to the company accumulating resources, and, more importantly, the capacity that is significant for the development and implementation of superior "sustainable process innovations and product innovations". Moreover, it is expected that significant sustainable product innovation performance and sustainable process innovation would influence environmental performance. In the study of Kuckertz and Wagner [56], it was argued that the achievement of a competitive advantage that is sustainable by an organization should encourage a firm to transform environmental concern into opportunities. This, they stressed, can only be achieved when the firm shares their internal environmental capabilities with the stakeholders. This, in turn, will lead to the firm achieving a competitive advantage that will be sustainable in the market where they operate.

Meanwhile, the literature on the relationship between SIO and financial performance suggests a positive relationship in the long term [12,15,47]. An observation was made by Berrone and Gomez-Mejia [57] that the relationship between environmental innovation and financial performance might not be linear, which implies that achieving acceptable environmental performance could take more time than expected, thereby increasing outcome uncertainty. Madsen and Rodgers [58] therefore observed that while it is possible for a company to gather benefits that could be "reputational insurance, leniency from regulators, and decreased risk of public activism from their CRS activities", there is a possibility for the cost of CRS to outweigh the benefits over a short period of time. However, positive outcomes are noted in the expected value of financial performance in the long run. The issue of financial performance and sustainable innovation was also investigated

by Barnett and Salomon [59]. The study observed that despite numerous studies on the relationship, the results were mixed. For instance, Luo and Bhattacharya [60] investigated the relationship between CRS and financial performance, and the study found that positive, non-significant, or negative returns from CSR is possible under different environments. On the part of Chatterji, Levine, and Toffel [61], it was stated that in case the CRS metrics are noisy indicators that are correct for CRS operations, a small correlation as an outcome could understate the link between expected CSR and financial performance. However, in a situation where bogus metrics are presented to the stakeholders, the possibility of achieving a positive correlation is high, with the attendant consequence being the overstating of the relationship between the expected CRS and financial performance.

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In reference to the relationship of the SIO to employee performance, some studies supported a positive relationship between SIO and employee performance [11]. The study stressed that having a sense of belonging in a company that an employee works for is one of the social and psychological rewards that an employee expects from an organization [47]. This is with the view that the feeling of being part of the firm will enhance the commitment of the employee, especially regarding a societal issue, such as environmental sustainability, through its SIO [11].

In our study, drawing from the extant literature, we believe that if SIO is properly pursued by the manufacturing companies in UAE, the outcome from the SIO will influence

sustainable process innovation performance, sustainable product innovation performance, environmental performance, financial performance, and employee performance. Thus, we propose the following hypothesis:

Hypothesis 7 (H7). *Sustainable innovation orientation directly influences (a) sustainable process innovation performance, (b) sustainable product innovation performance, (c) environmental performance, (d) financial performance, and (e) employee performance.*

Furthermore, it is expected that a firm will attract consumers that are environmentally conscious through SIO, will earn loyalty among green-conscious consumers, and will improve its reputation among a wider cross-section of society. On the other hand, in a market environment that is characterized by the growing of sustainability awareness among consumers in the stages of making decisions regarding brand choice where there is a high number of products, the consumers are likely to limit their set of considerations to the brands with a high sustainability rating. Although, the final decision could still be influenced by other factors, the inclusion or exclusion of which could be influenced by the sustainability attributes, the positive relationship between SIO and marketing performance is well-founded [11,14]. However, Claudy et al. [61] studied the link between sustainable products and process innovations, and the consumer behaviors indicated that a wide gap exists between the consumer's intention to purchase a green product and their actual behavior. For instance, their study shows that about 40% of the respondents were willing to purchase green product but only 4% actually did. A similar study by Luchs et al. [62] submitted that for "strength-related" products, their attributes are valued, and the positive influence of sustainability characteristics on the consumer choice could be reduced and could sometimes result in consumers switching to other products, and this would negate the sustainability properties. The study then suggested that in such conditions, the company can reduce the potential negative influence of sustainability properties on the consumer choice by using "explicit cues" about the strength of the firm product.

Meanwhile, Olson [63] was of the opinion that the general adoption of green products could possibly demand a "green tradeoff reduction and/or compensation for the tradeoff", which would be possible by providing significant information on the merit of non-green properties in comparison to brown products, which are the alternatives. This view was in agreement with Kronrod, Grinstein, and Wathieu [64], who observed that swaying customers to participate in eco-friendly activities poses a serious challenge as a result of the perception that most of the time, the beneficiaries are not the customers who participate in the eco-friendly behavior but that it is the other customers and society at large who benefits. It is on this note that we propose the following hypotheses:

Hypothesis 8 (H8). *Sustainable process innovation performance directly influences environmental performance.*

Hypothesis 9 (H9). *Sustainable product innovation performance directly influences (a) environmental performance and (b) marketing performance.*

Hypothesis 10 (H10). *Environmental performance directly influences (a) marketing performance and (b) financial performance.*

Hypothesis 11 (H11). *Marketing performance directly influences financial performance.*

2.4.4. Mediating Effects of SIO in the BMI and Corporate Performance Relationship

From the extant literature reviewed in this study, we found that some studies have investigated business model innovation, sustainable innovation orientation, and management accounting control systems individually. However, to the best of our knowledge, no comprehensive work has been done to build an integrated empirical model that examines the three constructs in a model and the mediating role of the MACS and SIO in

the relationship between a business model and corporate performance (sustainable innovation outcomes). In our study, we are of the view that MACS and SIO will mediate the relationship between BMI and corporate performance (employment performance, environmental performance, and financial performance), as is the opinion of Veradarajau [14]. The study Veradarajau [14] theoretically presented the possibility of sustainable product and process innovation performances and other measures of organizational performance as the outcomes of a sustainable innovation orientation that are based on the extant literature that determined business model innovation and management accounting control systems as the antecedents of a sustainable innovation orientation. It then becomes imperative to investigate the possible mediating role of a sustainable innovation orientation in the relationship between its antecedents and its outcomes. Therefore, the following hypotheses are proposed:

Hypothesis 12 (H12). *Management accounting control systems partially mediate the relationship between BMI and SIO.*

Hypothesis 13 (H13). *Management accounting control systems partially mediate the relationship between BMI and financial performance.*

Hypothesis 14 (H14). *A sustainable innovation orientation partially mediates the relationship between BMI and financial performance.*

Hypothesis 15 (H15). *A sustainable innovation orientation partially mediates the relationship between BMI and employment performance.*

Hypothesis 16 (H16). *A sustainable innovation orientation partially mediates the relationship between BMI and environmental performance.*

Hypothesis 17 (H17). *MACS and SIO partially mediate the relationship between BMI and employment performance.*

Hypothesis 18 (H18). *MACS and SIO partially mediate the relationship between BMI and environmental performance.*

Hypothesis 19 (H19). *MACS and SIO partially mediate the relationship between BMI and financial performance.*

3. Data Sources and Methods

The research framework of our study, depicted in Figure 1, shows the relationship among the variables. In the framework, we proposed that BMI would have a direct relationship with SIO and MACS as well as that MACS would have a direct relationship with SIO. In addition, firm and industry-related factors were proposed as the sustainable innovation orientation drivers, while sustainable product and process innovation and some measures of corporate performance were proposed as the outcomes of a sustainable innovation orientation. The mediating role of MACS and SIO in the relationship between BMI and sustainable innovation outcomes (corporate performance) were also hypothesized, as in this study, we contend that the innovation of a business model by manufacturing companies in UAE can lead to a sustainable outcome but also hypothesize that the relationship will be partially mediated by SIO and MACS.

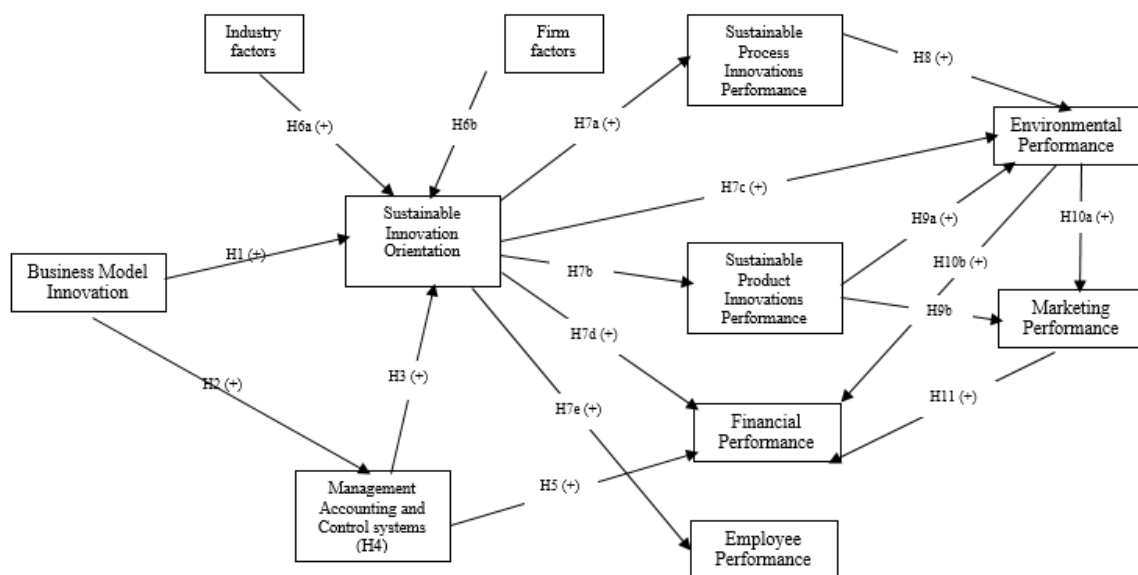


Figure 1. Study theoretical model.

A cross-sectional research design was adopted to examine data collected from a representative sample of manufacturing companies in the UAE. The use of a cross-sectional design in this study made it possible to examine variations in corporate performance over a wide range of manufacturing firms in the UAE. The data were collected using a questionnaire.

3.1. Items Measurement

The questionnaire was developed using related ideas obtained from similar studies. The questionnaire was composed of eight sections. The first section catered to the demographic details of the participants while the proceeding sections covered information on sustainable orientated innovation, which was measured with five items [11]. Firm-related factors were measured with six items [50]; five adapted and modified items from Qi et al. [16] were used to measure industry-related factors (see Appendix A, Table A1); sustainable process and product orientation were measured with four and five items, respectively [11]; and BMI [23] and MACS [42] were measured with two (2) items each. Finally, overall corporate performance was sub-divided into six sub-constructs as suggested in the literature [52], and these were employee performance [11], which was measured with four items (see Appendix A); environmental performance [11], which was measured with three items; marketing performance and financial performance [11], which were measured with seven and three items, respectively (see Appendix A); and sustainable process and product orientation were measured with five and four items, respectively [11]. However, amendments were made to the questionnaire items so as to ensure that the research instrument remained highly valid and reliable in addressing the areas of concern.

3.2. Data Collection

A structured questionnaire was adopted in our study as an instrument for data collection. For a proper understanding of the items by the respondents, the questionnaire, which was originally prepared in the English language, was translated into the Arabic language by a language translator expert. In order to ensure the accuracy of the translated information, another expert was employed to translate the translated copy from English to Arabic back to English, after which the necessary adjustments were made, and the questionnaire was certified to be fit for distribution.

As a result of the absence of a comprehensive list of the manufacturing companies in the UAE, this study adopted Cochran's (1977) formula for sample size determination, which is helpful when a population is unknown or unavailable [65]. Thus, 384.16 was found to be the acceptable sample size, and consequently, 400 questionnaires were distributed to

managers drawn from different types of manufacturing firms in the UAE, ranging from transportation, computers and electronics; plastics, chemicals and petroleum; and clothing and textiles companies. Out of the 400 administered questionnaires, 355 (88.75%) were returned completed and were subsequently used for further analysis.

The descriptive statistics of the respondents' characteristics indicate that 191(53.8%) of the respondents were male, while 46.2% were female, which is an indication of gender balance among our respondents. About 44.79% (159) of the respondents were within the age bracket of 26–33 years of age, 18.59% were within the age range of 34 and 41 years of age, while 13.24%, 12.39%, and 10.99% of the respondents were within the age range of 42–49 years of age, 18–25 years of age, and above 50 years of age, respectively. In reference to the managerial cadre of the respondents, 41.69% were frontline managers, while 30.99% and 27.32% were middle cadre managers and top managers, respectively. This indicates that the respondents were well positioned to have a better perception of the items listed in our questionnaire. Finally, the description of the respondents' company size showed that 14.65% of the respondents were managers in a company with about 5–50 employees, 32.11% had between 50–250 employees, while 36.9% and 16.34% had 250–500 and above 500 employees, respectively. The mean, standard deviation, and correlations among the variables are presented in Table 1.

Table 1. Items and construct measurement assessment.

Construct	Indicator	Loadings	CR	AVE	VIF
Business Model Innovations	BMI2	0.701	0.738	0.587	1.033
	BMI3	0.841			1.033
Employee Performance	EP1	0.635	0.873	0.636	1.266
	EP3	0.890			2.378
	EP4	0.837			1.918
	EP5	0.804			1.814
Environmental Performance	EVP1	0.774	0.812	0.591	1.306
	EVP3	0.814			1.378
	EVP4	0.715			1.203
Financial Performance	FP1	0.803	0.854	0.662	1.495
	FP2	0.854			1.722
	FP3	0.782			1.394
Firm-related factors	FRF1	0.762	0.893	0.582	1.752
	FRF2	0.798			1.962
	FRF3	0.729			1.784
	FRF4	0.814			2.320
	FRF5	0.732			1.820
	FRF6	0.740			1.553
Industry-related factors	IRF1	0.825	0.916	0.687	2.076
	IRF2	0.800			2.167
	IRF3	0.893			3.241
	IRF4	0.847			2.505
	IRF5	0.776			1.871
Management Accounting Control System	MACS1	0.931	0.704	0.564	1.027
	MACS5	0.720			1.027

Table 1. Cont.

Construct	Indicator	Loadings	CR	AVE	VIF
Marketing Performance	MP1	0.706	0.892	0.543	1.754
	MP2	0.752			1.907
	MP3	0.725			1.661
	MP4	0.756			1.799
	MP5	0.808			2.132
	MP6	0.751			1.996
	MP7	0.652			1.579
Sustainable Innovations Orientation	SIO1	0.909	0.950	0.793	3.620
	SIO2	0.850			2.559
	SIO3	0.907			3.593
	SIO4	0.904			3.541
	SIO5	0.882			3.050
Sustainable Process Innovation Performance	SPRIP1	0.792	0.865	0.616	1.578
	SPRIP2	0.825			2.005
	SPRIP3	0.820			1.949
	SPRIP4	0.713			1.360
Sustainable Product Innovation Performance	SPIP1	0.723	0.873	0.578	1.425
	SPIP2	0.743			1.572
	SPIP3	0.767			1.837
	SPIP4	0.789			1.770
	SPIP5	0.779			1.751

Note: Model fit statistics: SRMR = 0.074, $\chi^2 = 2.774.429$, NFI = 0.609, rmstheta = 0.142. CR = composite reliability, AVE = average variance extracted, VIF = variance inflation factor.

4. Data Analysis and Results

Our study employed “Partial Least square-Structural Equation Modeling” (PLS-SEM) for the data analysis. This method is a family of “variance-based” methods of structural equation modeling (SEM) [60], which has become appealing to behavioral researchers as a result of its efficiency in estimating complex models with a large number of constructs, indicator variables, and structural paths without imposing data normality assumptions [66]. Sarstedt et al. [66] argues for “PLS-SEM to be a causal-predictive approach to structural equation modeling (SEM) that emphasizes prediction in estimating statistical models, whose structures are designed to provide causal explanations”. The comparison of PLS-SEM (variance-based) to CB-SEM (covariance-based) was made by Hair et al. [67] and Hair et al. [68], which concluded that while only CB-SEM considered the common variance for the estimation the model parameters, PLS-SEM considered the entire variance for estimation. In view of the argument for PLS-SEM, which is in tandem with our study, PLS-SEM was employed for the model analysis, and SmartPLS 3 software was used for the processing.

4.1. Assessment of Model Measurements

The first stage in the analysis of our data was to first examine the reliability and validity of the constructs and items in the model; this was to ascertain that the required criteria as suggested in the literature were fulfilled [69]. The results of the loadings of the items in our model are presented in Table 1, which reveals that all of the items have an acceptable loading (greater than 0.70), as suggested in the literature [67], except for

one item in the employee performance construct (0.635) and one in market performance construct (0.652), which were retained because the other properties of the construct were observed to be good for further analysis. Moreover, in determination of the reliability of the construct in of our model, the results presented in Table 1 show that the “composite reliability” (CR) value for all of the constructs is above the threshold of 0.7 [70]. This is an indication of the reliability of our model construct. Similarly, the “average variance value” (AVE) for our constructs are all above the recommended threshold of 0.5 [67]. This implies that there is adequate convergence of our model construct in explaining the variation of the items, which indicates the convergent validity of our constructs. In other words, the constructs in our model offer more than a 50% explanation of the variation of its items.

Consequent to the convergent validity assessment, the extent of the construct distinctiveness from each other in the model was examined. The assessment was conducted through the use of the Fornell–Larcker Criterion [71] and the newly developed heterotrait–monotrait ratio (HTMT) [72]. The comparison of the correlation of the selected variable constructs with the square root of the average variance extracted from each construct as exhibited in Table 2 shows that the inter-correlation values were lower than the values of the square root of the average extracted variance. Hence, it was deduced that the variables had satisfactory discriminant validity. Meanwhile, in response to the shortcomings of the Fornell–Larcker Criterion [72], HTMT was developed to enhance the assessment of the construct’s discriminant validity. Henseler, Ringle, and Sarstedt [72] proposed that an HTMT value that is far less than 0.90 is an acceptable threshold for the discriminant validity of a model construct. The result of our model assessment as presented in Table 3 shows that the values are all less than 0.90, and this complements the Fornell–Larcker Criterion in confirming the discriminant validity of our model constructs. To ensure the absence of collinearity among the items, Hair et al. [67] suggested that the “variance inflation factor” of the items should be examined. The study recommends that a VIF value that is greater than 1 but that is less than 5 indicates the absence of collinearity. Thus, going by the results presented in Table 1, it is safe to conclude that our model is not suffering from collinearity.

Table 2. Fornell–Larcker Criterion.

	BMI	EP	EVP	FP	FRF	IRF	MACS	MP	SIO	SPIP	SPRIP
BMI	0.766										
EP	0.137	0.797									
EVP	0.149	0.572	0.769								
FP	0.130	0.665	0.481	0.814							
FRF	0.126	0.531	0.366	0.375	0.763						
IRF	0.135	0.577	0.350	0.422	0.700	0.829					
MACS	0.229	0.587	0.464	0.436	0.382	0.320	0.751				
MP	0.202	0.554	0.312	0.462	0.716	0.644	0.350	0.737			
SIO	0.230	0.796	0.662	0.555	0.449	0.537	0.468	0.422	0.891		
SPIP	0.221	0.530	0.303	0.420	0.623	0.526	0.337	0.782	0.412	0.785	
SPRIP	0.193	0.492	0.300	0.428	0.624	0.542	0.321	0.736	0.375	0.731	0.760

Note: Diagonal values (**bold**) are square roots of AVE. BMI = business model innovation, EP = employee performance, EVP = environmental performance, FP = financial performance, FRF = firm-related factors, IRF = industry-related factors, MACS = management accounting and control systems, MP = marketing performance, SIO = sustainable innovation orientation, SPIP = sustainable product innovation performance, SPRIP = sustainable process innovation performance.

Table 3. Heterotrait-monotrait ratio (HTMT).

	BMI	EP	EVP	FP	FRF	IRF	MACS	MP	SIO	SPIP
BMI										
EP	0.262									
EVP	0.352	0.796								
FP	0.312	0.864	0.692							
FRF	0.236	0.615	0.485	0.459						
IRF	0.254	0.673	0.459	0.518	0.801					
MACS	0.739	0.312	0.588	0.312	0.821	0.701				
MP	0.379	0.670	0.414	0.577	0.830	0.745	0.797			
SIO	0.423	0.588	0.844	0.666	0.493	0.588	0.845	0.473		
SPIP	0.432	0.670	0.420	0.549	0.752	0.629	0.787	0.312	0.480	
SPRIP	0.372	0.606	0.398	0.552	0.730	0.630	0.776	0.877	0.420	0.588

Note: BMI = business model innovation, EP = employee performance, EVP = environmental performance, FP = financial performance, FRF = firm-related factors, IRF = industry-related factors, MACS = management accounting and control systems, MP = marketing performance, SIO = sustainable innovation orientation, SPIP = sustainable product innovation performance, SPRIP = sustainable process innovation performance.

4.2. Structural Model Testing

Subsequent to the satisfactory assessment of the model measurement, the examination of the structural model testing was conducted. First, we resampled the data to 5000 and used the bootstrapping method [69] so as to assess the significance of the path coefficients. The value of our model fit (0.074) indicate the good fit of our model, which is in agreement with Henseler, Hubona, and Ray [73], who suggested that a cut-off value that is less than 0.08 is considered to be appropriate for a “PLS path model”. In addition, the “normed fit index” (NFI) was examined in line with Henseler, Hubona, and Ray [73], who recommend that values close to 1 indicate the fitness of the model, and though our result (0.609) is close to one, Henseler, Hubona, and Ray [73] warn that the NFI should be interpreted with caution because it is still rarely used. In order to ensure that the results from our analysis are not biased, the “common biased method” should be accounted for, and Kock [74] opined that in PLS-SEM analysis, the “common method bias” (CMB) can be assessed through the examination of the VIF. Our result for the VIF values presented in Table 1 show that our model failed to violate the assumption that the VIF value should be greater than 1 and less than 5, indicating the absence of CMB error in the model.

Moreover, we examined the variance of the explanation of the variables in the model through the coefficient of determination (R^2). The results presented in Figure 2 indicate that BMI, MACS, IRF, and FRF have about 40% variation in explaining “sustainable innovation orientation”. As for the MACS, the explanation of the BMI variation on it is low (5%). Similarly, SIO explained about 14% and 16.9% in SPRIP and SPIP, respectively, while SIO, MACS, EVP, and MP explained about 41% of the variation in financial performance. Meanwhile, about 63% of variation explanation in employee performance was found to be explained by the sustainable innovation orientation in this study. As for the variation explanations in environmental performance, SIO, SPRIP, and SPIP were found to explain about 44% of the variation, while SPIP and EVP provided about 62% of variation explanation in marketing performance (see Figure 2). In accordance with the argument of Henseler, Hubona, and Ray [67] that the weight of the path coefficient should be examined through the evaluation of effect size (f^2), our presented results show that SIO has a strong effect size on EP (1.725), EVP (0.601), SPIP (0.204), SPRIP (0.163), and SPIP shows a strong effect size on MP (1.362). Meanwhile, BMI shows a moderate effect on MACS (0.055), IRF has a moderate effect on SIO (0.131), MACS has a moderate effect on FP (0.027) and SIO (0.123), while MP shows a moderate effect on FP (0.079) and FP (0.068), respectively. However, the effect size of BMI on SIO (0.016) is considered to be weak, and EVP has a weak effect size on FP (0.019) and MP

(0.016), while the FRF effect size on SIO (0.002) and that of SPRIP on EVP (0.004) (see Table 4) are considered to be weak in accordance with the recommendation of Cohen [75].

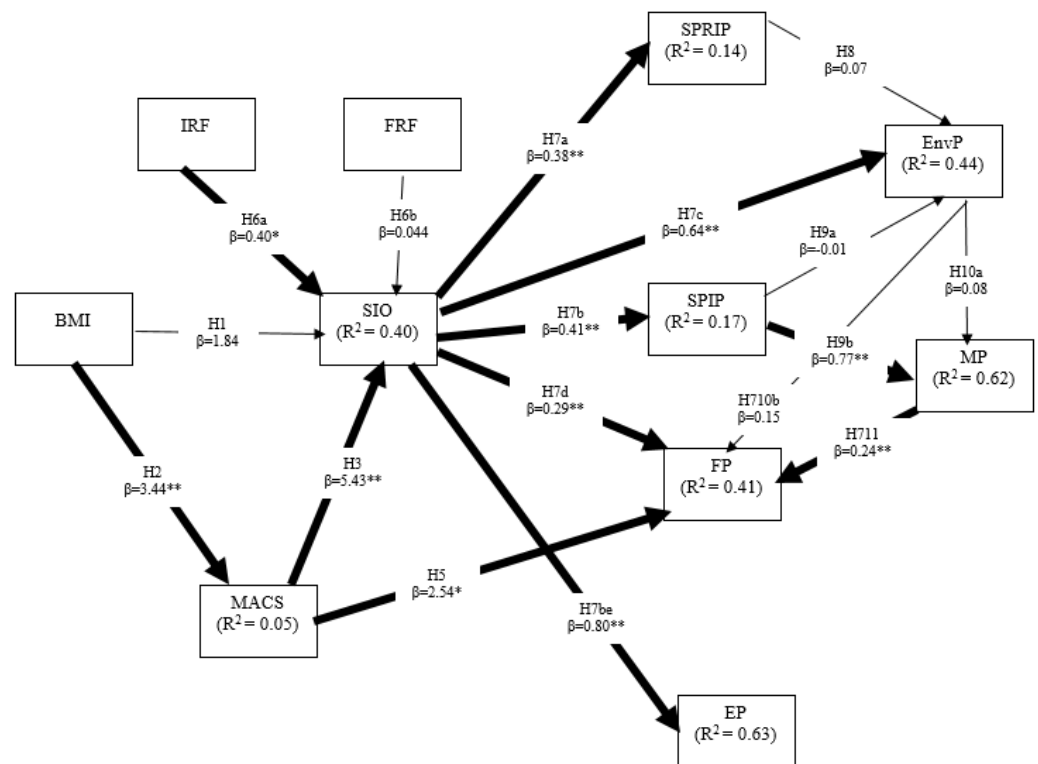


Figure 2. Model testing results. (* means statistical significance at the 1% level and ** means statistical significance at 5% level).

Table 4. Effect size.

Interaction	Effect Size (f^2)
BMI → SIO	0.016
BMI → MACS	0.055
EVP → FP	0.019
EVP → MP	0.016
FRF → SIO	0.002
IRF → SIO	0.131
MACS → FP	0.027
MACS → SIO	0.123
MP → FP	0.079
SIO → EP	1.725
SIO → EVP	0.601
SIO → FP	0.068
SIO → SPIO	0.204
SIO → SPRIP	0.163
SPIO → MP	1.362
SPRIP → EVP	0.004

Note: BMI = business model innovation, EP = employee performance, EVP = environmental performance, FP = financial performance, FRF = firm-related factors, IRF = industry-related factors, MACS = management accounting and control systems, MP = marketing performance, SIO = sustainable innovation orientation, SPIO = sustainable product innovation performance, SPRIP = sustainable process innovation performance.

Finally, we assessed the statistical significance and the relevance of the path coefficient so as to validate or invalidate the hypotheses stated in our study. The results for the statistical significance of our hypotheses are presented and depicted in Table 6 and Figure 2. As presented in Table 5 and depicted in Figure 2, the results show that the hypothesized relationship between BMI and SIO is not true ($\beta = 0.102, t = 1.839$); therefore, we failed to reject H1 and conclude that there is no positive or direct relationship between BMI and SIO. Meanwhile, BMI was found to have a direct influence on the MACS ($\beta = 0.229, t = 3.443$) and was statistically significant at a confidence level that was less than 1%. Thus, we accept H2 and conclude that a positive relationship exists between BMI and MACS. Similarly, H3 and H5 were supported with our findings. This was a result of the positive and statistical significance of the coefficients of the interaction between MACS and SIO ($\beta = 0.301, t = 5.432$) and MACS and FP ($\beta = 0.149, t = 2.542$). Furthermore, the examination of the influence of firm and industry-related factors on the SIO as hypothesized in H6 (a and b) shows that while industry-related factors were found to positively and statistically significantly influence SIO ($\beta = 0.396, t = 5.03$), firm-related factors were not found to be significant ($\beta = 0.044, t = 0.507$). Thus, we failed to support H6b, while H6a was supported, and we can then conclude that only industry-related factors significantly influence sustainable innovation orientation.

Table 5. Hypotheses testing.

Hypotheses	Interaction	Beta	T Statistics	p-Values	Decision
H1	BMI -> SIO	0.102	1.839	0.066	Not supported
H2	BMI -> MACS	0.229	3.443	0.001	Supported
H3	MACS -> SIO	0.301	5.432	0.000	Supported
H5	MACS -> FP	0.149	2.542	0.011	Supported
H6a	IRF -> SIO	0.396	5.030	0.000	Supported
H6b	FRF -> SIO	0.044	0.507	0.612	Not supported
H7a	SIO -> SPRIP	0.375	6.670	0.000	Supported
H7b	SIO -> SPIP	0.412	6.808	0.000	Supported
H7c	SIO -> EVP	0.641	12.467	0.000	Supported
H7d	SIO -> FP	0.286	3.076	0.002	Supported
H7e	SIO -> EP	0.796	26.038	0.000	Supported
H8	SPRIP -> EVP	0.067	0.828	0.407	Not supported
H9a	SPIP -> EVP	-0.010	0.120	0.905	Not supported
H9b	SPIP -> MP	0.757	19.487	0.000	Supported
H10a	EVP -> MP	0.083	1.770	0.077	Not supported
H10b	EVP -> FP	0.146	1.534	0.125	Not supported
H11	MP -> FP	0.244	3.844	0.000	Supported

Note: BMI = business model innovation, EP = employee performance, EVP = environmental performance, FP = financial performance, FRF = firm-related factors, IRF = industry-related factors, MACS = management accounting and control systems, MP = marketing performance, SIO = sustainable innovation orientation, SPIP = sustainable product innovation performance, SPRIP = sustainable process innovation performance.

The hypotheses testing results for H7 (a–e) as presented in Table 5 and depicted in Figure 2 reveal that SIO directly influences SPRIP ($\beta = 0.375, t = 6.67$), SPIP ($\beta = 0.412, t = 6.808$), EVP ($\beta = 0.641, t = 12.467$), FP ($\beta = 0.286, t = 3.076$), and EP ($\beta = 0.796, t = 26.038$). Therefore, H7 (a–e) was supported. The hypothesized influence of SPRIP on environmental performance (H8) was not found to be significant ($\beta = 0.067, t = 0.407$), and as such, we failed to support H8 and can conclude that sustainable process innovation performance does not directly influence environmental performance. In addition, sustainable product innovation performance was hypothesized to directly influence environmental performance

(H9a) and marketing performance (H9b). The results exhibit that while H9b is supported as a result of its significance ($\beta = 0.757, t = 19.487$), we failed to support H9a ($\beta = -0.010, t = 0.120$). We then conclude that only marketing performance is influenced by sustainable product innovation performance. As for the influence of environmental performance on both marketing performance and financial performance, we predicted that environmental performance will directly influence marketing performance (H10a) and financial performance (H10b). However, the results depicted in Figure 2 and presented in Table 6 show that the influence of environmental performance on both marketing performance ($\beta = 0.083, t = 1.770$) and financial performance ($\beta = 0.146, t = 1.534$) are not statistically significant, and thus, H10 (a and b) is not supported. Finally, the influence of marketing performance on financial performance was hypothesized (H11), and the results show that the influence of marketing performance on the financial performance is statistically significant ($\beta = 0.244, t = 3.844$). Therefore, H11 is supported, and we can conclude that marketing performance directly influences financial performance.

Table 6. Mediation analysis.

	Indirect Effect	Beta	T Statistic	p-Value	Decision
H4	BMI -> MACS -> SIO	0.069	2.70	0.007	Partial mediation
H12	BMI -> MACS -> FP	0.034	2.09	0.036	Partial mediation
H13	BMI -> SIO -> FP	0.029	1.661	0.097	No mediation
H14	BMI -> SIO -> EP	0.081	1.849	0.065	No mediation
H15	BMI -> SIO -> EVP	0.065	1.825	0.068	No mediation
H16	BMI -> MACS -> SIO -> EVP	0.055	2.663	0.008	Partial mediation
H17	BMI -> MACS -> SIO -> EP	0.044	2.562	0.010	Partial mediation
H18	BMI -> MACS -> SIO -> FP	0.020	1.786	0.074	No mediation

The mediating effects were examined, and the results are presented in Table 6. The results show that the relationship between BMI and SIO will be partially mediated by MACS (*indirect effect* = 0.069, $t = 2.7$). This implies that there is an indirect influence of BMI on SIO through MACS; thus, H4 was supported. Similarly, MACS are also shown to partially mediate the relationship between the BMI and FP in relation to H12 (*indirect effect* = 0.034, $t = 2.09$). Meanwhile, sustainable innovation orientation performance was not found to mediate the relationship between BMI and FP (*indirect effect* = 0.029, $t = 1.66$), BMI and EP (*indirect effect* = 0.081, $t = 1.849$), and BMI and EVP (*indirect effect* = 0.065, $t = 1.825$). Therefore, H13, H14, and H15 were not supported. Furthermore, it was hypothesized in H16, H17, and H18 that MACS and SIO would mediate the relationship between business model innovation and measures of corporate performance (EVP, EP, and FP). The results show that while MACS and SIO partially mediate the relationship between BMI and EVP (*indirect effect* = 0.055, $t = 2.63$) and BMI and EP (*indirect effect* = 0.0044, $t = 2.562$), the mediating effect of MACS and SIO (H18) in the relationship between BMI and FP was not found to be significant (*indirect effect* = 0.0020, $t = 1.786$). As a consequence, H16 and H17 were supported while, H18 was not supported.

5. Discussion and Conclusions

5.1. Discussion

Our study contributes significantly not only to the literature but also towards the quest to empirically develop new ways to enhance sustainable corporate performance in business corporations. This can be evidenced by ideas suggesting that there is a limited number of available and effective business models that can help curb a surge in operational costs [32]. This study addressed this concern and specifically revealed that business model innovation has a positive effect of 0.229 ** on the effective use of MACS. Such

conclusions reaffirm the notion that new business models are always needed to curb a surge in operational costs. In addition, all things being equal, an effective accounting management control system has the ability to positively improve the sustainability of the organizational innovation orientation. This is line with the argument of some previous that opined the possible impact of MACS on a firm's performance [19,20] but was in contrast to the study of Horngren, Foster, and Datar [44], who demonstrated that MACS could impose obstacles on efforts to promote sustainable orientation.

Secondly, studies on the effects of industry factors have always been associated with numerous contrasting arguments [8,16,47]. This study managed to address this issue and found that while industrial-related factors are significant for enhancing sustainable orientation performance, firm-related factors were found to not be significant in the context of the UAE. This can be supported by the significance of the relationship between IRF and SIO (0.396 **). This is because an improvement in financial and marketing industry factors helps to create a conducive operational environment that fosters a sustainable orientation as well as the development and adoption of sustainable practices [3,51].

Third, this study empirically demonstrated that reorientating business activities plays a pivotal role towards strengthening the effective use of both process and product orientation activities by 0.375 ** and 0.412 **, respectively. Some studies suggested this to be relatively true but lacked empirical support [15,55]. Consequently, these results determine the benefits of sustainable orientation on the environment [55], employee performance, financial performance [12,15], and overall company performance [4,5]. Meanwhile, the direct relationship found in our study contrasted with the argument of Berrone and Gomez-Mejia [56], who determined a nonlinear relationship between SIO and financial performance. Meanwhile, the argument of Sousa-Zoner and Miguel [23] and Schaltegger et al. [33] that corporate performance can only be achieved through the sustainable innovation orientation is corroborated with our findings.

The other significant contribution made by this study is based on the huge emphasis that it placed on the contribution of MACS towards improving financial evaluation performance. This is because the use of MACS by the manufacturing companies resulted in an improvement in financial evaluation performance by 0.149. In addition, the adoption of MACS is usually associated with the development and use of improved financial evaluation tools and strategies that help in regulating financial costs [41]. Similarly, improvements in sustainable process orientation performance imposed an influence on the financial performance (0.286 **) and employee performance (0.796 **). Our results are in agreement with Maletic et al. [11], who found similar results and determined that the sustainability of an innovative firm orientation would enhance their corporate performance. It is to the researchers' knowledge that the effects sustainable product orientation performance on financial evaluation, operation, and employee performance had of long remained empirically unexamined [14]. Moreover, the study managed to fill the unexplored gap on the effects of sustainable product orientation performance on environment and marketing performance. As such, it revealed that improvements in sustainable product orientation performance does not necessarily translate to environmental performance but significantly influences marketing performance. This is evidenced by the non-significance relationship between SPIP and EVP, SPIP, and MP (0.757 **). In addition, MACS were also found to partially mediate the relationship between the BMI and OCP. The implication is that even though the business model is conceptualized to ensure the sustainability of the overall corporate performance of the company, the deployment of an effective MACS is essential for an effective performance. Finally, it is established in our study that the contribution of business model innovation to the manufacturing companies in the UAE for the sustainability of their company's performance can only be possible through an effective use of MACS and SIO.

In addition, among the major contributions of this study is the empirical investigation of the mediating role of MACS and SIO in the relationship between BMI and corporate performance, which, to the best of our knowledge, have not been previously evaluated.

Our findings reveal that though BMI does not directly influence SIO, it has an indirect effect on SIO through the MACS. This implies that BMI can only influence the innovative ideal of the manufacturing companies in the UAE for sustainability through the effective deployment of a management accounting control system, which will ensure the financial prudence of the organization for an effective outcome. In addition, MACS were also found to partially mediate the relationship between the BMI and FP. The implication is that even though the business model is conceptualized to ensure the sustainability of the financial performance of the company, the deployment of effective MACS is essential for an effective outcome. Moreover, it is established in our study that the contribution of manufacturing companies in the UAE to the environmental sustainability and employee performance of the country can only be possible through an effective MACS and SIO.

5.2. Conclusions and Suggestions for Future Studies

By placing considerable attention towards the importance of SEM, this study provided an empirical examination of the mediating roles of sustainable orientation and management accounting control in the relationship between sustainable business model and corporate performance. Additionally, the drivers of sustainable innovation were empirically examined, as were the outcomes of sustainable innovation on corporate performance. Robust results empirically revealed the mediating role of a management accounting system on the relationship between sustainable innovation and the business model and the relationship between business model sustainability and financial performance. In addition, management accounting control system and sustainable innovation orientation were found to mediate the relationship between business model sustainability and environmental performance and business model sustainability and employee performance. The results also provided empirical support of our established argument that developing new business models that are crucial for enhancing frugal innovation and overall corporate performance requires the deployment of an effective management accounting control system. This can also be extended to include the argument that adopting sound and effective management accounting and control systems is vital for boosting overall corporate performance. The third argument was embodied in the notion that the reorientation of sustainable practices is essential for stimulating sound improvements in sustainable product and process orientation performance.

The findings therefore imply that manufacturing firms need to engage in cost cutting activities by increasing production efficiency, reducing overhead costs, and using less expensive materials. However, this must be done in such a way that the adopted cost cutting strategies do not impose obstacles to efforts to promote sustainable orientation. This also requires that firms take into account changes in firm and industry factors, thereby developing sound and effective marketing and financial strategies that boost corporate performance through the development and adoption of sustainable practices. Such strategies will also help in strengthening the effective development and use of improved financial evaluation tools and strategies that will help in regulating financial costs. It is demonstrated in our study that the manufacturing companies in the UAE have the potential to contribute to overall corporate performance (employee, environment, financial) with the initiation of a sustainable business model through the sustainable innovation orientation that will ensure that the companies achieve a competitive advantage [3,8] without compromising the ability of the unborn generations [1,11].

The significant managerial implications of our study is that manufacturing companies in UAE can achieve competitive advantage by focusing on their environment, including the stakeholder demand and customer need without neglecting the interaction with potential partners. Thus, managers should encourage their employees to have more understanding of the present and future needs of the stakeholders and to also seek knowledge outside the scope of their organization. In addition, managers should make efforts to achieve excellence in sustainable innovations in a manner that is both in the long and short term so that the customers and other stakeholders will be satisfied in a balanced way.

The results of this study are specifically based on the examination of manufacturing companies in the UAE. As a result, the results of this study cannot be generalized to other countries and industries such as the banking sector or the telecommunications industry. Firms in these respective sectors and industries are increasingly facing challenges undermining their corporate performance. As a result, future studies ought to center on the role of sustainable orientation and management accounting and control systems in dealing with such challenges. In addition, our model can be replicated in the service industry to validate or invalidate the outcomes of this study.

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Appendix A

Table A1. Construct measurements and sources.

Construct	Items	Source
BMI	How do you view the present overall effectiveness of BMI activities in your organization?	Sousa-Zomer, & Miguel (2018)
	What is your view on the way other employees in the organization involved in BMI anticipate and solve problems?	Sousa-Zomer, & Miguel (2018)
Employment performance	The turnover ratio has decreased over the past 5 years	Maletič et al., (2014)
	The level of employee motivation has increased over the past 5 years	Maletič et al., (2014)
	There have been significant improvements in safety standards and health performance over the past 5 years.	Maletič et al., (2014)
	Employee education and training have increased over the past 5 years	Maletič et al., (2014)
Environmental performance	The consumption of raw materials has improved over the past 5 years	Maletič et al., (2014)
	The quantity of recycled materials has increased over the past 5 years	Maletič et al., (2014)
	The waste ratio (e.g., kg per employee per year, kg per unit of product) has decreased over over the past 5 years	Maletič et al., (2014)
Financial performance	There has been steady growth in the return on investment above industry average over the past 5 years	Maletič et al., (2014)
	Sales have been growing above industry average over the past 5 years	Maletič et al., (2014)
	Profit margins have managed to surpass the industry average over the past 5 years	Maletič et al., (2014)
Firm-related factors	A high level of financial capital	Galbreath& Galvin (2008)

Table A1. Cont.

Construct	Items	Source
	Having a lot of physical structures such as warehouses and other immovable properties	Galbreath& Galvin (2008)
	Institutional policies such as training, compensation, recruitment, etc., which are meant to attract and retain skilled employees	Galbreath& Galvin (2008)
	Customer service reputation	Galbreath& Galvin (2008)
	Registered designs	Galbreath& Galvin (2008)
	Service or product reputation	Galbreath& Galvin (2008)
Industry-related factor	Our ability to negotiate for low prices over our customers	Qi et al., (2010)
	Our ability to negotiate for low prices over our suppliers	Qi et al., (2010)
	The extent to which substitute services or product threaten our firm	Qi et al., (2010)
	The intensity at which competitors engage in price war	Qi et al., (2010)
	The extent to which competitors compete for high market positions	Qi et al., (2010)
Management Accounting Control Systems	The system captures the key performance areas of the business units, providing a comprehensive overview of the business.	Granlund (2003)
	Management accounting and control systems should be used to analyze how operational processes and activities can be improved	Granlund (2003)
Marketing performance	Our services and products have witnessed significant improvements over the past 5 years	Maletič et al., (2014)
	Customer satisfaction has increased over the past 5 years	Maletič et al., (2014)
	Customer complaints have decreased over the past 5 years	Maletič et al., (2014)
	There has been a reduction in the cost of poor quality over the past 5 years	Maletič et al., (2014)
	The organization has managed to introduce a lot of innovative services and products than our main rivals over the past 5 years.	Maletič et al., (2014)
	Customers perceive our new services and products as innovative	Maletič et al., (2014)
	New technology is being adopted at a high speed compared to that of our competitors.	Maletič et al., (2014)
Sustainable Innovation Orientations	The organization works on developing new competencies that promote innovation in the organization.	Maletič et al., (2014)
	Managers always make an attempt to improve innovation skills in critical areas where the organization lacks previous experiences.	Maletič et al., (2014)
	Higher level managers are always continuously seeking better ways of understanding the expectations and requirements of key stakeholders	Maletič et al., (2014)
	Effort is placed towards having innovative processes and technology that is environmentally friendly.	Maletič et al., (2014)
	Suppliers and customers are always involved in the designing and development of the organization's services and products.	Maletič et al., (2014)

Table A1. Cont.

Construct	Items	Source
Sustainable Process Innovation Performance	All of the organization's departments, such as finance, human resources, and production, always work together to ensure that all of the initiatives are sustainable.	Maletič et al., (2014)
	The organization regularly undertakes business process reengineering with a focus on green perspectives	Maletič et al., (2014)
	The business processes are flexible, allowing us to achieve high levels of responsiveness towards key stakeholder needs and demands	Maletič et al., (2014)
	Our organization has a learning culture that stimulates sustainable innovation.	
Sustainable Product Innovation Performance	Our efforts to develop innovative ideas that promote sustainability involve sourcing knowledge from external sources such research institutions, customers, partners, etc.	Maletič et al., (2014)
	The organization involves key non-market stakeholder issues such as local communities, general public, governments, and NGOs early in the product/service design and development stage	Maletič et al., (2014)
	Radical improvements are made by the organization to reduce the effects of service and product lifecycles on the environment	Maletič et al., (2014)
	Initial market examinations are done to assess customer ideas about the use of green products	Maletič et al., (2014)
	Sustainability is considered to be a platform for service/product differentiation	Maletič et al., (2014)

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