

## Sustainable innovation and business success: The mediating roles of information technology capability and knowledge management



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### ARTICLE INFO

#### Article history:

Received 16 December 2023

Received in revised form

10 April 2024

Accepted 4 May 2024

#### Keywords:

Sustainable innovation

Information technology capability

Knowledge management

Business success

CB-SEM model

Small and medium enterprises

### ABSTRACT

In this study, our goal was to explore the connections between Sustainable Innovation (SI), Business Success (BS), Information Technology Capability (ITC), and Knowledge Management (KM) within Small and Medium Enterprises (SMEs) in Saudi Arabia. We chose a quantitative method, grounded in a positivist viewpoint, and selected 180 officials from Saudi Arabian SMEs using a targeted approach. We gathered data through a structured questionnaire and analyzed it with Covariance-Based Structural Equation Modeling (CB-SEM) to understand how these variables interact. Our results showed that SI did not have a direct and significant effect on BS. However, it had a notable positive influence on ITC and KM. Furthermore, both ITC and KM were found to significantly boost BS, highlighting their crucial mediating roles. These findings point out the indirect but essential influence of SI on BS by improving technological abilities and KM processes. This provides important guidance for SMEs in Saudi Arabia on how to effectively utilize SI.

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### 1. Introduction

In the rapidly evolving global business landscape, Small and Medium Enterprises (SMEs) in Saudi Arabia find themselves at a crucial point, confronted with the urgent task of incorporating sustainable innovation (SI) to sustain their competitiveness and secure long-term success. The purpose of this research is to examine the consequences of SI on Business Success (BS) in these enterprises while also investigating the mediating functions of Information Technology Capability (ITC) and Knowledge Management (KM). As a result of the unique economic and cultural environment in Saudi Arabia, it is crucial to understand the interaction between these factors in the small and medium-sized enterprise (SME) sector (Liu et al., 2023; Dwikat et al., 2023; Fahad et al., 2023).

Unsustainable innovation, distinguished by its lack of emphasis on environmental consciousness, social responsibility, and economic viability, has yet to emerge as a cornerstone for BS. The extent and

nature of its impact, particularly in SMEs, necessitate comprehensive exploration (Shalhoob and Hussainey, 2022; Bocken and Short, 2021; Benlaria and Alanazi, 2023). This analysis proposes that SI influences BS directly or indirectly through enhancing information technology capabilities and implementing effective KM systems.

Incorporating advanced technologies and management practices in SMEs in Saudi Arabia highlights the pivotal role of ITC and KM in converting SI into tangible business outcomes. This research aims to provide empirical insights into these dynamics through rigorous quantitative analysis, thereby contributing to a deeper understanding of sustainable business practices in emerging economies, specifically in the Middle Eastern context (Helal et al., 2023; Alzahrani et al., 2023; Benlaria et al., 2023).

Organizations must connect their strategy with economic growth and environmental sustainability in today's competitive business world. Modern businesses must integrate SI to create and deploy solutions that meet current and future needs (Chege and Wang, 2020). Innovation must be based on an organization's core capabilities to persist. IT abilities are essential for idea propagation, according to Alloui and Mourdi (2023). Modern IT systems enable firms to collect, analyze, and use data. This helps people make educated judgments about safe practices, resource optimization, and new

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<https://doi.org/10.21833/ijaas.2024.05.018>

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environmental solutions. Information Technology (IT) facilitates cooperation and information exchange within and outside businesses, according to Colicchia et al. (2019). The phenomenon encourages creativity and collaboration to find long-term solutions.

Demir et al. (2023) stated that KM is crucial to sustained innovation. An organization must use effective KM to obtain, archive, and share environmental information. The information helps promote innovation, informed decision-making, and staff learning (Abuezhayeh et al., 2022; El-Tahan et al., 2021). Organizations may accelerate SI by leveraging employee intelligence. An atmosphere that encourages information exchange among employees can achieve this (Bos-Nehles and Veenendaal, 2019). SI and corporate success are linked via intermediaries. Kanda et al. (2019) stressed the importance of intermediaries in connecting different environments. For instance, this decision enhances businesses' information management and IT skills. Turulja and Bajgoric (2018) stated that IT skills facilitate KM activities, making organizational knowledge exchange easier. The growing knowledge has enabled innovative solutions (Lee et al., 2022). This improves corporate competitiveness and performance.

Shahzad et al. (2017) stated that KM and ICT skills are essential for organizational innovation. Studying the elements that influence the link between SI and corporate performance is crucial. The study fully comprehends this relationship by evaluating it as firms must innovate and succeed. This study examines ITC, SI, KM, and businesses' success in filling the existing research gap (Martins et al., 2019). The study aimed to evaluate the importance of SI in BS and the potential effects of ITC and KM. The study's first objective was to evaluate the influence of SI on BS. The study's second objective was to assess the relationship between SI, ITC, KM, and BS. The third objective of the study was to investigate the mediating role of ITC and KM on the BS. Hence, this study examines these relationships and provides businesses with insights to improve their capabilities and stay competitive in the evolving business setting.

## 2. Literature review and hypothesis development

### 2.1. SI and BS

In the dynamic and competitive business world, companies are increasingly realizing the importance of innovation, particularly SI. This type of innovation focuses on creating and implementing products, methods, and services that prioritize people, the environment, and operational efficiency (Zhu et al., 2023). Businesses that adopt innovative and environmentally friendly strategies are more likely to succeed and gain a competitive edge. As societal and environmental awareness grows, consumers are more inclined to patronize companies with strong environmental, social, and governance performance

(Qiu et al., 2020). The Harvard Business Review noted that sustainable enterprises see a 25% increase in profitability and a 13% growth in market share. Al Aina and Atan (2020) also highlighted that sustainable companies are more likely to attract and retain top talent. This leads to our first hypothesis:

**H1:** SI has a significant impact on BS in SMEs.

### 2.2. The role of ITC

Information Technology (IT) is crucial in preserving and enhancing innovative ideas. IT integration can assist firms in innovating socially and environmentally responsible solutions. Enhanced access to information through IT helps organizations generate new ideas and solutions, fostering collaborative problem-solving (Nussholz, 2018). IT capability in organizations is instrumental in addressing social and environmental challenges (Shahzad et al., 2020). Erkmén et al. (2020) observed that companies with stronger IT capabilities are likelier to incorporate environmentally friendly practices. McLean (2019) found that high IT capability correlates with better financial success. This informs the next hypotheses:

**H2:** SI significantly influences ITC in SMEs.

**H3:** ITC significantly enhances BS in SMEs.

### 2.3. KM as a catalyst

KM is crucial for long-term innovation and business performance. Effective KM systems are essential for collecting, storing, and distributing SI data (Shahzad et al., 2020). Rafi et al. (2022) argued that companies that are intensive in KM are better at converting innovative ideas into financial gains. KM systems aid in documenting and sharing SI successes, encouraging knowledge acquisition and expansion (Pai et al., 2022). This leads to the following hypotheses:

**H4:** SI significantly affects KM in SMEs.

**H5:** KM significantly impacts BS in SMEs.

### 2.4. Mediation of IT and KM in SI

Information technology and KM help ideas thrive and survive. Both qualities work together to keep ideas lasting and successful. KM is vital to the creation of sustainable IT and communication solutions. Information Technology (IT) in KM procedures improves KM effectiveness and fosters long-term innovation. IT systems collect and store environmental sustainability data. Information is essential because organizations share and use it (Tassabehji et al., 2019). KM solutions let people share their expertise, spreading information. Effective information exchange requires powerful IT tools and systems. Businesses must combine IT and information management to encourage continuous

innovation (Santoro et al., 2018). The company needs information technology tools to create, share, and use information to streamline these procedures. Strong KM rules are required to manage and share knowledge inside the company.

Understanding how ICT and KM may affect permanent breakthroughs is crucial. Technology has made KM easier by giving people more ways to share information. Klingenberg and Rothberg (2020) examined how information technology and KM can sustain results. The study found that organizations with strong combinations of these competencies fare better. Al Teneji et al. (2022) found that ITC and KM affect organizational performance and long-term innovation. Companies may turn long-term innovation initiatives into profitable commercial successes using sophisticated IT and information management methods. Intermediate-level elements help determine how much enduring innovation affects firm success and offer scholars and professionals significant information (Huang et al., 2022).

The combination of IT and KM is essential in sustaining innovation outcomes. Studies have shown that organizations with a potent blend of these capabilities perform better (Klingenberg and Rothberg, 2020; Al Teneji et al., 2022). This interplay is hypothesized to mediate the impact of SI on BS, leading to the mediation hypotheses:

**H6:** KM mediates the relationship between SI and BS in SMEs.

**H7:** ITC mediates the relationship between SI and BS in SMEs.

## 2.5. Cultural and global perspectives on SI

The impact of company culture on SI project success and the need for a global perspective in evaluating the interplay of innovation, IT skills, KM, and organizational success cannot be overstated (Ali et al., 2018; Lim et al., 2022). Companies with a global focus on supply chain networks and environmental sustainability often rely on contemporary IT and robust KM systems (Chiu, 2023).

Integrating and effectively managing SI, IT capabilities, and KM are crucial for long-term BS. The hypotheses developed in this literature review are designed to explore the intricate relationships between these components and the mediating roles of IT and KM within the context of SI. This framework provides a comprehensive understanding of the dynamics in contemporary business environments.

Company culture significantly affects SI project success. Culture also affects project performance and commercial outcomes. Company culture affects how employees share information, use technology, and manage knowledge (Chu et al., 2019; Alanazi and Benlaria, 2023). Awan et al. (2019) found that firms that value creative ideas and environmental sustainability are more likely to execute SI. IT skills,

KM, and SI are heavily influenced by culture. The influence of SI on long-term corporate success is crucial. Ali et al. (2018) found that organizations that invest in IT and KM are more likely to succeed. Businesses that commit to constant innovation are also more likely to succeed. Technology and information integration must be pursued for long-term goals. This strategy stresses long-term innovations that boost corporate success.

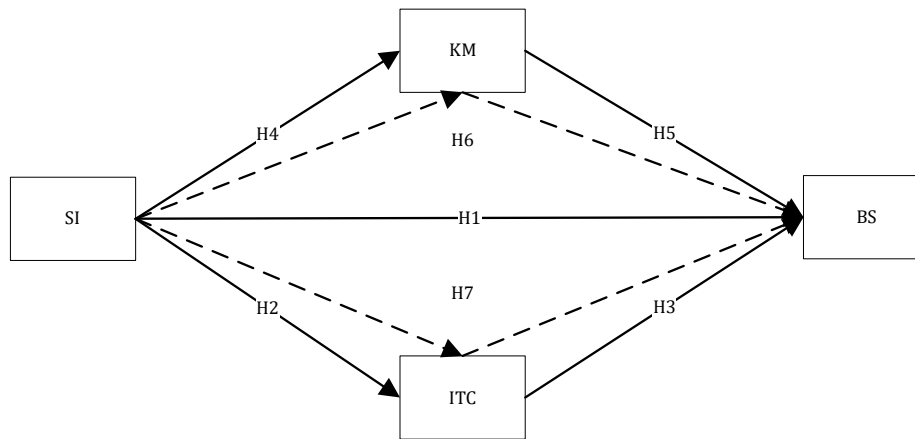
A worldwide perspective is essential for assessing long-term innovation, IT skills, information management, and organizational success. Lim et al. (2022) claimed that modern organizations' supply chain networks and environmental sustainability focus on contemporary IT and robust KM systems to handle global sustainability issues better. This effort significantly boosted their foreign business. This emphasizes the need to study these components as a whole. Any initiative must involve and engage stakeholders to succeed. Chiu (2023) emphasized the importance of IT tools and information exchange in encouraging active engagement. The study found that organizations with strong IT and KM capabilities and active stakeholder engagement in long-term innovation initiatives are more likely to succeed and meet stakeholders' diverse needs.

Governance systems' effects on long-term innovation and firm performance must be examined. Murphy and Gouldson (2020) suggested that organizations in locations with strict sustainability rules may need to improve their IT and information management skills. This must be done to comply with laws and increase profits. Determining how these components interact in different scenarios is harder legally. Finally, innovation depends on IT-KM integration. According to Fernando et al. (2019), long-term commercial performance and innovative ideas may provide organizations an edge over competitors. A holistic approach that includes ITC and KM can attain this goal. In creation, ITC and KM must be examined thoroughly.

## 3. Methodology

The methodology of this study establishes the framework for data collection, management, and analysis, guided by a positivist philosophy that emphasizes systematic and scientific approaches to ensure empirical rigor (Holtz, 2020). Fig 1 illustrates the conceptual framework adopted in this research, highlighting the interrelationships among SI, BS, ITC, and KM. This deductive approach enabled the development of structured hypotheses, facilitating a logical examination of these constructs' interplay.

The study's methodological design aligns with exploring observable and quantifiable phenomena within the context of SMEs in Saudi Arabia. The study specifically targeted 180 officials from SMEs in the northern region of Saudi Arabia, utilizing purposive sampling to ensure participants possessed the relevant expertise and insights, thereby enhancing the study's validity and relevance (Bruce et al., 2018).



**Fig. 1:** Research framework

Primary data collection involved surveys, as Mamabolo and Myres (2019) recommended, focusing on information management, business growth, and SI. The analysis of this data employed regression and correlation techniques, with SmartPLS and Covariance-Based Structural Equation Modeling (CB-SEM) chosen for their efficacy in handling complex variable interactions (Rožman et al., 2020). This methodological framework, grounded in positivism and quantitative research approaches, was selected for its suitability in exploring the chosen variables within a practical context, with purposive sampling allowing for informed and relevant responses. SmartPLS and CB-SEM were chosen because of their ability to manage the complexities of the study's variable interactions effectively.

#### 4. Results

Fig. 2 shows a measurement model of the relationship model of SI, ITC, KM, and BS. In addition, it proposes that ITC and Km mediate the relationship between SI and BS. Factors measure the strength of the relationship between the variables and the underlying construct. All the variables in the above image are more significant than 0.7, which is considered good, thus indicating that the measures are reliable and valid. On the other hand, the model's key argument is that investment in SI, such as establishing eco-friendly products and adopting sustainable practices, indirectly contributes to the business's success. Therefore, the impact is mediated by IT capabilities and KM practices. Moreover, strong SI capabilities, including data, management, infrastructure, and digitalization, allow firms to develop, implement, and monitor their SI initiatives efficiently. Additionally, IT systems can facilitate data analysis, resource allocation, and communication, promoting a more supportive environment for SI.

The model's core argument is that investing in SI, such as developing eco-friendly products or adopting sustainable practices, can indirectly contribute to BS. This impact, however, is mediated by two key factors: IT capabilities and KM practices.

In Table 1 and Fig. 2, the measurement model of the study is effectively demonstrated, with each construct exhibiting psychometric solid properties. SI shows excellent internal consistency and reliability, as indicated by a Cronbach's Alpha of 0.935 and Composite Reliability (CR) of 0.934, alongside an Average Variance Extracted (AVE) of 0.705, ensuring robust convergent validity. Similarly, BS maintains a high level of internal consistency (Cronbach's Alpha: 0.891) and reliability (CR: 0.889), with an AVE of 0.577. ITC construct also follows suit, with commendable reliability (Cronbach's Alpha: 0.880; CR: 0.880) and an AVE of 0.556. Lastly, KM upholds a solid internal consistency (Cronbach's Alpha: 0.870; CR: 0.871) and a satisfactory level of convergent validity with an AVE of 0.535. While most factor loadings across constructs are well above the acceptable threshold, a few, such as ITC1, are marginally below but still within a reasonable range. Overall, the measurement model presents a reliable and valid representation of the constructs, laying a solid foundation for the study's subsequent analyses.

Table 2 of the study presents an analysis of discriminant validity for the constructs using the Heterotrait-Monotrait (HTMT) ratio and the Fornell-Larcker criterion. The HTMT ratios for all pairs of constructs –BS, ITC, KM, and SI – are well below the threshold of 0.85. Specifically, the HTMT ratios between BS and ITC (0.841), BS and KM (0.731), BS and SI (0.809), ITC and KM (0.764), ITC and SI (0.824), and KM and SI (0.730) all indicate strong discriminant validity, confirming that these constructs are distinct and not overly overlapping. Additionally, the Fornell-Larcker criterion further substantiates these findings. The diagonal values representing the square root of the AVE for each construct (0.905 for BS, 0.907 for ITC, 0.831 for KM, and 0.910 for SI) are more significant than their respective off-diagonal values, satisfying the criterion and reinforcing the distinctiveness of the constructs. These results demonstrate that the constructs within the model are statistically distinct, ensuring the clarity and integrity of the constructs and adding robustness to the research framework.

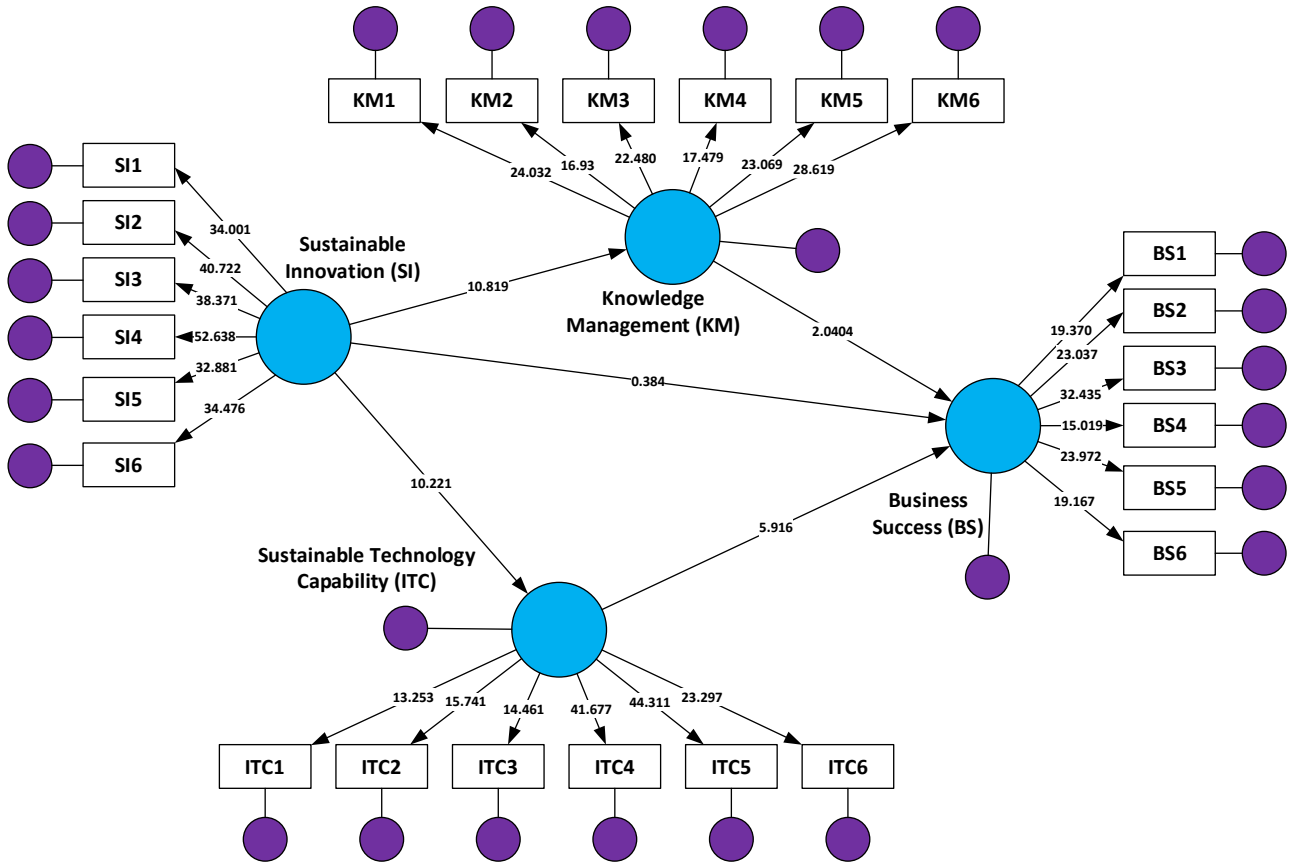


Fig. 2: Assessment of the measurement model (Validity and reliability test)

Table 1: Summary of the measurement of the model

Constructs	Items	Factor loading	Cronbach's alpha(> 0.7)	CR (> 0.7)	AVE (> 0.5)
SI	BS1	0.750	0.935	0.934	0.705
	BS2	0.789			
	BS3	0.790			
	BS4	0.688			
	BS5	0.788			
	BS6	0.747			
BS	ITC1	0.626	0.891	0.889	0.577
	ITC2	0.658			
	ITC3	0.644			
	ITC4	0.852			
	ITC5	0.863			
	ITC6	0.792			
ITC	KM1	0.747	0.880	0.880	0.556
	KM2	0.685			
	KM3	0.767			
	KM4	0.673			
	KM5	0.743			
	KM6	0.768			
KM	SI1	0.834	0.870	0.871	0.535
	SI2	0.856			
	SI3	0.837			
	SI4	0.886			
	SI5	0.811			
	SI6	0.811			

Table 2: Discriminant validity

Constructs	BS	ITC	KM	SI
<b>Discriminant validity (HTMT Ratio)</b>				
BS	-	0.841	0.731	0.809
ITC	0.841	-	0.764	0.824
KM	0.731	0.764	-	0.730
SI	0.809	0.824	0.730	-
<b>Discriminant validity (Fornell-Larcker criterion)</b>				
BS	0.907	0.759	0.701	0.834
ITC	0.759	0.905	0.679	0.746
KM	0.701	0.679	0.831	0.75
SI	0.834	0.746	0.75	<b>0.91</b>

HTMT Ratio < 0.85 is considered valid; Bold values exceed the respective row and column values according to the Fornell-Larcker criterion

Table 3 demonstrates the explanatory power of the model through the R-squared values for each

construct: BS, ITC, and KM. The R-squared value for BS is notably high at 0.837, indicating that the

model's predictors explain a substantial 83.7% variance in BS. This suggests the model's solid fit and high effectiveness in explaining BS. Similarly, ITC exhibits an impressive R-squared value of 0.820, meaning that the model accounts for 82% of its variance, reaffirming the predictors' robustness. KM, with an R-squared of 0.562, also shows a high level of explained variance, with over half (56.2%) of its variation being accounted for by the model. Overall, these R-squared values reflect the substantial explanatory power of the model, underscoring the relevance and impact of the selected independent variables on the respective dependent variables and highlighting the overall predictive validity of the study's theoretical framework.

**Table 3:** R-squared values

Constructs	R-squared	Variance explained
BS	0.837	High
ITC	0.820	High
KM	0.562	High

In the study, the goodness-of-fit of the estimated model is assessed and compared with a null model, as shown in Table 4. The estimated model demonstrates a moderate to good fit across various statistical measures. The Chi-square value is significantly lower than the null model's (1145.682

vs. 10696.667), indicating a better fit for the estimated model (Schermelleh-Engel et al., 2003). Although the Chi-square/Degrees of Freedom ratio is slightly above the preferred range at 4.638, it is still within acceptable limits for larger samples (Kline, 2017). The Root Mean Square Error of Approximation (RMSEA) is 0.095, marginally higher than the recommended upper limit of 0.08, suggesting a moderate fit (Hermida, 2015). However, other fit indices such as the Goodness-of-Fit Index (GFI) at 0.964, Adjusted Goodness-of-Fit Index (AGFI) at 0.925, and the Standardized Root Mean Square Residual (SRMR) at 0.064 are within optimal ranges, indicating a good model fit. Furthermore, indices like the Normed Fit Index (NFI), Tucker-Lewis Index (TLI), and Comparative Fit Index (CFI) all exceed the 0.95 threshold, reinforcing the model's adequacy (Bentler, 1990). The higher Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) values in the estimated model compared to the null model suggest further model comparison and potential refinement. Overall, these findings indicate that while the model demonstrates a good fit, certain aspects like RMSEA and Chi-square/df ratio highlight areas for potential improvement.

**Table 4:** Results of goodness-of-fit

	Estimated model	Null model
Chi-square	1145.682	10696.667
Number of model parameters	27.000	24.000
Number of observations	407.000	n/a
Degree of freedom	287.000	276.000
P value	0.000	0.000
Chi-square/Degree of freedom	4.638	4.886
RMSEA	0.095	0.092
RMSEA low 90% CI	0.089	0.087
RMSEA high 90% CI	0.100	0.091
GFI	0.964	n/a
AGFI	0.925	n/a
PGFI	0.637	n/a
SRMR	0.064	n/a
NFI	0.951	n/a
TLI	0.965	n/a
CFI	0.951	n/a
AIC	1251.682	1142.673
BIC	1464.149	1355.253

Fig. 3 illustrates the structural model of the study, employing bootstrapping with 5000 samples to validate the relationships between SI, ITC, KM, and BS in SMEs. This method provides statistical validation for the model's pathways, with standardized beta coefficients and t-values indicating the strength and significance of each relationship.

Table 5 of the study offers a comprehensive analysis of the direct relationships between SI, ITC, KM, and BS. The results present a nuanced picture of these interrelationships. Hypothesis 1 (H1) proposed a positive impact of SI on BS. However, the analysis leads to its rejection due to a negative standardized beta (-0.050) and a non-significant p-value of 0.701, indicating no substantial direct effect of SI on BS. Conversely, Hypothesis 2 (H2), suggesting a positive relationship between SI and

ITC, is strongly supported by a high standardized beta (0.732) and a significant p-value (0.000), affirming a considerable positive influence of SI on ITC. Similarly, Hypothesis 3 (H3), which posited a positive impact of ITC on BS, is also accepted, evidenced by a very high standardized beta (0.885) and a significant p-value, highlighting the critical role of ITC in enhancing BS. Hypothesis 4 (H4) and Hypothesis 5 (H5) explore the impact of SI on KM and the subsequent effect of KM on BS, respectively. Both hypotheses are accepted, with significant p-values and positive betas (0.608 for H4 and 0.180 for H5), indicating that SI positively influences KM, which moderately contributes to BS. These findings collectively suggest that while SI directly impacts ITC and KM, its direct influence on BS is insignificant, underlining ITC and KM's importance as key mediators in driving BS in SI.

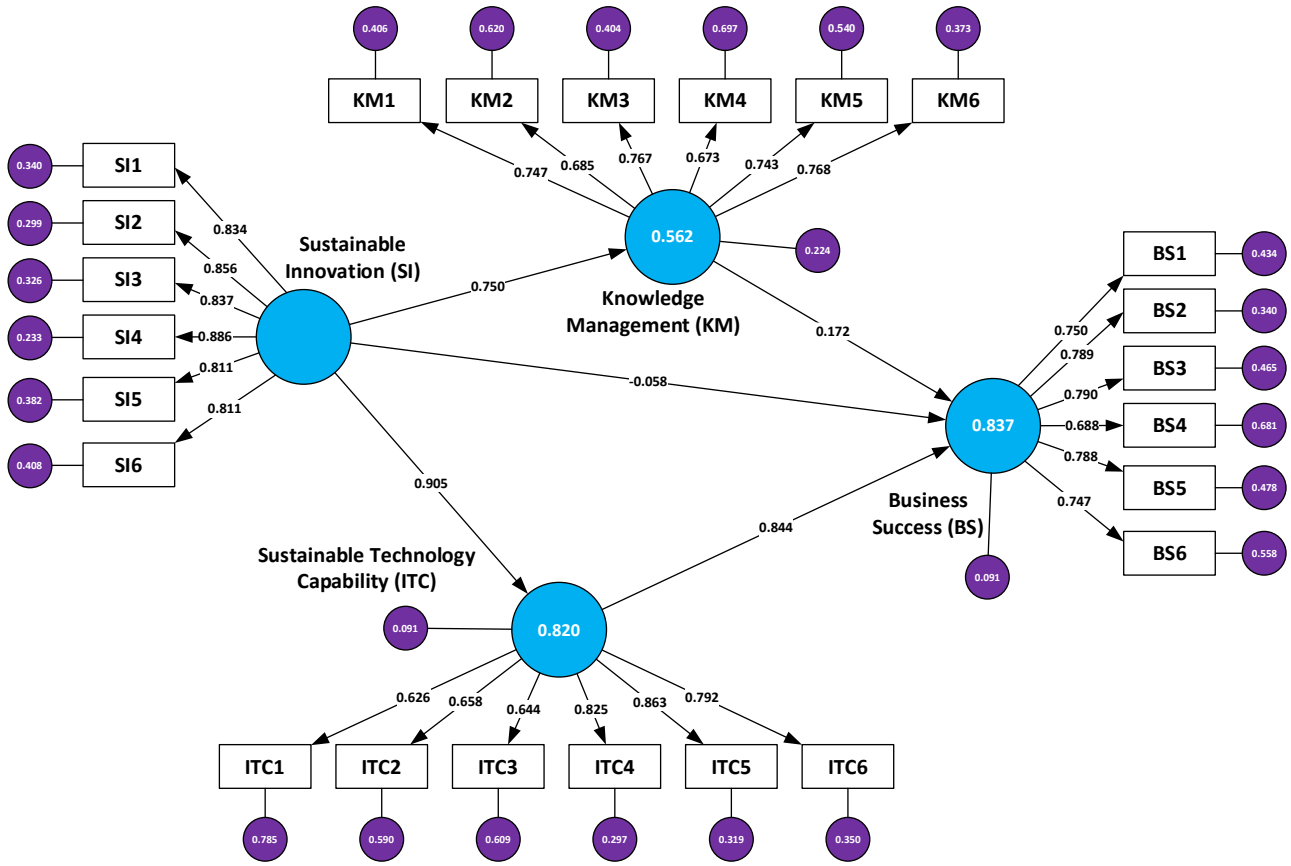


Fig. 3: Structural model (Bootstrapping @5000)

Table 5: Summary of direct hypotheses testing

Hypotheses	Std. beta	t value	P values	Decision
H1: SI -> BS	-0.050	0.384	0.701	reject*
H2: SI -> ITC	0.732	10.221	0.000	accept**
H3: ITC -> BS	0.885	5.916	0.000	accept**
H4: SI -> KM	0.608	10.819	0.000	accept**
H5: KM -> BS	0.180	2.404	0.017	accept*

\*: p < 0.05; \*\*: p < 0.01

Table 6 in the study provides a detailed analysis of indirect hypothesis testing, focusing on the mediation effects in the relationships between SI, KM, ITC, and BS. The results reveal significant mediation effects. Hypothesis 6 (H6) examines the indirect impact of SI on BS through KM, with an indirect path coefficient of 0.129 and a t-value of 2.507, significant at a p-value of 0.013. The bootstrapped confidence interval ranges from 0.040

to 0.236, not spanning zero, indicating full mediation by KM. This suggests that KM is a critical mediator between SI and BS. Similarly, Hypothesis 7 (H7) explores the mediation effect of ITC in the relationship between SI and BS. It shows a substantial indirect impact of 0.764, with a t-value of 5.705 and a significant p-value of 0.000. The bootstrapped confidence interval, ranging from 0.512 to 1.056, confirms full ITC mediation. These findings highlight the importance of KM and ITC as pivotal mediators, suggesting that the impact of SI on BS is predominantly indirect and channeled through these factors. These insights emphasize the nuanced and indirect pathways through which SI influences BS, mediated by KM and ITC.

Table 6: Summary of indirect hypotheses testing

Relationship	Indirect effect			Bootstrapped confidence interval		Decision
	Path Coeff.	t-value	Significance level P	2.5%	97.5%	
H6: SI -> KM -> BS	0.129	2.507	0.013*	0.040	0.236	Full mediation
H7: SI -> ITC -> BS	0.764	5.705	0.000**	0.512	1.056	Full mediation

\*\* : P<0.01; \* : P<0.05

## 5. Discussion

The study found no significant direct association between SI and BS, implying that the two factors are unimportant. KM and ITC are substantially affected by SI, and it was revealed that ITC and KM are crucial to BS. BS, ITC, and KM have high R-square values, suggesting considerable explained variance (Nellestijn, 2022). The goodness-of-fit tests and Chi-square statistics show that the projected model fits

well. Direct hypothesis testing shows a substantial link between the variables. The indirect hypothesis testing shows that KM and ITC fully mediate the association between BS and SI.

The study illuminates the complex linkages between long-term creativity, ITC, KM, and BS. The finding suggests that SI does not directly affect BS. This shows the model's intricate relationship. SI is mainly studied in relation to organizational performance (Zhang et al., 2019). Several traits

distinguish this finding. The lack of an impact suggests that SI may not be the main factor in economic success. KM and ITC are explored further after this finding. It was revealed that SI improves KM and ITC, making identifying how sustainable practices help a company succeed easier. This study confirms that KM is crucial to transforming innovation into accurate results (Al Teneji et al., 2022). A persistent innovation culture helps organizations use and share knowledge more effectively, improving performance. A symbiotic link exists between SI and information technology capabilities, where sophisticated technology allows the adoption and management of sustainable practices (Valdez-Juárez and Castillo-Vergara, 2021). KM's influence on the outcome variable shows its importance in BS. This highlights the need to document, preserve, and share SI knowledge. Knowledge-management-focused companies foster learning, growth, and innovation. According to Durst et al. (2019), knowledge is a vital tool for companies. This research supports earlier findings that KM improves organizational performance.

Information technology skills enhance BS. As this finding shows, technology is crucial to turning SI into commercial results. Opazo-Basáez et al. (2018) found that sophisticated IT firms can improve productivity, communication, and operational performance via digital technologies. This performance boost might lead to long-term success. The result supports the view of technology as a tool that improves organizational processes and outcomes. BS, ICT, and KM have high R-square values, suggesting high explanatory power. This shows that the proposed model adequately captures and fully accounts for these variables' complex relationships. Akram et al. (2018) stated creativity requires ITC and KM abilities. Examining the complex relationship between environmental improvement and commercial success is crucial. Establishing and using this relationship could sustain corporate development and provide long-term financial rewards.

The study shows that SI and BS are not directly connected. This is because the SMEs in the sample have varying levels of innovation adoption. However, ICT helps mitigate this issue, demonstrating that sustainable practices influence BS in multiple ways. For example, studies by Akram et al. (2018), Kölbl et al. (2020), Martins et al. (2019), and Shahzad et al. (2017) emphasized the importance of a holistic approach. They stressed that integrating IT and KM capabilities fosters lasting innovation. This study shows how SI strategies affect BS with the mediating role of KM and ICT. This study agreed with Costa and Matias (2020) in emphasizing the necessity of people having the knowledge and abilities to handle information and use technology to turn SI into economic prosperity. This study contributes to research on green business practices and for businesses trying to stay competitive, facing fast innovation, technology, and information management in today's complicated environment.

## 5.1. Limitations and future research

One of our main goals is to apply this study to SMEs in the Kingdom of Saudi Arabia, where this type of research has not been done before. This means the results may not be generalizable. The chosen sample is a limitation of the study, and future research could test the model with a larger and more diverse sample. Besides ITC and KM, other important factors like HRM practices, leadership, and organizational culture could be added to the proposed model to study the relationship between SI and BS.

## 6. Conclusion and recommendation

The research shows that KM, BS, SI, and ICT are all linked. The findings revealed that SI and BS rarely correlate. This showed that SI might not be enough to maintain the success of a business. However, it can be supported by a business's ability to determine how well organizations perform with ITC and KM. It was revealed that ITC and KM are crucial to BS as they significantly influence the BS in association with SI. BS, ITC, and KM have high R-square values, indicating that the suggested model explains a lot of the variance, and Chi-square statistics and goodness-of-fit tests further corroborate this claim. The research revealed a substantial link between long-term creativity, ITC, KM, and BS. Indirect hypothesis testing shows that KM and ITC mediate BS and strategic innovation. SI improves KM and ITC, emphasizing their importance in turning creative ideas into corporate results. SI is closely linked to ITC, highlighting the need for advanced technology in sustainable practice implementation and management.

The study supports previous research findings that KM is crucial to transforming fresh ideas into actual results. IT abilities are considered essential for corporate success. Technology should be seen as a tool that improves organizational performance and helps achieve goals. The study highlights the need to examine the relationship between environmental innovation, KM, and technology to promote company innovation and long-term profitability. This study's findings can help organizations manage innovation, technology, and information in a quickly changing global context. The sustainable business practices literature obtains valuable insights from this study. Companies can stay competitive by embracing innovation in this age of fast technological change. Based on the findings of the survey, the following are recommended:

- Integrating sustainable practices with IT and KM: Businesses must strategically use IT and KM to embrace environmentally friendly practices. Creating a workplace that supports these factors makes SI more viable for company success. Comprehensive planning is needed to maximize sustainable practices, information management, and modern technology synergy.



- Prioritize KM skills: KM skills must be prioritized due to their importance in businesses. Companies have to pay to train their employees to get better at these things. Giving people the tools to handle information keeps them creative and helps the company succeed. Keeping, sharing, and recording information about SI helps people learn new things and improves the organization's sustainability plans.
- Focus on continuous technological advancements: To stay relevant, businesses must emphasize technology advancements. For information technology skills to keep up-to-date, people must be aware of significant technological changes and willing to keep learning. With this focus, the business can use current technology to create long-lasting innovations that bring capital and improve operations.

### Funding

The Deanship of Scientific Research funded this work at Jouf University through the fast-track Research Funding Program.

### Compliance with ethical standards

### Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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