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## Article

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Journal of Innovation and Entrepreneurship

## Provided in Cooperation with:

Springer Nature

*Suggested Citation:* Asad, Muzaffar; Muhammad Uzair Asif; Sulaiman, Mohammed Ali Bait Ali; Satar, Mir Shahid; Alarifi, Ghadah (2023) : Open innovation: The missing nexus between entrepreneurial orientation, total quality management, and performance of SMEs, Journal of Innovation and Entrepreneurship, ISSN 2192-5372, Springer, Heidelberg, Vol. 12, Iss. 1, pp. 1-13, <https://doi.org/10.1186/s13731-023-00335-7>

This Version is available at:

<https://hdl.handle.net/10419/290300>

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# Open innovation: the missing nexus between entrepreneurial orientation, total quality management, and performance of SMEs

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## Abstract

Drawing upon the theoretical foundations of the resource-based view, the current research aims to examine the mediating role of open innovation between entrepreneurial orientation, total quality management, and SMEs performance. Open innovation is not new, but SMEs operating in the developing economies are unaware of its importance and need. A structural equation model was used in the study to evaluate the relationships between the data collected from 270 SMEs with the help of adopted questionnaires. The results confirmed the impact of entrepreneurial orientation along with total quality management on open innovation as well as the performance of SMEs. Second, the indirect impact of entrepreneurial orientation along with total quality management via open innovation has also been established which is proven as significant. Owners and managers of SMEs should consider customer-driven practices in an entrepreneurial manner to achieve elevated levels of performance based on the study's findings.

**Keywords:** Open innovation, Entrepreneurial orientation, Total quality management, SMEs

## Introduction

For the last two decades, open innovation has been gaining significant importance for practitioners as well as academicians because of squeezed innovation cycles. Similarly, open innovation has gained attention from academicians and practitioners in the field of innovation as well as SMEs because of increasing importance of knowledge management in SMEs (Asif et al., 2021). As innovation process is highly dependent on knowledge sharing and knowledge exploitation which gained from the external market.

Entrepreneurial firms are renowned because of their innovativeness. Thus, open innovation is usually observed as more common in entrepreneurially oriented firms. Entrepreneurial Orientation (EO) of the enterprises determines how the strategy of the organizations will be shaped. In those economies where enterprises need to continuously be engaged in opportunity seeking, EO is the extent to which an enterprise is entrepreneurially oriented as compared to being conservative regarding developing its strategy

and orchestration of resources. These are the core strategies that the firms need to rely on for gaining sustainability and competitive advantage. Hence, manager and owners in different contexts need to boost EO to gain a competitive advantage.

Another important aspect required for gaining performance is quality. In the literature of marketing and management, quality has always remained in spot light by the researchers for identifying the main dimensions of Total Quality Management (TQM) practices. The concept has been defined through various dimensions ranging from opinion of value to conformance with requirements, fitness of use, and finally to meeting customer's expectations. While several researchers have identified the characteristics of facilities, procedures, staff that support TQM which led to superior performance of enterprises through customer satisfaction. The role of innovation which is compulsory for customer satisfaction has hardly been addressed as a response of TQM practices. However, it is logically supposed to have a strong link between open innovation and TQM practices as both the concepts deal with customers' satisfaction.

Recently, Asad et al. (2021a) claimed that because of the increasing use of big data entrepreneurially oriented firms take advantage of open innovation (Asad et al., 2021b). Whereas TQM research appears to concentrate more on understanding its importance for organizational success, consequently, these practices are still directed from within the enterprise. EO, however, is supposed to be highly engaged with open innovation along with TQM implementations to gain higher performance (Krajcsák, 2019); likewise, the same impact has been analyzed over corporate sector (Khalfallah et al., 2021) and the same influence for the SMEs has not yet been analyzed, despite the fact that the SMEs are more influenced by market as compared to large corporations. Thus, TQM practices implemented by entrepreneurially oriented firms appear to complement open innovation, which has not yet been empirically evaluated, especially in any developing economies.

Although both EO and TQM practices are somehow interlinked, there is scarcity of literature empirically identifying the complementing mediating roles of open innovation between EO, TQM, and performance of SMEs especially in the context of developing countries. Despite the conceptual rigor, the role of TQM practices for achieving organizational performance especially in the context of SMEs operating in developing countries needs attention of the researchers. Similarly, the impact of TQM practices and performance of SMEs, as well as the link of EO and performance of SMEs, has been studied separately by the researchers mainly in the developed countries and the mediating complementing mediating role of open innovation has hardly gained attention by the researchers, especially for the SMEs operating in the developing countries. Therefore, using the theoretical lenses of Resource-Based View (RBV) and contingency theory, the aim of the study is to identify the mediating role of open innovation between two complementing constructs (TQM and EO) and performance of SMEs.

### **Literature theory and hypothesis**

In this research, the literature review focused on existing studies in the field of performance of SMEs. Performance of SMEs is dependent on numerous factors. However, after the detailed review of literature, it has been observed that performance of SMEs is highly dependent on entrepreneurial orientation and total quality management.

Moreover, it has also been discovered that to get maximum performance from entrepreneurial orientation and total quality management, open innovation helps to improve the significant impact of EO and TQM.

Measuring performance is critical especially when it comes to SMEs because of informal record keeping (Asad et al., 2021a; Majali et al., 2022). Thus, measurement of performance of SMEs in the developing countries is based on the perceptions of owners and managers of SMEs regarding improvement in sales, assets, incomes, and employees (Andrewis et al., 2018; Alzu'bi & Al-Jaghbeer, 2019; Asad et al., 2020; Haider et al., 2017a, 2017b, 2017c). Performance can also be considered as a multi-dimensional construct which includes market share, market growth, profitability, increase in assets and sales, and increase in employment is the core fundamentals of its dimensions. Forth and Bryson (2019) suggested that those measurements which provide up-to-date or innovative information to their managers, as well as their owners, are examined as a significant tool for managing the SMEs.

Furthermore, the Pakistani government as well as the industry which established a broad-based analysis of the factors that would make the SME sector more competitive includes allowing them to access finance more easily (Abbasi et al., 2017). Likewise, several SMEs struggle to develop up to a certain point and fail to graduate to larger enterprises as a result of their low-performance trap (Qalati et al., 2022). Likewise, investment growth, as well as sales and profitability growth, might be slow or even static because of the same reason (Zuhaib et al., 2022). Moreover, limited resources of SMEs might not allow them to gain more advantages.

In addition, another major issue that has been observed in the literature over performance of SMEs which has gained relatively less attention by the researchers is total quality management (Asad et al., 2020). The main reason due to which SMEs in Pakistan are not competing the SMEs of developing countries is lack of focus of SMEs over quality. SMEs in the developing countries operate in relatively more turbulent environment (Demirbag et al., 2006; Asad et al., 2021b), which further increases the need for paying attention over quality. Therefore, implementing TQM along with EO could be a significant strategy to gain better performance.

Entrepreneurial Orientation (EO) refers to the enterprise's innovative behavior among other firms. EO is the behavior of an enterprise to become a leader by creating new innovative products as well as services for gaining better performance (Haider et al., 2017a, 2017b, 2017c). Asad and Sharif (2016) stated that EO role is becoming significant as well as prominent in illuminating the performance of SMEs. Likewise, EO can also be illustrated as an enterprise behavior that involves skills to foresee and exploit available opportunities with the help of internally generated resources (Abdul, 2018).

Furthermore, Sadiku-Dushi et al. (2019) claimed that entrepreneurial enterprises are distinguished by other enterprises because of their management philosophy of stimulating innovativeness, risk-taking, and proactiveness. Likewise, those entrepreneurial-oriented enterprises that perform their activities with the involvement of innovation, their performance will be enhanced (Forth & Bryson, 2019). Moreover, previous researchers especially in the developing countries such as Pakistan suggested to study EO as a unidimensional construct, considering the interpretation level

of the participants of a developing country (2021b; Asad et al., 2018, 2020). Hence the proposed hypothesis is as follows:

$H_{a1}$ : Entrepreneurial orientation has a significant relationship with performance of SMEs.

Another important construct which influences performance of SMEs in the developing countries is Total Quality Management (TQM). Over the enhancement literature on entrepreneurially oriented SMEs, very few studies have analyzed the role of TQM and the same studies in the context of Pakistan are even limited. Asad et al. (2020) stated that there is a significant relationship between the TQM implementation and the perceptual measures of the performance; however, the researchers ignored the importance of innovation. Moreover, previous researchers also founded that there is significant outcomes of TQM practices over performance of SMEs. Hendricks and Singhal (2001) argued that small enterprises tend to get advantages more from TQM as compared to medium enterprises.

Likewise, the majority of the researches on TQM appears to focus on large enterprises. Furthermore TQM practices have mainly been analyzed over the construction businesses (Ahire & Golhar, 1996; Androwis et al., 2018; Alzu'bi & Al-Jaghbeer, 2019; Hendricks & Singhal, 2001). At the same time, researchers in the field of TQM have emphasized over projects-based businesses (Altayeb & Alhasanah, 2014) and SMEs sector has gained limited attention, despite the importance of the construct. This shows that there is a gap in the literature which is further supplemented by the fact that recognizing the role of TQM practices in enhancing open innovation for gaining performance is missing. However, considering the influential role of TQM following hypothesis has been proposed.

$H_{a2}$ : Total quality management has a significant relationship with performance of SMEs.

Due to the rapidly changing business environment and increasing technological complexity, firms need to be proactive in open innovation. New knowledge can be gained from external sources and innovating products and services based on the external knowledge is open innovation (Liao et al., 2019; Leckel et al., 2020). Open innovation which can easily be obtained through university industry collaboration is lacking in the developing countries despite their potential of providing opportunity to enterprises for acquiring complementary knowledge (Tariq et al., 2019). Open innovation is a crucial means by which enterprises can gain a competitive advantage which is required for gaining high performance (Tariq et al., 2022). In this case, open innovation boosts knowledge creation, consequently improving performance (Tariq et al., 2017). Open innovation enables enterprises to satisfy their customers that affects overall performance. However, for entrepreneurially oriented SMEs to gain high performance, it may be desirable to achieve open innovation through total quality for gaining superior performance, because inefficiencies are the main reasons behind time and financial costs which are considered as a burden for the SMEs which are already lacking resources (Majali et al., 2022). Hence, the proposed hypotheses are as follows.

H<sub>a3</sub>: Open innovation mediates the relationship between entrepreneurial orientation and performance of SMEs.

H<sub>a3</sub>: Open innovation mediates the relationship between total quality management and performance of SMEs.

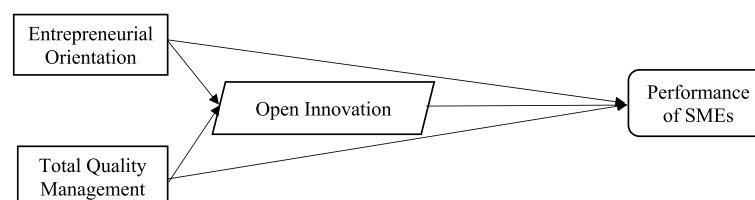
Dealing with open innovation and investigating the mediating effect of innovation of enterprises, Asad et al. (2021b) claimed that innovation significantly influences performance. However, the inconsistency between EO and performance has not been explored enough, likewise understanding the importance of TQM practices especially for the SMEs operating in developing countries has hardly been studied which clearly shows that there are significant gaps in the literature of SMEs performance. Therefore, considering the theoretical underpinning of RBV to support EO and TQM and contingency theory to support open innovation, the following framework has been developed for empirical testing (Fig. 1).

In the abovementioned framework, we claim that the relationship between EO and performance along with TQM and performance has been analyzed separately by the prior researchers, however, analyzing them together has a synergetic impact; furthermore, the impact of EO and TQM can be enhanced by adding the mediating role of open innovation, which is not the pat of internal resource of the firm, as it is highly dependent over the external information, thus, by complementing RBV and adding to the body of knowledge by exploring the mediating role of open innovation with the theoretical support of contingency they, between EO, TQM, and performance, this study has been conducted over the SMEs of Pakistan.

### Research methodology

The aim of the present quantitative casual study is to measure the effect of entrepreneurial orientation and total quality management over the performance of SMEs with the mediating role of open innovation. The major issue of performance lies with the SMEs in Pakistan because of EO and TQM as discussed in the literature. Therefore, in this study, the unit of analysis is SMEs operating in the Sialkot city of Pakistan. There are about 3.249 million businesses in Pakistan, and more than 90% of the total businesses are the SMEs. In Pakistan, 64% of SMEs are operating in Punjab. Likewise, Sialkot is the major hub of the SMEs sector along with the second main export city of Pakistan (Punjab Portal, 2016). Hence, Sialkot city has been chosen for the collection of data.

This research is causal as well as cross-sectional; therefore, the data have been collected from the Sialkot during 3 months. The data have been gathered through the pre-developed questionnaires, because the data for the variables used in the study were not



**Fig. 1** Research framework

collectable through any other mean. Respondents were managers and owners of SMEs. Though some researchers believe that EO is a multidimensional construct; in this study, it has been taken as a unidimensional construct because of the organizational structures as well as the understanding level of the respondents (Asad et al., 2021b). The items for entrepreneurial orientation and performance were adopted from Khan et al. (2021), Similarly, the items for open innovation were adopted from Freixanet et al. (2021); likewise, the items for total quality management were adopted from Asad et al. (2020). The perceptual responses were measured using 5 points Likert scale ranging from 1 =strongly disagree to 5 =strongly agree, the use of 5 point Likert scale is suggested by several authors and it allows the researchers to collect the reliable data which is the true perception of the respondents (Haider et al., 2017a, 2017b, 2017c; Tariq et al., 2017; Khan et al., 2021). For analyzing the model, structural equation modeling was chosen, as it is more reliable for theory building. The data were collected from 270 SMEs and purposefully those SMEs were chosen which engaged in open innovation. The sectorwise distribution of SMEs is mentioned in Table 1.

After collecting the data, structural equation modeling has been used to test the hypotheses raised in the researcher based on the prior literature. However, before testing the hypothesis, reliability of the instrument used was also checked. Likewise, outer model was ensured first before evaluating the inner model. In the next section, the results are explained.

**Analysis and findings**

The analysis of the collected data has been divided into two main parts initially the external model has been analyzed followed by the analysis of internal model. For analyzing the external model initially, content validity has been conducted using item loadings, Cronbach’s alpha, composite reliability, and Average Variance Extracted (AVE).

**Content validity**

The data have been analyzed initially by ensuring the item loadings. All the items having loading values lower than 0.7 were eliminated from the instrument and it was ensured that sufficient number of items were left in the model. Item loadings must be measured for every item, because if any item has less than 70% correlation with the factor, then it should preferably not be included in the model. It was also ensured that not more than 10% of the items were removed. Furthermore, the reliability and validity of the construct were also determined using Cronbach’s alpha, Composite

**Table 1** Sectorwise distribution

Sector	Proportion
Electronic devices	53
Leather processing	37
Leather goods	44
Sports goods	98
Surgical goods	22
Beauty Instruments	16

(Source: Authors)

Reliability (CR), and Average Variance Extracted (AVE) with a threshold level of 0.50, 0.60, and 0.70, respectively (Hair et al., 2013). The overall content validity of the instrument is illustrated in Table 2.

After the instrument’s reliability and validity have been established, the next stage is the discriminant validity of the instrument must be assessed.

**Discriminant validity**

In any causal study, it is essential to investigate the discriminant validity of the instrument to verify that the items are measuring the variables as well as nothing else, or the items in the other constructs are not measuring any other exogenous variable more than the one the construct is supposed to measure (Franke & Sarstedt, 2019). Discriminant validity is examined by verifying that the measured value for the variable is below than any of the other variables in a similar column (Henseler et al., 2015). The results of the discriminant validity of all the variables are shown in Table 3.

**Table 2** Convergent validity

Variables	Entrepreneurial orientation	Open innovation	PSMEs	Total quality management	Cronbach's Alpha	CR	AVE
Entrepreneurial Orientation	0.861				0.861	0.906	0.706
	0.855						
	0.817						
	0.827						
Open innovation		0.793			0.962	0.966	0.723
		0.895					
		0.787					
		0.838					
		0.865					
		0.847					
		0.869					
		0.886					
		0.83					
	0.849						
	0.888						
Performance of SMEs			0.767		0.918	0.932	0.603
			0.755				
			0.759				
			0.843				
			0.781				
			0.82				
			0.778				
			0.756				
		0.724					
Total quality management				0.803	0.861	0.906	0.707
				0.789			
				0.915			
				0.851			



**Table 3** Discriminant validity

Variables	Entrepreneurial orientation	Open innovation	Performance of SMEs	Total quality management
Entrepreneurial orientation	0.84			
Open innovation	0.601	0.85		
Performance of SMEs	0.659	0.587	0.777	
Total quality management	0.493	0.601	0.445	0.841

**Table 4** Total effects

Direct Effects	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
EO > PSMEs	0.237	0.238	0.091	2.603	0.010
TQM > PSMEs	0.236	0.247	0.069	3.444	0.001
EO > Open innovation	0.403	0.394	0.124	3.244	0.001
TQM > Open innovation	0.403	0.418	0.117	3.439	0.001
Open innovation > PSMEs	0.587	0.595	0.075	7.805	0.000

#### Path coefficients direct effects

In this research, the determination of the direct effects has been examined in which initially the relationship between the independent variable (entrepreneurial orientation and total quality management) and the dependent variable (performance of SMEs). Furthermore, then, the relationship between the independent variable (entrepreneurial orientation and total quality management) and the mediator variable (open innovation). Finally, the relationship between the mediator (open innovation) and the dependent variable (performance of SMEs). The findings of all the calculated values of all the variables are shown in Table 4.

After all the results in Table 3 in which initially, direct effects of entrepreneurial orientation over PSMEs have been checked along with it has been found to be significantly affected as per the measurements ( $\beta = 0.237$ ,  $t = 2.603$ ). Second, the direct effects of total quality management over the PSMEs have been checked and also found to be significant as per the calculations ( $\beta = 0.236$ ,  $t = 3.444$ ). Third, the direct effects of entrepreneurial orientation over open innovation have been evaluated and found to have a significant effect as per the measurements ( $\beta = 0.403$ ,  $t = 3.244$ ). Fourth, the direct effects of total quality management over open innovation were checked and discovered to be significant according to the measurements ( $\beta = 0.403$ ,  $t = 3.439$ ). Finally, the direct mediating effects of open innovation over PSMEs were checked and it was also found to be significant as per the calculations ( $\beta = 0.587$ ,  $t = 7.805$ ). Furthermore, after the analysis of the direct effects, the next stage is to determine the indirect effects.

#### Specific indirect effects

In this research, the analysis of the indirect effects has been examined in which the entrepreneurial orientation and total quality management which is the independent variable open innovation is the mediating variable and the performance of SMEs is the

**Table 5** Mediating effects

Indirect effects	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
EO → Open innovation → PSMEs	0.237	0.238	0.091	2.603	0.010
TQM → Open Innovation → PSMEs	0.236	0.247	0.069	3.444	0.001

**Table 6** Predictive relevance

Descriptions	SSO	SSE	Q <sup>2</sup> (= 1 – SSE/SSO)
Open innovation	1100	734.833	0.332
PSMEs	900	634.278	0.295

dependent variable. The findings of all the variables which are measured are shown in Table 5.

After all the analysis indirect effects as shown in Table 4 in which the mediating effects of open innovation in the relationship between entrepreneurial orientation and the PSMEs the measurements are calculated which are significantly affected as per the analysis ( $\beta=0.237$ ,  $t=2.603$ ). Likewise, the mediating effect of open innovation which is a significant relationship between total quality management and the PSMEs as per the analysis of ( $\beta=0.236$ ,  $t=3.444$ ). Afterward, the analysis of indirect effects the next stage is to analyze the cross-validated redundancy.

#### Construct cross-validated redundancy

Finally, the cross-validated redundancy Q<sup>2</sup> test which may be calculated using the blindfolding procedures, which can be used to determine the Q<sup>2</sup> (Hair et al., 2013) Furthermore, this study utilized the Stone–Geisser test to analyze the Q<sup>2</sup> over the blindfolding procedures to obtain the cross-validated redundancy to analyze for the endogenous latent construct (Hair et al., 2013). The findings of the cross-validated redundancy are shown in Tables 5 and 6.

After all the analysis in Table 5 which illustrated that all values of Q<sup>2</sup> are greater than zero which are open innovation (0.332) and PSMEs (0.295). However, if the values of Q<sup>2</sup> are greater than zero it shows the model has validated redundancy whereas if the values are lower than zero it shows the model has a lack of validated redundancy.

#### Conclusions, discussion, limitations, and recommendations

The purpose of the study was to analyze the mediating role of open innovation between EO, TQM, and performance. For the said purpose, the data were collected from the owners and managers of 270 SMEs. The data were analyzed through structural equation modeling using SMART PLS3. For developing the framework of the study, theoretical support of RBV and contingency theory was taken. The findings of the study revealed that the entire framework was significant.

Regarding EO, the findings show that SMEs that are entrepreneurially oriented performs better as compared to SMEs that are being operated on conventional basis. The

findings are supporting the findings of previous researchers, where it is claimed that EO boosts performance (2021a; Abdul, 2018; Asad et al., 2018). It is because of the fact that entrepreneurially oriented SMEs are more proactive and innovative, as a result, they satisfy their customers better and consequently their businesses perform better. However, the findings contradicted a few of the researchers as those researchers challenged the proposition of RBV and claimed EO to have a negative or u shaped effect over performance (Harms et al., 2010; Kreiser et al., 2013). Second, they ignored a crucial factor which was open innovation which, as per the findings of the current study play a significant role. Those SMEs that do not focus on market driven innovation hardly performs well.

Another important construct that was employed in the study was TQM which has hardly been analyzed in for identifying the performance of SMEs in the context of developing countries. The findings revealed that TQM also has a significant impact, and the results of the study are in line with several prior researchers (Sadikoglu & Olcay, 2014; Shafiq et al., 2019). TQM practices help SMEs in meeting customers' expectations by provision of quality products and services. Most of the studies over TQM practices focused on construction-based businesses or projectized businesses; therefore, analyzing TQM practices over the performance of SMEs is another contribution of the study.

EO and TQM both are significant, and this is also supported by the previous researchers (Ali et al., 2020; Sahoo & Yadav, 2017). EO and TQM have been analyzed in very few studies; however, the fact is that the aim of both the constructs is the same which is keeping customer satisfaction as a top priority. Most of the SMEs that engage in TQM practices are entrepreneurial in nature. Having a common aim, it would be right to claim that EO and TQM are compulsory for each other; therefore, both the constructs when applied collectively create constructive collaboration.

The findings regarding the mediating role of open innovation between TQM practices and performance are also significant and are in line with the prior studies (Khalfallah et al., 2021; Krajcsák, 2019). SMEs that focus over TQM never ignore the importance of customer feedback and market operations. SMEs involved in TQM practices always give top priority to the customers and to do so they have to constantly innovate based on the market feedback and market information.

Similarly, the mediating role of open innovation between EO and performance was also found significant and was also in line with the prior studies (Won & Park, 2018). Furthermore, prior studies have taken open innovation as mediator along with performance, however, hardly authors have analyzed the mediating impact of open innovation between EO and performance (Freixanet et al., 2021; Liao et al., 2019). EO construct contains innovativeness, however, this innovativeness is slightly different from open innovation. Thus, analyzing the mediating role of open innovation between EO and performance, especially in the developing countries context is another contribution of the study.

The findings of the study not only fulfill the contextual gaps; however, the theoretical gaps as well as the study enriched RBV by the support of contingency theory. The construct analyzed in the study has not been analyzed before, which shows that the study has significant contextual, theoretical, as well as practical significance. The findings are important for the practitioners as well as the policy makers in designing the policies for motivating

entrepreneurs in the developing countries to get involved in open innovation practices as well as TQM practices, because both the concepts are ignored by the entrepreneurs in the developing countries.

The study was conducted during pandemic; therefore, the study has some imitations as well. Initially, the performance might have been affected due to pandemic; however, this element has not been catered in the study, whereas it might would have affected performance. The results shown in the study identified that EO, TQM, and open innovation are the main predictor of performance; however, any event that influence the entire world certainly influence on SMEs as well. The quality in terms of meeting the customers' expectations might have affected due to Pandemic; however, it was not incorporated in the study. Second, like any quantitative study, the findings of the current study might be having the biasedness of the respondents as the owners' might would have not pretended; however, certain measure and cross questions were asked for the elimination of this issue. Second, the prevailing political conditions of the country are also not very stable, which certainly affects performance. These study findings are only limited to three variables, which defines the scope of the study; however, including some other relevant variables based on the context might further improve the results in terms of explained variation.

Considering the literature reviewed, it is suggested that in future, the researchers should analyze other variables that may influence performance while keeping open innovation as a mediator. Second, as the data were collected only from 270 SMEs, a large sample size might be of significant use for the researchers and also may alter the results. Finally, the environmental factors have not been addressed; however, SMEs are trend followers as compared to trend makers; thus, importance of open innovation cannot be ignored. However, in future, the researchers may also consider taking moderating variable to further enhance the value of  $R^2$ . Despite all these limitations, it would be right to say that the findings hold significant theoretical, practical and even policy implications. The policy makers for the SMEs should also focus on open innovation rather than thinking about provision of financial access only.

#### **Acknowledgements**

We would like to acknowledge all the participants who responded to the questionnaires we gave to them.

#### **Author contributions**

MA has compiled the over research and has supervised the entire work. MUA has collected the data and providing information about Pakistani SMEs. MABS conducted the literature review and theoretical framework. MSS has conducted the analysis, GA has written the conclusions and recommendations.

#### **Funding**

This research received no external funding.

#### **Availability of data and materials**

Not applicable.

#### **Declarations**

##### **Competing interests**

The authors declare no conflict of interest.

Received: 23 November 2022 Accepted: 17 August 2023

Published online: 10 November 2023

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