Exploring the technology orientation influence on the innovativeness-performance relationship of manufacturing SMEs

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Abstract: Globally, organisations have been facing excessive challenges due to the rapid changes within business environments. An empirical approach is used with smart PLS as the investigative tool to explore the impact of innovativeness within manufacturing SMEs on performances while using the technology as a moderating factor. Insignificant impact of innovativeness on performances of manufacturing SMEs in Oman could be observed. It is suggested that the way forward is to enhance capability for or support research and development, promote collaboration among SMEs, review government legislation and support towards the SMEs, have a well-focused capacity building plan, and strive for more competitive markets.

Keywords: innovativeness; technology orientation; SME; performance.

Reference to this paper should be made as follows: Saqib, M., Zarine, R. and Udin, Z.M. (2018) 'Exploring the technology orientation influence on the innovativeness-performance relationship of manufacturing SMEs', *Int. J. Innovation and Learning*, Vol. 24, No. 3, pp.277–300.

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1 Introduction

The rapidly changing global competitive business environment makes it quite challenging for SMEs to create and maintain competitive positions. To enhance their performances and achieve competitive advantages, they have to emphasise on strong strategic planning relating to effective and efficient manufacturing strategies and such can generally be facilitated by being innovative while embracing the technologies. Effective strategies for managing key valuable organisational assets such as knowledge are undoubtedly crucial for organisational innovativeness to be embraced thus enhance performance (Blossom et al., 2014).

It has been recognised that Oman SMEs are not performing as expected due to factors such as lack of innovative practices, non-existence of knowledge capturing and sharing values, financial barriers relating to ownership and technology embracing and embedding (Ashrafi and Murtaza, 2008). Organisational knowledge management, innovativeness and technology orientation (TO) are the phenomena that need to be closely monitored to ensure continuous improvement of organisational performance. Unexpected changes in market knowledge and development, existing market deficiencies, difficulties in securing initial capital, restricted access to resources and new technologies curbing innovation do not necessary alleviate the issues. Furthermore, globalisation has progressively intensified competition and sharpened the merit underlining the importance of identifying key performance indicators and being innovative to boosting performance for achieving competitive advantages. Given the limited dependence of SMEs on large multinational enterprises in developing countries, their chances of competing are enhanced (Hussain et al., 2010; Saqib et al., 2017a, 2017b).

Presently, the performance of SME sector of Oman is not only relatively low in comparison to other developing countries around the world, but also among the GCC countries. Oman is one of the relatively less developed markets for personal computers (Greenhill et al., 2011–2012). Innovation is an imperative element of business performance in a changing viable situation (Bueno and Ordonez, 2004) while business performance is associated to the aptitude of the firm to grow and achieve its strategic objectives (Hult et al., 2004). Business performance also relates to the actions taken in relation the competitive forces within the external environment, thereby amalgamating the competence and usefulness.

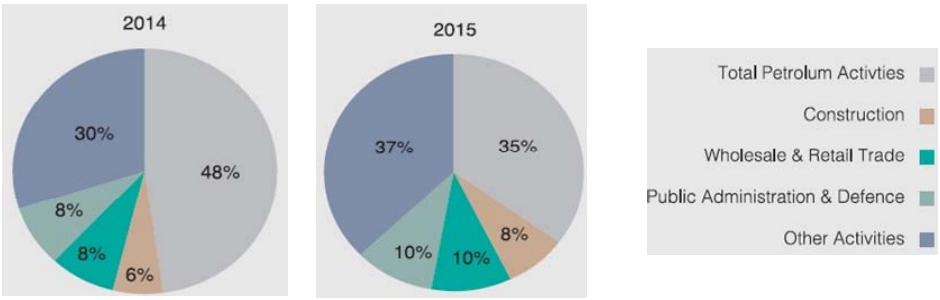
SMEs in Oman can use innovation as an instrument to attain better business performance (Forsman and Temel, 2011) which enhance and improve business growth (Hult et al., 2004). Some studies have found significant relationship between "innovation and sales growth and profitability" (Avlonitisa and Salavou, 2007) while few researchers have found a non-significant relationship between 'innovation and return on investment' (Forsman and Temel, 2011), but in a different market context, the key relation between

innovation and business performance needs to be tested. Thus, there is a clear gap to investigate the role of innovativeness in the context of Sultanate of Oman.

2 Literature review

SMEs contribute massively towards competitiveness of any economy (Ahmed and Al-Roubaie, 2011) and their significance cannot be underestimated as they can be major sources for poverty eradication, national economy growth, social uplift and employment (Akhtar and Raees, 2011). It is even more so in emerging economies. According to the National Center of Statistics and Information (NCSI), quarterly structures of gross domestic product (GDP) by several different SME sectors of Oman are as follows:

Figure 1 Structure of Oman GDP, at the end of third quarter (2014 and 2015) (see online version for colours)



Source: NCSI (2016)

SMEs have a significant role in terms of economic share in developed and developing economies and they are vital actors for job creation, enhancing innovation, competitiveness, entrepreneurship and the establishment of an effective innovation system for countries. Oman manufacturing SMEs can also be vital in improving the investment climate and strengthening their capacities to respond to trade and investment opportunities, but still there is quite a bit to achieve.

As stated by Drucker (1954), innovation is one of the two basic roles of any business enterprise with the other being marketing. Innovation allows for new ideas to be incorporated within the business to attain success when previous techniques of success gradually become ineffective. Despite the huge contributions of technological improvement towards generating employment and innovation, SMEs are still finding it quite challenging to turn them into opportunities and that is due to inadequate skills of entrepreneurship, lack of market and TO, high enterprise death rate, and constraint in sourcing of the required funds.

The main concern of this research is manufacturing SME performances in Muscat, Oman where the SMEs can push 90% of the economic development activity within the country, enhance the progress of social wellbeing by contributing significantly towards the GDP, offer useful goods and services to consumers, and alleviate unemployment. Organisations should adopt and implement innovative ways to sustain and increase their overall performances through practicing new ideas and managing knowledge related to

their daily routine work. This is essential in particular for manufacturing SMEs. Below is the new official definition of micro, small and medium businesses in Oman.

Table 1 New definition of SMEs in Oman

Category	*No. of employees*	*Annual sales turnover*
Micro	1 to 5	Less than 100,000 OMR
Small	6–25	100,000 to 500,000 OMR
Medium	26–99	500,000 to 3 Million OMR

Source: CBO (2016)

In Table 1, the new definition of SMEs with reference to Mining, manufacturing, services, construction, wholesale, retailing and service trading sector in Oman is shown relating to the criteria of number of employees and capital invested in to the businesses.

Innovation in simple terms can be explained as application or transmission of knowledge from research to development to application. Collaborative innovation is becoming increasingly important and it is closely related to sharing knowledge. The innovativeness ensures the understanding of the needs of the business environments, saves time-to-markets, reduces the learning cycle and enhances problem solving capabilities, production and integration while simultaneously adopting new knowledge in response to business issues (Altmann, 2010). Innovation can be practiced and it may be considered as a completed knowledge life cycle process which starts with an issue, moves through the knowledge production and ends with the knowledge incorporation (Steyn and Toit, 2007). Such practice results in many organisations coming up with new ideas and concepts which can be transformed to creative products and services that differ from their competitors.

3 Theoretical concept and framework

Theory of diffusion of innovation (DoI) by Rogers (1995) relates to innovative ideas and emerging technologies and it also extensively explores and covers several different dominant aspects of innovation such as innovative attributes, type of innovation, innovation decision, communication channel, innovation strategy, nature of social system over time and change agent. In addition, it well covers the technical aspects too (Rosenbusch et al., 2011). Furthermore, researchers believe in adopting a multidisciplinary and an integrated approach, supported by different models and theories to attain detail outcomes.

Theory DoI explores five prominent features of innovations such as relative advantage, complexity, compatibility, trialibility and observability. This theory also looks at several different characteristics that are established by using latest technologies. Evident attributes of innovation affect organisational performance according to the DoI theory.

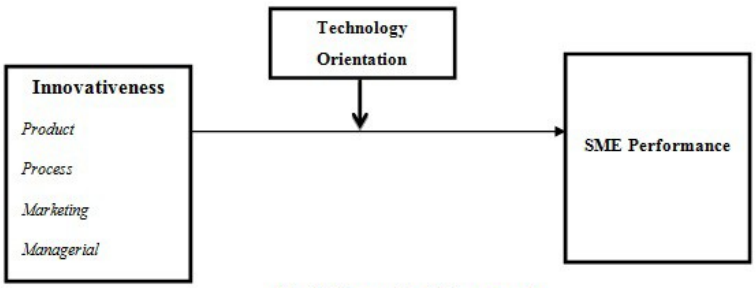
3.1 Theoretical contribution

This research study presents a unified multidimensional research-framework by assimilating two diverse literature streams, that is, innovativeness and TO. It analyses

their mutual association and impact on SMEs performance in the context of one of the developing countries. This study contributes to the existing theories and body of knowledge demonstrating the important role of TO in strengthening the relationships between innovativeness and SMEs performance

Firstly, this study looks into the relationship between Innovativeness and SMEs performance, especially in the manufacturing industry community in the sultanate of Oman, then highlights the importance of TO and innovativeness in boosting performances of SMEs in the developing states in general and the Sultanate of Oman in particular.

Figure 2 Conceptual framework



3.2 Practical contribution

Provide empirical evidences on the importance of TO in strengthening the relationships between innovativeness and the SMEs performance. The present study proposes to test a research framework and certain underlying hypotheses with the use of quantitative research approach that is survey-based. And as a joint venture, all the stakeholders involved in the diffusion process including; businesses, organisations, and officials can take benefit from the outcome of this research. This study can also provide the SME owners; decision makers; official bodies of the industry and policy makers with a framework to assess how Oman SMEs through the use of innovations and technology could influence their sustainable competitive performance

The theoretical base of this paper is established by reviewing a thorough literature. In the literature, causal associations have been identified among entrepreneurial orientation, that is, TO, innovation and firm performance. The given Figure 2 elaborates the proposed association in a sequential manner.

Globally, SMEs have highest percentage of businesses and their roles in terms of revenue and employment generation are significant. Countries such as United States of America, Canada, United Kingdom, Japan, Australia and other developed nations recognised that very well and they have taken various initiatives such as policies and regulations aiming at facilitating their progress for economic sustainability. The recognition is further echoed by the organisation for economic cooperation and development (OECD) highlighting their contributions towards employment creation opportunities, market creation and development, higher standards of living as well as the GDPs of almost every country (OECD, 2000). High productivity, increased level of competitiveness, and huge economic growth may be added to the list.

For instance, SMEs are playing a major role in the economy of New Zealand, where SMEs account for 99% of all businesses in the country and creating about 60% of local employment (Lawson et al., 2003). It is noted that employment generation is happening more from firms with less than 500 employees (Baldwin et al., 2002). Similarly in the UK, SMEs are responsible for about 60% of the workforce and is the case in most EU member states proclaiming that SMEs makeup over 99% of businesses, 67% of the job market and more than 50% of the GDP contribution (OECD, 2016).

Additionally, noticeable advantage creations of SMEs within developed economies compared to that of developing countries due to lack of infrastructure, cultural, social and bureaucratic issues, resources and innovation (Kapurubandara and Lawson, 2006). It is obvious that SMEs in developing countries should focus more on innovativeness to pursue the positive consequences on organisational performance as is the case of New Zealand, where they are spending 10 percent of GDP on adopting new technologies making it top standing nation in the world within that context (Hudson et al., 2001; Clarke, 2004; Clark, 2010).

3.3 Performance of SMEs

SMEs performance has strong influence on the competitiveness and nation's economy output but is largely dependent on how certain constraints are counterbalanced by government agencies and their assistance. It is true that without government assistance, operational constraints will prevent to achieve key objectives (Ayyagari et al., 2007). Many SMEs are seen as subsidiary establishments, born out of circumstances and thus unable to exploit opportunities within the market (Henningsson et al., 2004).

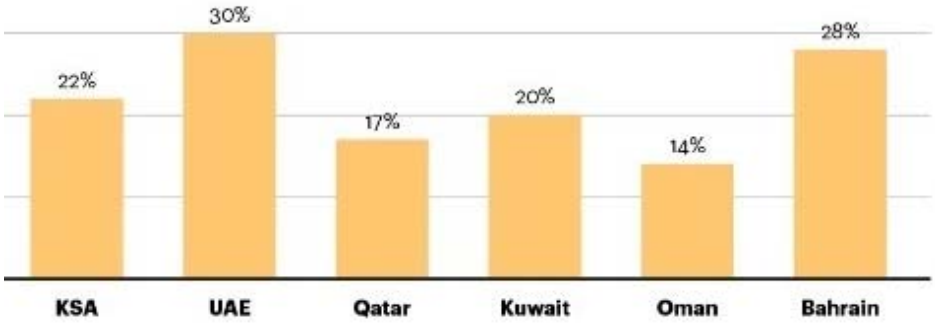
The development and overall performance of SMEs across the world has been appealing among development governments, financial institutions, economists and non-government organisations due to their dynamic nature and ability to contribute proficiently (Humphrey, 2003). Many researchers around the world are also showing interest to emphasise the involvement of SMEs sector to mainly economic growth of the states (Ridenour and Newman, 2008). Essentially expectations from SMEs sector are to be able to imitate the contributions and benefits that are already happening in developed countries, within their respective developing countries such employment creation, poverty alleviation and substantial contribution in the nations' GDP. However, unfortunately, most of the developing nations' statistics show that because of socio-economic and other indicators, SMEs do not effusively contribute and are not realising their strategic objectives as well (Moorthy et al., 2012).

In brief, to improve performance of Omani manufacturing SMEs, several strategies and policies could be revised and applied by firms. For instance, SMEs could be allowed and able to develop new product and pursue process improvements through innovations while taking advantage of the government sponsored related research, development and innovation initiatives. This enabling environment would help SMEs to improve their market standing in terms of leadership, increase and sustain their competitive advantages while improve performance and as a consequence, boosting market share, customer outreach and new firm markets (Zahra and Nielsen, 2002).

Table 2 Overall GCC ranking – SMEs contribution to the GDP

Country name	*GDP contribution (%)*
United Arab Emirates	30%
Bahrain	28%
Kingdom of Saudi Arabia	22%
Kuwait	20%
Qatar	17%
Sultanate of Oman	14%

Figure 3 Overall GCC ranking – SMEs contribution to the GDP (see online version for colours)



In GCC, the SME contribution to GDP is much smaller.

All over the world, SMEs are deliberate as the pillars of economic system in developed as well as developing states. In GCC countries, especially, Omani SME's situation of GDP contribution is low as compare its regional neighbours such as KSA, UAE and Qatar. In today's vibrant market environment, SMEs existence is absolutely vital and it should be noted SMEs hire more human resource than larger firms. Growing and dynamic SMEs are so critical for the growth and sustainability of any nation that more than 50 different countries have their own altered definitions of SMEs in terms of number of working employees, sales and annual turnover (Pittaway et al., 2005).

4 Association between innovation and SME performance

Innovation refers to the ability of a firm to commercialise its available resources and invention (Ireland et al., 2001). The association between innovation and firm performance is quite evident from the past and current literature (Garcia and Calantone, 2002; Darroch, 2005). Several different researchers have thoroughly examined the interaction between firm resources and the extent to which it can manage innovative practices. Innovation cannot be achieved in isolation rather require enough knowledge. Resource based view (RBV) is a significant and most cited theoretical foundation in this

context (Hafeez et al., 2012). Many researchers have clearly argued in favour of innovation for higher firm performance. In the context of SMEs, innovation refers to seeking novel ways of doing things. Looking for new ways and better ways of introducing new products, processes and in order to grasp the marketing and managerial benefits in terms of higher profits, market share and competitive advantages (Schumpeter, 1982; Hafeez et al., 2012). In the perspective of SMEs, four types of innovations are identified in the literature, i.e., product, process, marketing and managerial innovation (Weerawardena, 2003; Wang and Ahmed, 2004).

In the current world of competitive environment, it is essential for companies to stay ahead of its competitors and create competitive advancements. One of the main forces that drive this process is the ability of a firm to practice innovativeness. In an empirical research study, expressed that competitive strategies can lead to innovation, which, in turn, increase firm performance.

H1 The higher the level of innovative practices, the higher performance level of SMEs.

5 Association between TO and SME performance

TO can inhibit or foster innovation process. Several research studies have stressed upon ties between entrepreneurial orientation, TO, innovation and firm performance (Wicklund and Shepherd, 2003; Harms et al., 2009). Resource-based view explicitly recognises the importance of intangibles such as TO and organisational knowledge assets, etc. it offers a significant opportunity to explore these theoretical complementarities in examining the relationship between information technology resources and firm performance (Bharadwaj et al., 1999). Research study by Keha et al. (2007) expressed that entrepreneurial orientation and TO plays an influential role on the acquisition and utilisation of marketing information and also has a direct effect on firm performance. The effective utilisation of information and technology positively affects firm performance and it partially moderates the relationship between entrepreneurial orientation and firm performance (Keha et al., 2007).

H2 The higher the level of TO, the higher performance level of SMEs.

Innovation has been defined in literature in a variety of ways (Schumpeter, 1934; Kanter, 1988; Freeman and Soete, 1987; Wolfe, 1994; Damanpour and Gopalakrishnan, 1998; Hansen and Wakonen, 1997; Weerawardena, 2003). However, in this research study, a comprehensive definition is adopted, thus, innovation is defined as a firm practice of bringing novelty in operations such as manufacturing new products, orienting new technologies, searching new opportunities of markets and customers, managing assets and modifying administrative system.

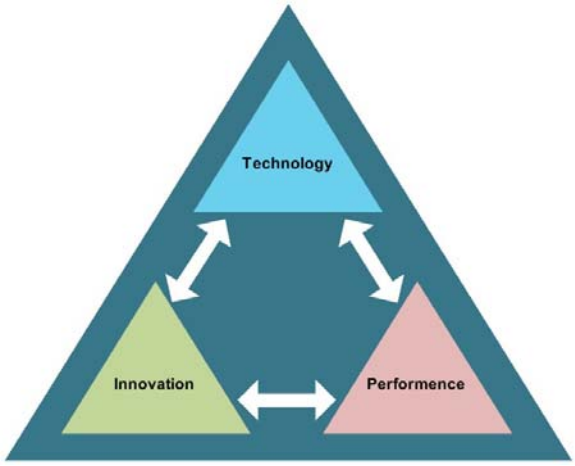
Innovation is an organisation's capability to develop new value propositions by introducing new and unique product and better services, embracing new operating practices, market and technology-orientation and competencies (Miles and Snow, 1978; Schumpeter, 1982). Innovation is related to both content and process. Content-wise, initially a firm can initiate offerings of new market products. Process wise, a firm designs and develops novel ways of running a business, such as new operational ways in quality control, work flow design and achieving unique competencies in identifying and attracting valuable customers. The definite objective of innovation is the creation and delivery of customer value in the form of new products and services.

5.1 Dimensions and operationalisation of innovativeness

The notion of innovativeness of firms was initially prescribed as a process of opportunities when adopted in practice (Schumpeter, 1934; Tidd et al., 2001). It provides with flexible alternative choices to practice and ensure the firm survival to be among competitors (Banbury, 1995). Firm innovativeness has different definitions when used in different contexts. In this research study, A comprehensive explanation of innovativeness is adopted; therefore we define innovativeness as a firm practice that brings novelty by implanting new ideas, concepts or systems in firm's operations either through incremental/gradual changes or radical transformations at once regarding new product development, new production techniques, new customers or markets, designing marketing strategies and modifying firm's administrative practices. Various research studies have different indicators or dimensions to measure firm innovativeness (Han et al., 1998; Hurley and Hult, 1998; Wang and Ahmed, 2004).

Miller and Friesen (1983a, 1983b) have taken four important aspects of firm innovativeness in their research study, which are product/service innovations, production methods, executives taking risk and unique unusual solutions. Hage (1980) differentiate between two levels of innovativeness, i.e., radical and incremental. Robertson (1967) and Anderson and Ortinau (1988) classify three categories of innovation such as continuous, dynamically continuous and discontinuous innovations. Lawton and Parasuraman (1980a, 1980b) decided their scale on two dimensions of innovativeness, i.e., the degree of change in the consumption pattern necessitated by adoption and degree of difference between the new and old products in the market. Capon et al. (1992) analysed firm innovativeness with three aspects: marketplace novelty, strategic partiality to initiation and advance technology use. In the same regard, Han et al. (1998) evaluated firm innovativeness on the basis of two components, i.e., administrative and technical innovation. All these research studies and their analysis results indicate that innovativeness is the concept of being open to approaches and ideas as a dimension of organisation's culture orientation. Cultural innovativeness then reflects the extent to which an organisation is oriented towards the change for better performance.

Figure 4 Relationship of innovation, technology and performance (see online version for colours)



Research studies in the perspective of other developed and developing countries shows different results of analysis. Most of the countries such as New Zealand, Australia, South Korea, China, Malaysia, UK, France, Sweden, and Germany, etc. are showing positive impact of innovativeness on their businesses (Wright et al., 2004; Jimenez-Jimenez and Valle, 2011). However, it is also noticed that some of the research studies showing insignificant or inconsistent results (Damanpour and Evan, 1990; Darroch, 2005; Wright et al., 2005). Thus, partial and inconsistent analysis results relating to firms innovativeness leave room for its further extensive exploration and empirical research. Keeping in view the inconsistent results, this empirical study has addressed a different culture for research. Four dimensions of innovativeness as adapted, to be evaluated for a possible relation to SME performance of Oman.

6 Innovativeness and Oman SMEs

Likewise, SMEs plays critical role and well-known dynamic drivers of any country's economy all over the world (Blossom et al., 2014). It is true for most of the countries since SMEs have the abilities to generate pool of growth in terms of GDP and employment. SMEs yield a significant share of GDP. Previous studies show that SMEs contribute significantly to nation's economic growth, employment creation, poverty alleviation, social status standings through reduction in income disparity, local and regional development and community interconnection just to mention a few (Matlay and Westhead, 2005).

Sultanate of Oman is a developing country and is having modest economy dependent on natural resources such as crude oil and natural gas. Because of decreasing oil reserves and values, Oman is actively following development plans that focus on the development of industries and privatisation. It is also pursuing for the establishment of a less oil dependent economy for the coming years while simultaneously trying to create more job opportunities for the Omani nationals. According to World Fact book 2015 and as per the Public Authority for SME Development (PASMED), Oman SMEs are representing about 90% of all businesses and subsidising a trivial percentage of 14 to 20 in employment creation. Oman is exploring several different sectors to diversify its economic activities and gradually reducing its dependency on oil. Some of the evident projects are the new airport with a much larger accommodating capacity for visitors, further development of industrial zones to allow the setup of new industries or expansion of the current ones, preferential financial support for SMEs and special economic zones. A number of infrastructure development projects are also under construction. Tourism and small industries are also key components of the government's policy. His Majesty the Sultan Qaboos stressed on the need for economic diversification and encouragement of investment in productive projects of public interest and for development of SMEs. One of the stimulating sectors in Oman is SME, which encourage local and international investors in the country. More opportunities are expected to emerge shortly from the current ninth comprehensive five year plan 2016–2020 (Arshi, 2017).

Furthermore, Sultanate of Oman is one of the developing countries realising the importance of stimulating interest in entrepreneurship especially small and medium businesses. Government institutions and private agencies are interestingly participating in

entrepreneurship as an attempt to diversify the economic activities and stimulate entrepreneurship (Khan and Almoharby, 2007). In a report published by IMF Executive Board, 2015, government stressed on the need of having a broad industrial sector and specified that "Efforts toward economic diversification should be supported, to reduce dependence on oil and to generate jobs for citizens for the government to achieve this goal. Business environment should be enhanced by removing hurdles such as, technological and cultural issues in Oman. Although the government is taking solemn efforts to develop the SMEs sector, however, there is still lacks coordination between the SMEs and the government agencies involved. Scarce financing, limited abilities to exploit technology, lack of and innovative practices, constrained managerial capabilities, excess regulations, difficulty in recruitment, developing and retaining talented employees, limited access to business opportunities, and distrust in the credit markets are the current problems faced. Currently Oman Chamber of Commerce and Industry (MoCI), Riyada – Public authority for SME development in Oman (Riyada) and Al Raffd Fund (Raffd) and Wamda are managing and taking care of SME development in the country. The aforementioned facts illustrate that SMEs are growth engines and confirm the dynamic role they are playing in any nation's economy.

7 Design/methodology approach

7.1 Population and data collection procedure

This study aimed Omani manufacturing SMEs as the target respondents. According to the information collected from the Chamber of Commerce and Industry, Oman, the total manufacturing SMEs in Muscat were more than 500. With respect to the sample size, it is recommended as 'bigger is always better' (Iacobucci, 2010). It is better to have bigger sample size, as it improves the power and reduces the estimation error. In this regard, GPower 3.1 was employed to get better sample size. According to the result obtained from GPower statistics, the suitable sample size of 100 was measured having power (1–β error prob. = 0.950). Furthermore, according to Sekaran (2006), the ideal sample would be in between 30 and 200, as calculated in this case. In the light of aforesaid discussion, the study managed to get response from 91 respondents, whereas the survey was self-administered. Self-administered survey method is most suitable approach if the survey is limited to locally where potential respondent can be approached personally.

7.2 Sampling technique

While taking care of an important factor of 'heterogeneity of sample, number of variables and statistical tool for data analysis used in the research study'. This study opted simple random sampling. This approach is more appropriate, easier, simpler and affordable to collect sample out of population, comparing to other sampling techniques (Sekaran and Bougie, 2016). Keeping in view the total numbers of eligible respondents SMEs Firms, the sample was randomly chosen. In total about 500 manufacturing industries in Muscat located in Al-Rusayl, Al- Azaiba, Ghala, Bowsher, Berka industrial areas.

Table 3 Demographics detail

Firm age	*Frequency*	*Percent*
1–5 Years	29	53.86 %
6–10 Years	13	31.86 %
10+ Years	49	14.28 %
Categorisation of SME (no. of Employees)		
Small (6–25)	32	36 %
Medium (26–99)	59	64 %
Status of business		
Declining	12	13.20 %
Stable	41	45.05 %
Growing	38	41.75 %

7.3 Instrument

This study validates innovativeness (INN) constructs in the context of manufacturing SMEs sector in Muscat, Sultanate of Oman. Using a structured, self-administered questionnaire, the data was duly collected from 91 SME Firms. Keeping the view the prime importance of phenomenon, this study investigates innovativeness relationship to the performance of manufacturing SMEs and the also investigated the role played by TO in the relationship between innovativeness and performance of SMEs. For the first time, TO has been successfully employed as moderating variable in conducting and evaluating this research study. A clear divide among previous research studies of innovation and SME performance instigate towards further validation of the constructs. It is worthy to note that innovation may or may not be influenced by the cultural diversities and so far the western cultures have been the main focus of innovation in related studies (Venkatesh et al., 2012). Hence, the validation study in the perspective of Sultanate of Oman, a developing country with its rich culture, would be of immense help.

7.4 Demographic profile

The respondent's demography is provided in Table 2. In terms of size categorisation, 59 out of 91 (64%) were small industries with less than 25 employees and 32 out of 91 (36%) were medium industries with over 25 employees. In term of SME age (no of years) 49 (53.84%) SMEs were aged between 1–5 years, 29 (31.86%) were aged between 6–10 years and 13 (14.28%) SMEs were aged over ten years. The income invested by several different SMEs ranges from 1–2 m$, 3–4 m$, 5–6 m$ and over 6 m$. 41% of the SMEs showed a stable status of their business in the last five years, 12% showed declining and 38% SMEs showed growing status of the business.

8 Analysis and results

In order to evaluate the possible relationship of innovativeness to the SME performance in the perspective of Muscat, Oman, this research study employed partial least square

(PLS) path modelling to investigate the data by using SmartPLS 3.0. PLS – structural equation modelling PLS-SEM is a second generation modelling technique and equally good in analysing statistical framework and better forecast (Hair et al., 2016). It is a useful and appropriate tool to analyse the real-time applications and complex models. PLS path modeling not only allows developing and validating complex models but also calculates error model and at the same time allows multiple outcome variable. It allows direct incorporation and computation of moderator into a model (Iacobucci, 2010). It also can accept non-normal data (Chin, 2010), which is one of the common issues in the social science research studies. Tabchnick and Fidel (2007) recommend PLS SEM as one of the most trustworthy statistical tools for social and behavioural sciences that allows investigating more than one relationship simultaneously.

8.1 Convergent validity

Convergent validity refers to the extent to which items of a latent construct correlate with each other and the level at which they accurately represent the construct they are meant for (Hair et al., 2006). In determining convergent validity, the average variance extracted (AVE) is examined and the AVE value for a construct should ideally be greater than the variance shared between the construct and other constructs within a model (Couchman and Fulop, 2006). However, according to Barclay et al. (1995), the rule of thumb is that an AVE value should be above 0.45. In Table 4 AVE results with their resultant coefficients indicate that convergent validity has been established for all this research latent constructs.

8.2 Discriminant validity

According to Duarte and Raposo (2010), discriminant validity implies the extent to which a construct differs from others in a model. In order to examine discriminant validity in this study, the square-root of the AVEs for a given construct are used to replace the correlation matrix along the diagonals, and are compared with the absolute correlations of other variables in the model (Fornell and Larcker, 1981; Tang et al., 2011). To ascertain this, the squared correlations should be greater than the off-diagonal coefficients in the corresponding rows and columns (Hair et al., 2006). This has been achieved where in Table 4 clearly indicates that each latent construct shares more variance with its own items than with other constructs, thus supporting the assumption that there is adequate discriminant validity in this study (Henseler et al., 2015).

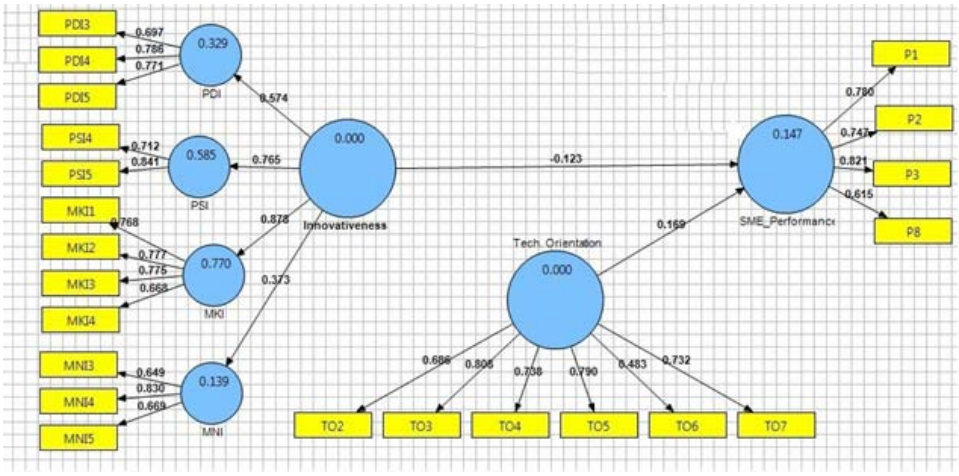
Table 4 Latent variable correlations and square roots of AVE

Latent variables		*1*	*2*	*3*	*4*	*5*	*6*
1	Marketing innovativeness	*0.849*					
2	Managerial innovativeness	0.618	*0.836*				
3	Product innovativeness	0.596	0.607	*0.847*			
4	Process innovativeness	0.739	0.667	0.747	*0.797*		
5	Performance	0.642	0.673	0.566	0.645	*0.765*	
6	TO	0.624	0.784	0.591	0.673	0.606	*0.789*

Discriminant validity can be assessed by comparing the values of item loadings with cross-loadings (Henseler et al., 2015). According to Chin (2010), the actual rule of thumb in this analysis is that all the indicator loadings should be higher than the corresponding cross-loadings. As indicated in Table, all the indicator loadings (appearing in bold) are found to be suitable measures of their latent constructs as they all loaded above the recommended threshold value of 0.5 (Hair et al., 2010), and are also higher than the corresponding cross loadings. This implies a satisfactory level of this study's discriminant validity. In view of these analyses, this study's construct validity has been established successfully, indicating that subsequent analysis involving hypotheses testing within the inner model would be meaningful because reliability and validity of latent constructs offer significant contributions that can be comprehensive. In this research study, construct validity has been recognised with content, convergent and discriminant validities. Having presented the results of the measurement model for this study which indicated that the measures for all the latent constructs are valid and reliable, the next step is to present results of the inner (structural) model.

While following the analysis mood and objectives to evaluate the Innovativeness constructs, this research study employs measurement model approach given as Figure 5. It validates items' individual reliability, internal consistency, convergent validity and discriminant validity by looking at three important values, i.e., outer loading, AVE and composite reliability.

Figure 5 Measurement model (see online version for colours)



As illustrated by the conceptual framework shown the result analysis starts with examining the relationship between the overall innovativeness and the performance of SMEs in Oman to determine whether or not it exist and if it does, to what extent. This includes narrowing down on crucial individual innovativeness factors within SMEs which are identified as Product Innovativeness (new product development), process innovativeness (new production techniques), marketing Innovativeness (new customers or markets), and managerial innovativeness (designing marketing strategies and modifying firm's administrative practices) to determine whether or not they are being practiced and what are their respective contributions towards the overall innovativeness

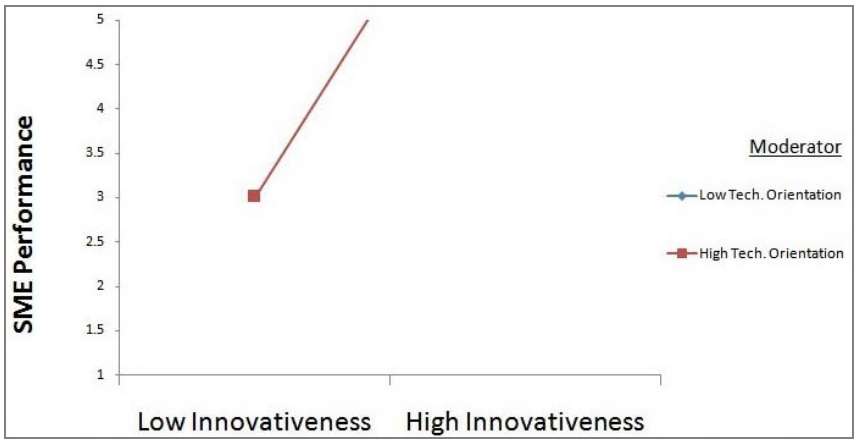
within the SMEs in Oman. It is to be noted that the overall innovativeness is the impacting factor of interest in this case.

Then the focus is turned to the moderating factor which is the technology to determine whether it is having the anticipating effect on innovativeness-performance relationship in the case of Oman as is generally the scenario in the developed parts of the world.

Figure 5 shows the measurement model constructed from the data collected. The measurement model provide the necessary information regarding the innovativeness practice of individual innovativeness factors (product, process, marketing and managerial) and their respective contributions towards the overall innovativeness within the SMEs in Oman with the resulting impact on performance of those SMEs.

To have a good sense of the nature of relationships in between the different factors illustrated on the measurement model, it should be noted that the strength of the relationship may range from zero to one with diminishing strength as values approach 0 and increasing strength as values approach one. From the diagram, in terms of innovativeness within SMEs in Oman, significant emphasis is being placed on marketing innovativeness (0.770) and process innovativeness (0.585) while not much attention is being given to product innovativeness (0.329) and even worse when it comes to managerial innovativeness (0.139). The kind of attention each individual innovativeness factor is getting within the SMEs in Oman explains their individual contributions towards the overall innovativeness which quite significant when it comes to marketing innovativeness (0.876), process innovativeness (0.765) but as significant when it comes to product innovativeness (0.574) and managerial innovativeness (0.373). It appears that innovativeness within SMEs in Oman is being driven more at the operational level through operational processes and marketing but not as much at the strategic level. It can be noted that any innovative practice can only achieve its full potential if it is being driven by the top management (reference).

Figure 6 Moderating effect of to on innovativeness (see online version for colours)



As a result, the combination of the individual innovativeness factors provides an insignificant overall innovativeness within SMEs in Oman which is explained by the negative value (–0.123) of the innovativeness-performance relationship. Based on the

data collected, currently, the innovativeness-performance relationship within SMEs is negligible and this is quite consistent across the SMEs in Oman (standard error 0.0819).

With regards to the moderating factor which is the TO, its influence on the innovativeness-performance relationship is minimal giving a value of only 0.169. It is to be noted that technology has well penetrated the SMEs in Oman (Ashrafi and Murtaza, 2010) but exploring its use within the organisations may further explain the low influential factor. The low influential factor may also be observed in the moderating effect graph below where at least an intersection between the low TO and high TO is expected.

The negligible innovativeness-organisational performance relationship even with the support of technology as a moderating factor is nothing new as similar results have been observed from several researches (Damanpour and Evan, 1990; Darroch, 2005; Wright et al., 2005).

9 Result of hypothesis

Having presented the results of all the relationships hypothesised earlier (the main and moderating effects) in the preceding sections, Table 5 summarises the results of all the hypotheses that have been tested in this study.

Table 5 Summary of hypotheses testing

Hypotheses	*Hypothesised paths*	*Findings*
H1	The higher the level of Innovative practices, the higher performance level of SMEs.	Supported
H2	The higher the level of TO, the higher performance level of SMEs.	Not supported

10 Recommendations

As mentioned earlier, in this research innovativeness is considered as simply practices that bring novelty by implanting new ideas, concepts or systems in firm's operations either through incremental changes or radical transformations regarding new product development, new production techniques, new customers or markets, designing marketing strategies and modifying firm's administrative practices, however, in terms of innovativeness practices, it might not be the case with manufacturing SMEs of Oman. Therefore, the recommendation section highlights a number of activities that can be considered to encourage such practices.

10.1 Developing capability for and supporting research and development in SMEs sector

Innovation relates to application/transmission of knowledge from research to development of products/services. Innovative organisations are strongly research and development (R&D) oriented and are proactive in acquiring novel information while using sophisticated technologies (Cooper, 1984; Kanter, 1988). Little emphasis is

currently being placed on R&D in manufacturing SMEs in Oman neither to acquire novel knowledge nor to embrace the continuous development of good practices within the sector. This is mainly due to limited research capabilities and the culture of non-research based decision making (Kanter, 1988). Building research capabilities of SMEs and changing the culture regarding research is an effective means for a long-term solution as it would require significant time and effort while a more immediate solution is to develop a working relationship between the SMEs sector and the bodies/authorities that already have the research capabilities. For instance, the Oman research council which is a government affiliated body can work alongside the SMEs to undertake the more pressing research needs while simultaneously providing some guidance to them on how to integrate basic research and innovation within their current practices. The outcomes of the researches can then be made accessible to all SMEs to promote good practices which can in turn boost their performances and growth.

10.2 Promoting collaboration among SMEs

Collaborative innovation is becoming increasingly important as it promotes the knowledge sharing culture which normally leads to good practices thus resulting in overall performance enhancement. Currently, minimal or no collaboration is formally being practiced in between SMEs and therefore diffusion of good practices and newly created knowledge through the SME sector is very limited. A knowledge management initiative supported by technology where good practices may be exchanged or shared among SMEs and new knowledge may be generated would be helpful. Such initiatives are becoming very common in SMEs sector and proven to be very successful in countries such as Thailand, Bangladesh, Pakistan, China, Singapore, Malaysia and so on. Capabilities and resources required to implement such initiative are likely to be beyond the SMEs in Oman and therefore the support will have to come from the Government which is also well positioned to incentivise the SMEs to participate.

10.3 Reviewing of government legislation and support towards SMEs

Challenges faced by most developing countries' SMEs are restricted access to top quality raw materials and lack of experienced human resource to take advantage of information and communication technologies for business practice improvements (Mutula and Brakel, 2006). The absence of innovation culture, knowledge management, insufficient marketing and managerial skills and difficulty in accessing easy financing are add on challenges (Qiang et al., 2006; Hanqin and Allison, 2007). Furthermore, SMEs in developing countries tend to have lesser market shares due to their less than ideal infrastructure and their struggles to integrate regional cooperation, governance, legal and administrative processes (Ongori, 2008).

Oman being a developing country, its SMEs is facing similar issues and therefore further commitment and support is required from the Government. Improved or new trade deals have to be put in place that would allow SMEs to have easy access to and affordable importation of high quality raw materials. This should be accompanied by accessible favourable financing to ensure that SMEs could actually make use of the deals. As a result, the quality of the products being produced by Omani SMEs could be greatly enhanced thus becoming more marketable beyond the Omani border. With the right

marketing strategies through the same trade deals, the potential export market size and reach could significantly increase and so would be the growth of the SMEs sector. As explained by the Central Bank of Oman, reduction in rigidities and some push in the manufacturing sector could improve competitiveness and performances in the Sultanate (CBO, 2016).

10.4 Having a well-focused capacity building plan (human resource development plan)

Reviewing the Omani human resource development plan to ensure well-focused human resource development would also be crucial as the right quality human resource will facilitate the embracing of SMEs related developing technologies and good practices. Such should lead to more process streamlining and more synchronised supply chain management thus improving both the efficiency and the innovativeness. It should also allow for better embracing of the SMEs' potential, mitigating or overcoming challenges such as inadequate skills of entrepreneurship, lack of TO, and high enterprise death rate which are usually the case with SMEs. The well-focused capacity building would promote technology-orientation within the SMEs sector thus providing them with the ability to attain extensive technological background and to use it further enhance performance by building innovative technical solutions to meet dynamic needs of customers (Workman, 1993). There are numbers of higher education institutions in Oman that can be called upon to provide the necessary support.

10.5 Striving for a more competitive market

Currently, in Oman, market trends or behaviours especially in SMEs tend to be quite stagnant as there is not much of a competition within the market. SMEs are operating quite comfortably and safely within the Omani market to the extent where the need to grow and enhance the quality of existing products/services or even consider developing new ones does not come high on their agenda. But as discussed earlier, SMEs have a major dynamic role to play within a developing economy and it should be the same case for Oman where the SMEs sector is pretty static (CBO, 2016). Therefore, the need to push for a more competitive market should get the SMEs to become more active regarding the economic development. This should see the traditional production methods evolve causing less hindrance to competitiveness, innovativeness, good managerial and marketing practices (Weerawardena et al., 2006). There would be higher productivity, appropriate marketing, innovative practices, TO rather than labour intensive oriented and improved cooperation between Government agencies and SMEs which are usually lacking in SMEs sector affecting SMEs performance (Barwani et al., 2014; Hvidt, 2013; Buckley and Rynhart, 2011).

11 Limitations of the study

This study was carried out using a cross-sectional survey design to collect data at a single-point-in-time, which prevents causal inferences to be made from the population of the study. Therefore, it is suggested that an alternative research design, like longitudinal

design, should be considered in future studies. The present study was conducted among Omani small and medium scale manufacturing firms only. In this way, it offers a limited generalisability.

In the current study, the relationship between Innovativeness and performance of SMEs is not significant, which could be looked in further. Therefore, future studies are expected to consider those possible factors that could further improve the performance of Omani small and medium sized manufacturing firms, apart from firms' innovative capabilities and TO. In particular, future research might examine how certain context-specific TO could further strengthen the relationship between innovativeness and firm performance among an entirely different category of firm.

12 Conclusions

Innovation relates to application or transmission of knowledge from research to development of products/services making innovative organisations strongly research and development oriented and proactive in acquiring novel information while using sophisticated technologies (Cooper, 1984; Kanter, 1988). Therefore, innovativeness normally provide a positive thrust to organisational performances (Tajuddin et al., 2015) regardless of the size of organisations, be it small, medium or large. Such has been observed in several researches but unfortunately, this empirical research based on Omani SMEs, shows insignificant relationship in between innovativeness and organisational performance.

To promote innovativeness within SMEs in Oman to the extent that it can provide that expected positive thrust to their performances, a number of activities have been identified as possible catalyst. The first one being the developing of capability for or supporting research and development in SMEs sector, the second being the promoting of collaboration among SMEs, the third being the reviewing of Government legislation and support towards the SMEs, the fourth being having a well-focused capacity building plan (human resource development plan, and finally being the striving for a more competitive market.

Consequently, it will ensure better understanding of the business environments, save time-to-markets (reduce product/process development life cycle time), promote learning and enhance problem solving skills, and encourage integration of new knowledge to stimulate creative products and services.

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