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The intervening effect of structural capital on the relationship between strategic innovation and manufacturing SMEs' performance in Yemen

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A B S T R A C T

The field of strategic innovation (SI) has been garnering increasing research interest, with studies adopting and employing varying definitions and creating different methods for its measurement. Despite the innumerable studies, few have addressed manufacturing and small and medium-sized enterprises (SMEs), particularly those focused on Middle East countries, in light of the relationship between structural capital (SC) and SI. Hence, the present work is primarily aimed at examining the role of SC in SI and the performance of manufacturing SMEs. It employed the survey method to gather data from the study sample of 284 Yemeni manufacturing SMEs and the hypotheses were tested using Partial Least Squares-Structural Equation Modelling (PLS-SEM). On the basis of the results, there is a significant influence of SI on performance; SC also has a moderating role of on this relationship. The present study is expected to contribute to the creation of a measurement system for SI in SMEs, stressing each component of SI in enhancing the performance of such enterprises.

1. Introduction

The development of economies worldwide is partly dependent on the key role of small and medium-sized enterprises (SMEs) (Qamruzzaman & Jianguo, 2019; OECD, 2017; Wang, 2016) as they produce income and employment and contribute to the diffusion of innovation and knowledge (Al Mamun, 2018; Scuotto, Del Giudice & Carayannis, 2017). Both developed and developing countries have a significant proportion of SMEs; in the context of emerging economies, formal SMEs contribute to 60% of total employment and 40% of gross domestic product (GDP) (World Bank, 2010). Logically, the numbers would be considerably higher if informal SMEs were taken into consideration. The World Bank also provided an approximation of the number of workers likely to enter the global workforce in the subsequent decade and a half, 600 million, particularly in Asia and Africa (Khalique, Hina, Ramayah and bin Shaari, 2020; Tripathi, 2019). This approximation demonstrates the significance of SMEs in forming the economic landscape of emerging economies (Nolke, Ten Brink, May & Claar, 2019; Almobaireek, Alshumaimeri & Manolova, 2017). Given the role of SMEs in the growth and future of developing and emerging economies, their governments are actively seeking to support them for successful ventures (Ndiaye, Razak, Nagayev & Ng, 2018). In the context of Yemen, the SME sector has an unparallelled role in the economy, as reported by the OECD (2017), Yemeni Ministry of Industry & Trade (2016) and the World Bank (2015). Aside from being major employers, SMEs open up avenues for the future workforce (OECD, 2017; Aga, Francis and Rodriguez-Meza, 2015). However, SMEs in Yemen are faced with several challenges including poor infrastructure, raw materials sourcing issues, insufficient technical support, adoption of new technologies , and lack of a skilled workforce, along with a dearth of financing opportunities (AlQershi, Abas &Mokhtar, 2019; Yemeni Ministry of Industry & Trade, 2017). Additional problems come in the form of licensing procedures brought on by non-transparent government authorities, high taxes, lack of entrepreneurial skills, and lack of expertise in implementing good business plans to develop a thriving enterprise (Yemeni Ministry of Technical Education & Vocational

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Training, 2016; Fararah and Al-Swidi, 2013). Skills monitoring is essential, and although face-to-face monitoring is expensive, it guarantees productive results, as an advocated by Fararah, Al-Swidi and Yusoff (2014), Yemen Today (2014) and Al-Jazeera (2012). Abdullah, White and Thomas (2019), Abdullah, Thomas, Murphy and Plant (2018) and the Yemeni Ministry of Industry and Trade (2017) have identified further major challenges that SMEs in Yemen are currently facing, including the lack of robust institutional capacity with some partners, unstable rates of currency exchange, lack of security, lack of training and consultation, incorrect perceptions of lending to poor people, collection of debt, lack of qualified workers, inflation, insufficient working capital, inadequate management, ineffective infrastructure and relevant services, lack of supervision and auditing, lack of business skills, limitations in marketing, high rates of interest and demanded collateral, and the attitude of young people towards being employed by SMEs. Yemen has been selected to represent emerging economies, reflecting increasing market orientation and the extended economic basis required for transition into major economic forces (Wu and Deng, 2020; Uzhegova, Torkkeli & Ivanova-Gongne, 2020; AlQershi, Abas & Mokhtar, 2019; He and Karami, 2016). Investigation of the major role of SMEs in the development of emerging economies, and the focus on Yemen, contributes to the literature in many ways; for instance, the application of current theoretical developments in the fields of strategic innovation (SI), structural capital (SC) and performance through empirical testing in a unique environment, in order to improve the understanding of the validity of the theories in cross-cultural situations (Alshami, 2019; AlQershi, Abas & Mokhtar, 2019). Although various authors, including Malca, Pena-Vinces and Acedo (2019) and Veronica, Shlomo, Antonio and Victor (2019) contend that growth in emerging economies is propelled by SMEs, scholars have largely preferred to concentrate on SMEs in developed economies; as a result, entrepreneurial activities in emerging economies are still under-researched (Santhosh & Subrahmanya, 2019; Ouedraogo & Chrysostome, 2019).

2. Literature Review

2.1. Strategic Innovation and Performance

According to Shams, Vrontis, Weber and Tsoukatos (2018) and Kodama (2018), the importance of SI for sustainable competitive advantage has been recognized for many years. SI refers to the ability to develop and reform a business's premises and concepts to align them with changes in the market, companies, competencies and business systems (Shams, Vrontis, Weber & Tsoukatos, 2018; Xu, 2011). The innovation process entails the production or acceptance of services, processes, products and ideas that are new (Bruce & Bessant, 2002). SI takes place as the firm determines gaps in the positioning map of the industry and decides to minimize such gaps, as a result of which it can exploit new mass markets, as explained by Derrick and Soren (2007). In essence, examining these concepts could mitigate the empirical and conceptual gap in the literature on SI. From the managerial research point of view, most SI studies lack scientific analysis although they do propose novel ideas and measures. The literature also shows that SI and other relevant managerial concepts (e.g., strategic renewal) are more closely related to the organization's current needs and requirements as well as the customers they serve, although infact SI stresses future requirements and the needs of both (Coenen, Grillitsch, Hansen and Moodysson, 2017; Charitou and Markides, 2003; Markides, 1998). For example, in the case of Kenya, a significant relationship was found by Lilly and Juma (2014) between SI and performance among commercial banks, while in Turkey, Karabulut (2015) found a significant positive relationship, supported by Kalay and Lynn (2015), between SI and performance among manufacturing firms. Thus, this study proposes that:

H_1: There is a significant relationship between SI and manufacturing SMEs' performance in Yemen.

2.2. Structural Capital as Moderator

Under what conditions can the relationship between SI and SMEs' performance be optimized? That is, which resources, capabilities and external conditions can improve the effect of SI on performance? The present study examines the potential moderating effect on this relationship of SC. SC has generally been tested as an antecedent that consists of non-human assets in the form of information systems, routines, databases and procedures (Cleary, 2015; Wang, Wang and Liang, 2014). It lays the foundation of the organization, providing tools and the architecture needed to retain, package and relay knowledge throughout the stakeholders in the value chain (Manzaneque, Ramírez and Diéguez-Soto, 2017; Bontis, 2001). The goal is to provide an understanding of the key role that SC plays as an anteceden or /moderator in the relationship between SI and performance. To expand the definition given above, SC refers to a combination of competitive intelligence, formulae, patents, policies, information systems and the culture of the organization that stems from the firm's products and systems developed throughout the lifetime of the organization (Archer-Brown & Kietzmann, 2018; Hejazi, Ghanbari & Alipour, 2016; Yaseen, Dajani & Hasan, 2016). It is a resource that plays a major role in the creation and sustenance of the competitive advantage of the firm, as it is characterized by a non-commutable nature and it is difficult if not impossible to imitate (AlQershi, Abas & Mokhtar, 2019; Manzaneque et al., 2017). It represents the capability of the firm to identify which important activities to adopt (Muhammad, 2014). It is exemplified by the ability of an organization's technical staff to produce patents allowing fewer employees to complete a piece of work than those of competitors. The greater the number of employees with knowledge, the higher will be the potential of the organization to bring about innovation and invention of new services and products that could improve their market share (Wang et al., 2014). The ability of the rivals to employ other resources increases competition and minimizes the advantage of individual firms. Consequently, the performance of a firm is boosted by the internal factors of particular available resources and developed capabilities, and interaction (Zaheer and Bell, 2005). The general expectation

of innovation is that the less the present market competition, the greater will be the importance of the innovation to the firm. In other words, with fewer rivals, there will be less pressure for innovation; this calibration may result in performance enhancement, as argued by Liu and Atuahene-Gima (2018) and Henderson (1993). With SC, different roles come into play and are generally considered as the culture of the organization that streamlines the processes and systems relating to decision making (Ramezan, 2011). On the whole, it represents the firm's intellectual resources, as explained by Kim, Kim, Park, Lee and Jee, (2012) such as, products, routines, knowledge, internal procedures, capabilities and technology components coupled with intellectual features (e.g., Hejazi et al., 2016; Aramburu & Sáenz, 2011). On the basis of the findings in the literature on SC and its significance, this study proposes the following hypothesis:

H_2: SC moderates the relationship between SI and manufacturing SMEs' performance in Yemen.

Conceptual Framework

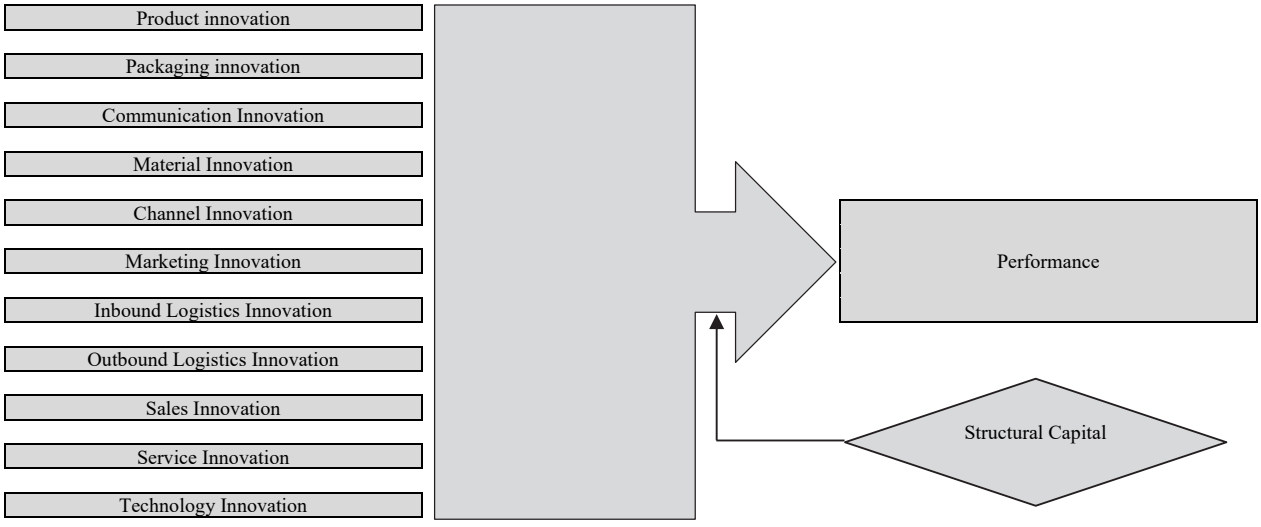

Fig. 1. The framework of the proposed study

3. Research Method

3.1. Sample and procedure

The study sample consisted of 1,441 Yemeni manufacturing SMEs randomly chosen from the Yemeni Ministry of Industry and Trade list. In simple random sampling, each population member has equal and independent opportunity to be chosen (Norman and Fraenkel, 2000). The SMEs were represented by their owners, who possessed the knowledge and authority for decision making and planning, and were therefore appropriate respondents. Applying Krejcie and Morgan's (1970) method to obtain an adequate sample size, the minimum response from a population of 1,400-1,500 was 307 cases; allowing for a poor rate of response, the author distributed 475 questionnaires to SME owners. Although the researcher was asked to double check completed copies of the questionnaire in case of missing data, 23 out of the 307 responses were discovered to have some problems and were not utilized for this study, leaving a total of 284 responses for analysis. The larger the sample, the more accurately the results can be generalized to the whole population. Accurate data was collected covering the study variables, SC, SI and performance (Bell et al., 2018). The study also made use of a stratified random sampling design, whereby the population is categorized into groups, ensuring a random sample from every group in proportion to the whole population. Each group's participants possess certain attributes and characteristics, and such categorization results in an efficient sampling design, appropriate for cases when various information types are taken from different groups in the whole population (Sekaran and Bougie, 2016). In this case, the groups were differentiated according to category of the firms. Thus, proportionate stratified sampling was used to choose the number of firms from each SME category, and random sampling for the final sampling selection. From SPSS analysis, a final random list was produced, whose members were sent the questionnaire (See Table 1).

Table 1
Sample Proportion among Small and Medium Firms

No.	Firms	Total Population	% of total	Probability sampling of firms
1	Small Manufacturing Firms	1301	90.29	277
2	Medium Manufacturing Firms	140	9.71	30
Total		1441	100%	307

3.2. Measures

The study's three major constructs are SI, SC and the performance of SMEs. Items from previous studies were adopted to measure the constructs: 12 items for SI from Yang (2014), seven for SC from Bontis et al. (2010), and ten for SME performance from Mokhtar et al. (2014), Kaplan and Norton (1992) and Gupta and Govindarajan (1984).
The study employed the 5-point Likert scale to rate the survey items, confirmed for its assessment of the participants' perceptions and its collection of authentic and accurate information (Franklin & Foa, 2002).

3.3. Data analysis and results

3.3.1. Non-response bias

In order to determine the presence of non-response bias, the study compared the 307 SMEs which returned the questionnaires with the remaining 168 who failed to return them. No significant differences were found, indicating that non-response bias is not a problem (Armstrong & Overton, 1977).

3.3.2. Preliminary data analysis

The factor loadings of the items, with their t-values, AVE and the composite reliability of the constructs, are displayed in Table 2. It is evident that all the items' factor loadings were above the cut-off point of 0.50, and the AVE of the constructs were higher than 0.50, confirming convergent validity. The constructs' composite reliability was above the 0.70 threshold level, indicating the reliability of the measures.

Table 2
Loadings, Composite Reliability and Average Variance Extracted

Constructs	Items	Loadings	Cronbach's	rho_A	Composite Reliability	Average Variance Extracted (AVE)
	PEF1	0.698	0.865	0.869	0.894	0.516
	PEF3	0.744				
	PEF4	0.773				
	PEF5	0.777				
	PEF6	0.668				
	PEF7	0.726				
	PEF8	0.633				
	PEF9	0.711				
	SC1	0.765	0.877	0.903	0.903	0.572
	SC2	0.806				
	SC3	0.814				
	SC4	0.799				
	SC5	0.677				
	SC6	0.714				
	SC7	0.709				
	SI1	0.612	0.897	0.900	0.914	0.518
	SI2	0.760				
	SI3	0.716				
	SI4	0.666				
	SI5	0.763				
	SI7	0.765				
	SI8	0.751				
	SI9	0.692				
	SI11	0.791				
	SI12	0.662				

In Table 3, constructs' statistical details are tabulated by mean, maximum and minimum and standard deviation. The results measured on the 5-point Likert scale are displayed in Table 3.

Table 3
Descriptive statistics for latent variables

	N	Minimum	Maximum	Mean	Std. Deviation
PEF	284	1	5	2.4133	0.88987
SC	284	1	5	3.1112	0.77174
SI	284	1	5	2.1317	0.93868
Valid N (listwise)	284				

Table 3 indicates the total number of respondents who gave the same answers to each question concerning the constructs, their agreement/disagreement and its level. The mean value for performance was 2.41 out of 5, indicating that the majority of

the respondents were in agreement about the low performance of the Yemeni manufacturing SMEs examined. The mean value for the SI construct was 2.13, indicating agreement on the unsatisfactory level of SI among Yemeni manufacturing SMEs. Finally, Table 3 indicates the agreement of the respondents as to the SC construct and its lack among the population examined (mean value of 3.11). The SME owners did not indicate significantly different opinions, which means, they are aware of the significance of SI and SC in their firm's performance as a top priority. Added to the above, the constructs' VIF values varied from 1.19 to 4.35 (all below the threshold level of 10), which indicates the absence of collinearity; in other words, the three constructs' correlations will provide accurate outcomes in the subsequent statistical tests (O'Brien, 2007). To minimize CMV effects, the study followed the procedural remedies recommended by Podsakoff, Mac Kenzie and Podsakof (2012): first, the respondents were informed that there were no wrong or right answers, and that their personal information would be protected and kept confidential; secondly, the scale items were expressed in simple, concise and straightforward language.

Table 4
Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	16.816	28.992	**28.992**	16.816	28.992	28.992
2	8.166	14.079	43.071	8.166	14.079	43.071
3	4.099	7.066	50.138	4.099	7.066	50.138
4	3.705	6.389	56.526	3.705	6.389	56.526
5	2.804	4.835	61.361	2.804	4.835	61.361
6	2.124	3.662	65.024	2.124	3.662	65.024
7	1.716	2.959	67.983	1.716	2.959	67.983
8	1.481	2.553	70.536	1.481	2.553	70.536
9	1.323	2.282	72.817	1.323	2.282	72.817
10	1.287	2.218	75.036	1.287	2.218	75.036
11	1.202	2.073	77.109	1.202	2.073	77.109
12	1.014	1.749	78.858	1.014	1.749	**78.858**
13	.947	1.633	80.491			
14	.869	1.497	81.988			
15	.819	1.412	83.400			
16	.711	1.226	84.625			
17	.703	1.211	85.837			
18	.620	1.068	86.905			
19	.595	1.026	87.931			
20	.549	.946	88.877			
21	.525	.906	89.783			
22	.515	.888	90.671			
23	.495	.854	91.524			
24	.463	.798	92.323			
25	.407	.703	93.025			
26	.400	.690	93.715			
27	.354	.611	94.326			
28	.339	.584	94.910			
29	.315	.543	95.453			
30	.297	.512	95.965			
31	.276	.475	96.440			
32	.238	.410	96.850			
33	.229	.394	97.244			
34	.207	.357	97.601			
35	.181	.311	97.913			
36	.161	.277	98.189			
37	.152	.262	98.452			
38	.120	.207	98.659			
39	.087	.151	98.809			
40	.083	.143	98.952			
41	.074	.128	99.080			
42	.071	.123	99.203			
43	.064	.110	99.313			
44	.056	.097	99.411			
45	.054	.092	99.503			
46	.048	.083	99.586			
47	.045	.078	99.664			
48	.032	.055	99.719			
49	.031	.053	99.772			
50	.025	.043	99.815			
51	.025	.042	99.858			
52	.024	.042	99.899			
53	.022	.038	99.937			
54	.014	.024	99.961			
55	.008	.014	99.975			
56	.007	.012	99.987			
57	.005	.009	99.997			
58	.002	.003	100.000			

Common method bias was tested through the use of Harman's single factor test, and on the basis of the CMB process, the variables were tested using exploratory factor analysis, to obtain the results of unrotated factor solution that displays the number of factors required to explain the variance in the variables (Siemsen, Roth and Oliveira, 2010). Thus, the single factor

test assumption of Chang, Van Witteloostuijn and Eden (2010) was followed to determine the significant level of common method bias, whereby one or a general factor accounts for a significant level of covariance in the variables (predictor and criterion) (Harman, 1967). The items were thus subjected to principal component factor analysis, and seven factors explained the cumulative effect of the variable, constituting 78.85%. The major factor explained 28.99% of the total variance, consistent with Sjoberg's (2000) statement that the variance should not be higher than 50%. In other words, no single factor explained most of the covariance of the variables (predictor and criterion). No common method bias was present to strengthen the relationships between study variables (refer to Table 4 for total variance explained).

3.3.3. Assessment of PLS-SEM Path Model Results

According to Hair et al. (2016) simulation of the PLS path models, the goodness-of-fit (GoF) index is inappropriate to validate the model as it cannot distinguish between valid and invalid models. Sarstedt, Ringle and Hair's (2017) two-step process was therefore employed for evaluation of the PLS-SEM reports. The two steps are assessment of the measurement model and the structural model (Hair et al., 2016).

In the first step, the measurement model is assessed by examining the individual items' reliability, the internal consistency reliability and content, convergent and discriminant validity (Hair et al., 2016). In the second step, the structural model is assessed by assessing the variance explained by the endogenous latent variable, and assessing the effect size (f2), the predictive relevance and the moderating variable. These steps are discussed in detail below:

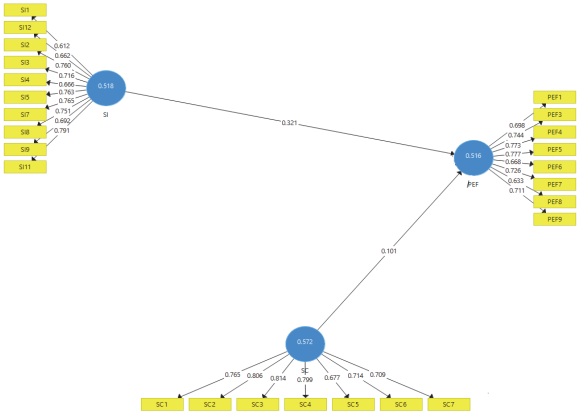

Fig. 2. Assessment of Measurement Model

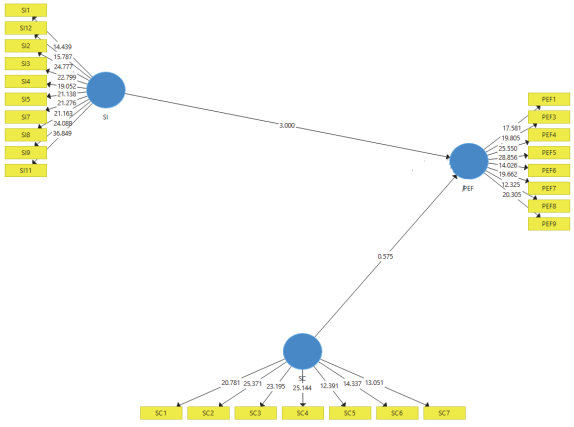

Fig. 3. Structural model

3.3.4. Assessment of Significance of the Structural Model

Following the determination of the measurement model validity, the structural model was assessed using a standard bootstrapping procedure, with 500 bootstrap samples and 284 cases to determine the significance of the path coefficients. This was conducted according to the guidelines established by Hair et al., (2011). The structural model's full estimates are presented in Fig. 3, and Table 5.

Table 5
Structural model (Direct)

	Std. Beta	Std. Dev	t-values	p-values	Decision
SI → PEF	0.321	0.107	3.000	0.003	Supported

The direct relationships in the model of this study were examined through the PLS structural model and the findings are presented in Table 5. Results for the hypotheses can be seen in the table. Hypothesis 1 predicted a significant relationship between SI and performance. The findings indicated a highly significant effect with a beta value of (β=0.321, t=3.000, p<0.003). Hence, the findings show that hypothesis 1 (H1) is supported. The result indicates that the association is highly significant, meaning that SI influences performance to a large extent among SMEs performance in Yemen.

3.3.5. Testing Moderation Effect

PLS-SEM was employed to detect and estimate the strength of the moderating effect of SC on the relationship between SI and SMEs' performance. As the product term approach has similar or superior results over the group comparison approach (Hair et al., 2016), it was the better option for testing this moderating effect. For this test, Hair et al. (2011) guidelines were followed; the results in Table 6 show the estimates of the product indicator approach.This study proposed that SC moderates

the relationship between SI and performance of SMEs in Yemen, and the results support the significant interaction terms representing the SI and SC (β=0.256, t=3.222, p<0.001) (refer to Table 6 and Fig. 5). Fig. 5 clearly shows that the relationship between SI and performance of SMEs became stronger through the inclusion of SC as a moderating construct.

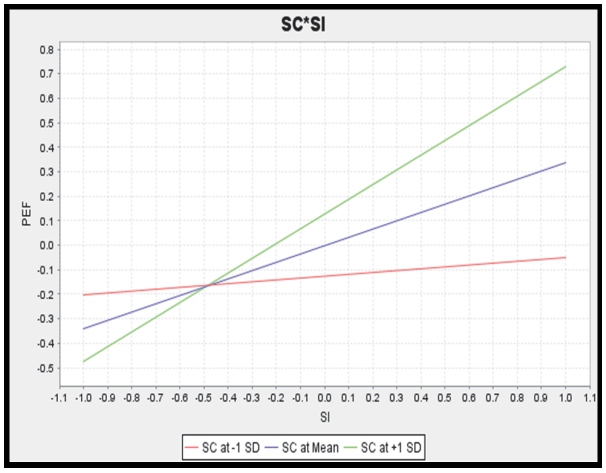

Fig. 4. Interaction Effect of Strategic Innovation (IS) and Structure Capital (SC) on SMEs Performance (PER)

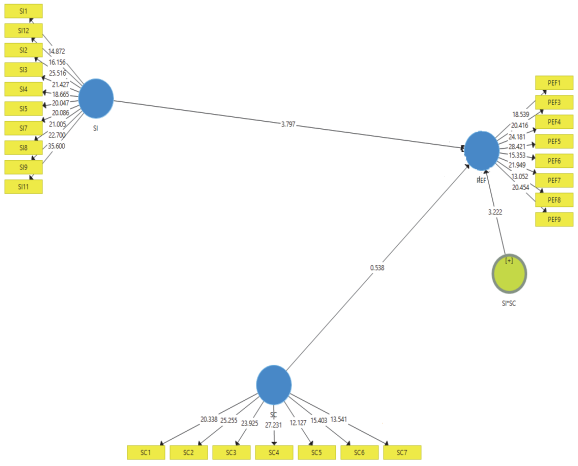

Fig. 5. Structure Capital Moderation Algorithm

Table 6
Structural Model (Moderating Effects)

Relationships	Std. Beta	Std. Error	t-values	p-values	Decision
(SC*SI) → PEF	0.256	0.083	3.222	0.001	Supported

4. Discussion and Conclusions

A conceptual model was developed to investigate the relationship between SI, SC and the performance of manufacturing SMEs in Yemen. The increasing trend towards modernization through innovation affects a firm's ability to survive in a dynamic business marketplace (Kindström, Kowalkowski & Sandberg, 2013; Boons & Lüdeke-Freund, 2013). Firms possessing unique internal capabilities (product innovation) may enhance their performance (Knight & Cavusgil, 2004). SC, in the form of organizational capabilities and intangible resources, can improve the firm's sustainable competitive advantage (Jardon & Martos, 2012). Similarly, active SI can lead to the creation of novel market places, enhance market share and boost the growth of organizations; conversely, lack of SI could prevent the organization from being competitive or improving its performance (Yang, 2014). It is imperative for companies to consider their stakeholders' interests in the formulation of innovation strategies so that they may include them in their performance objectives (AlQershi et al., 2019). More importantly, in SI, strong market competition protects the firm's market share from losing value (AlQershi, Abas & Mokhtar, 2018). Initiatives in SI are related with the objectives of the firm, frequently as a competitive reaction, and are considered as a strategy to obtain economic advantages in both the short and long term. Therefore, adding SI to the strategic decision-making process, firms may produce a complete picture of their performance. This study has found a positive relationship between SI and SMEs' performance, a result that contributes to reducing the literature gap concerning performance and SI in the context of Yemeni manufacturing SMEs. This gap is especially wide in the Yemeni and Middle East context, confirming the need for the present study. The literature also evidenced the significant influence of SC on performance; in the present study, SC was examined through its moderating influence on the relationship between SI and performance. The primary role of SC is to enhance the employees' skills and knowledge in order to improve overall performance in terms of market share and profitability. This study supports the moderating effect of SC on the SI-performance relationship, consistent with recent linear studies dedicated to SMEs, SC capability, successful product innovation and explorative capabilities (e.g., Leitner, 2015; Costa, Fernández-Jardon Fernández and Figueroa Dorrego, 2014; González-Loureiro & Dorrego, 2012). The results of these studies support earlier work in which innovative firms were found to improve their performance in the face of a dynamic market and to support their survival. SC is thus essential for SMEs: innovation should also be encouraged to improve productivity, along with proactive methods to search for resources throughout the supply chain. According to Agostini et al. (2017), there is a significant relationship between SC and organizational innovative performance, while Muhammad (2014) revealed the moderating effect of SC on the innovation-performance relationship. From this point of view, SMEs should be aware that, while existing resources are important, ongoing changes in the market will develop risks for future economic growth and performance. The question thus arises, "how can organizations change their strategies to meet future challenges?" In the context of Yemeni manufacturing SMEs, their owners and managers have to consider and prioritize innovation through the use of current technology to satisfy regional and local markets. The current study's findings show support the considerable strength of the relationship between

SI and performance, with SC as the moderating construct, confirming the proposition of Hair et al. (2016) and Baron and Kenny (1986). In particular, the moderating effect evidenced in this study was a partial effect, indicating the major contributions of this study to literature dedicated to Yemeni manufacturing SMEs. SC has been exposed by this study as the key to the SI and performance of organizations.

5. Theoretical Contributions

There are two major ways in which this study contributes to the management literature. The first is that the study provides empirical evidence of the effect of SI on the performance of SMEs, with the partial moderating effect of SC. That is, SI mechanisms improve the performance of SMEs, coupled with the partial effect of SC. In a more recent study, SI has been investigated in terms of its relationship with the internal capabilities of the firm (AIQershi et al., 2019). On the other hand, in the present study, SI is linked with performance, with SC being the moderating variable on the relationship between the two first constructs. It is thus suggested that SI be focused on in studies of the performance of SMEs in the manufacturing sector, to provide a deep insight into its effects, and in particular take note of the influence of SC. Another contribution is the empirical comparison of the combined effects of SI, SC and performance in the Yemeni context, given that the majority of the empirical studies to date have focused on countries in the developing world (AlQershi et al., 2019). This is a pioneering study in generalizing and comparing the findings in emerging economies, and thus, the results contribute to the understanding of SI in this particular context and the impact of the environment on SMEs' performance. The moderating effect of SC should especially be taken into account when examining SC and performance.

6. Managerial implications

Managers may find this study useful in the following ways; first, SI can be utilized by manufacturers to enhance the quality of their products through the implementation of current technologies and the institution of training initiatives to improve the skills and abilities of their workforce. Firms can facilitate the development of communication channels throughout their structure and departments for information sharing and interaction. Activities including workshops and seminars may be provided to enhance the capabilities of the workers, and procedures, processes and IT may be supported by investment in new technology for high market share and optimum performance. This is essential for manufacturing SMEs in Yemen, given structural capital's moderating role on the effect of SI on such enterprises' performance. Innovation in the form of adopting technology would assist in the development of innovative new products that can compete in the global market. Lastly, owners and managers of manufacturing SMEs in Yemen have to provide staff training continuously, despite the initial cost as the benefits of training outweigh the cost. It is recommended that training costs can be mitigated if SMEs form cooperative associations, supported by individual firms' efforts.

7. Limitations and Future Research

The first limitation of this study is the use of a cross-sectional research design in achieving its objectives. Despite the consistency of the results of theoretical reasoning, this design limits the evidence of causality among the proposed relationships. Future studies might adopt a longitudinal design from which to draw causal inferences. Another limitation is the study's reliance on previous studies in measuring SI (Yang, 2014), which are limited. Given the significance of the construct to the present study, assessing firms' development of new products, enhancement of materials quality, and development of marketing methods, and acquisition of goods/services at the best price should all be considered. Thus, future studies can gather evidence using collaborative data as a proxy, to measure SI. Lastly, the present empirical examination is focused on Yemeni manufacturing SMEs which naturally relates to potential limitations through culture and industry; deeper insight into the measurement of the variables might be considered in the context of large industries, in different emerging and developing countries.

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