

Shah, Syed Zulfiqar Ali; Anwar, Muhammad; Hussain, Ch. Mazhar

**Article — Published Version**

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Managerial and Decision Economics

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*Suggested Citation:* Shah, Syed Zulfiqar Ali; Anwar, Muhammad; Hussain, Ch. Mazhar (2020) : Top managers' attributes, innovation, and the participation in China–Pakistan Economic Corridor: A study of energy sector small and medium-sized enterprises, Managerial and Decision Economics, ISSN 1099-1468, Wiley, Hoboken, NJ, Vol. 42, Iss. 2, pp. 385-406, <https://doi.org/10.1002/mde.3242>

This Version is available at:

<https://hdl.handle.net/10419/233667>

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## RESEARCH ARTICLE

# Top managers' attributes, innovation, and the participation in China–Pakistan Economic Corridor: A study of energy sector small and medium-sized enterprises

Syed Zulfiqar Ali Shah<sup>1</sup> | Muhammad Anwar<sup>2</sup>  | Ch. Mazhar Hussain<sup>1</sup>

<sup>1</sup>Faculty of Management Sciences,  
International Islamic University Islamabad,  
Islamabad, Pakistan

<sup>2</sup>Witten Institute for Family Business,  
University of Witten/Herdecke, Witten,  
Germany

## Correspondence

Muhammad Anwar, Witten Institute for Family  
Business, University of Witten/Herdecke,  
Witten, Germany.  
Email: m.anwar.ims@gmail.com

## Funding information

Higher Education Commission (HEC), Pakistan,  
Grant/Award Number: 8559/Sindh/NRPU/  
R&D/HEC/2017

A large number of researchers are engaged in studying the determinants and consequences of China–Pakistan Economic Corridor (CPEC). Although optimism abounds, in particular, few empirical evidence is available for Pakistani businessmen and small and medium-sized enterprise (SME) operators on how to benefit from this tremendous opportunity. Our study examined how top managers/owners of Pakistani energy sector SMEs can innovate their businesses to reap the benefits of CPEC. We have examined the influence of demographic factors (age, education, experience, and financial literacy) of top managers/owners on different forms of innovation (product, process, marketing, and organization) and their consequent chances of success through participation in CPEC.

## 1 | INTRODUCTION

Internationalization has become a crucial strategic decision among business organizations irrespective of their size and nature of business (Lu & Beamish, 2001; Middleton, Liesch, & Steen, 2011; Schwens et al., 2018). In particular, business enterprises in emerging markets are increasingly opting for internationalization (that is entering into stable and developed markets), due to well-known constraints (e.g., limited resources and scope for growth) in the host market. (Anwar, Shah, & Khan, 2018). Other reasons cited for the trend include a high degree of local competition (Neubert & Van Der Krogt, 2020), lack of state support (Wu & Deng, 2020), poor technology (Li & Ding, 2017), and unstable market conditions (Adomako, Amankwah-Amoah, Dankwah, Danso, & Donbesuur, 2019). At the same time, the potential benefits of internationalization (e.g., high profitability, sales growth, stable markets, and opportunities), motivate emerging small and medium-sized enterprises (SMEs) to enter into foreign markets (Bianchi, Carneiro, & Wickramasekera, 2018; Zhang, Ma, Wang, & Wang, 2014). However, all the SMEs cannot make a successful international entry due to several weaknesses and constraints:

lack of support, deficiency of resources, regulations, and poor managerial skills (Anwar et al., 2018; Hutchinson, Fleck, & Lloyd-Reason, 2009; Lin & Chaney, 2007; Lu & Beamish, 2001). As pointed out by internationalization theory (Johanson & Vahlne, 1977), some enterprises enter into a foreign market earlier than others due to the availability of sufficient resources and capabilities (Weerawardena, Mort, & Liesch, 2019) whereas others have to wait much longer. In this context, literature has introduced a number of factors that can facilitate or hinder the efforts of enterprises towards internationalization. In general, literature has suggested strong networking (Peng & Lin, 2019; Senik, Scott-Ladd, Entekin, & Adham, 2011), sufficient resources (Lau, Ngo, & Yiu, 2010; Sui & Baum, 2014), advanced technology (Von Zedtwitz & Gassmann, 2002), and dynamic capabilities (Arikan, Koparan, Arikan, & Shenkar, 2019) as facilitating factors whereas poor support (Roy, Sekhar, & Vyas, 2016), deficiency of resources (Nguyen, Huynh, Trieu, & Tran, 2019), and poor innovative capabilities (Filippov, 2011) are indicated as hindering factors during internationalization process. However, it appears that no or very little has been paid to a vital factor that has potentially great importance on the process of entering into international markets. This factor is the

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background of the top managers/owners of the enterprises that aim to seek internationalization. These factors include age, education, experience, and financial literacy in the context of innovative activities and internationalization. The present study fills this gap and examines the influence of top managers/owners background factors: age, education, business experience, and financial literacy on the participation in China–Pakistan Economic Corridor (CPEC) with mediating role of product, process, marketing, and organizational innovation.

CPEC, the Chinese investment in Pakistan, collectively refers to the development projects intended for the infrastructure development throughout a designated corridor in Pakistan (Chauhan, 2019). CPEC is another name of international opportunity for business organizations operating in China and Pakistan. It is aimed to promote free trade between Pakistan and China to help improve economic growth and gross domestic product (GDP) (Ali, Saad, et al., 2020; Ali, Sabir, et al., 2020). It is also considered as the best trade zone of China–Pakistan and a hub of international business promotion. Therefore, we deem CPEC as an international business opportunity that will benefit enterprises in several ways. CPEC has started operation in energy sector, but operation in other industrial sectors is in progress. Therefore, we confined our study sample to energy sector SMEs in order to gain possibly valid insights.

The massive initial investment of \$46 billion in 2015 (Hussain, 2015; Kiani, 2016) has increased to \$62 billion as of 2017 (Siddiqui, 2017). The CPEC is the consortium of the projects intended for the development in the multidimensional infrastructural development such as transportation networks, energy sector development, and development of industrial zones aimed at the economic development of the underdeveloped regions of the country. The first overland cargo was transported in November 2016 to the Gwadar port for onward shipment to their designated destinations (Ramachandran, 2016).

The first priority projects to be completed and operated are energy development such as electricity, oil, and gas. Both the countries, China and Pakistan, have agreed to import/export power generation products. Hence, we emphasized on energy sector firms to unleash their capabilities towards CPEC. It is also argued that with respect to CPEC, SMEs in energy sector will have high export possibilities due to quick decision-making process and flexibility. Consequently, the corridor envisioned around \$33 billion worth of infrastructure in order to alleviate the energy crises of Pakistan. These projects are to be initiated by the private sector, where both SMEs and large organizations could contribute and benefit from the opportunities (Ali, 2018). A part of the projects would involve building a pipeline for transportation of the liquefied gas and oil between the main centers, such as Nawabshah and Gwadar, which could subsequently be exported (Irshad, 2015). The main input for these energy and electricity generation projects would be the fossil fuels and hydroelectric and other wind projects, in addition to the projected one of the world's biggest solar energy parts. In addition, to the Chinese investment, there are other funding opportunities for the local businesses, which could capitalize on these funding and can contribute in the betterment of the economy, such as Asian

Development Bank funded project aimed at the multisector development, private consortia, the interest free, and concessionary loans from the government.

There are myriads of investment and business opportunities for the energy sector businesses in Pakistan, as currently the energy generating capacity of Pakistan is around 25,000 MW, much below its energy needs. Given the energy crisis of Pakistan, major focus of the CPEC would be on energy generation, with an investment of around \$33 billion (Ali, 2018). The energy projects are to be delivered and run by the private sectors through the independent power producers run privately by businesses. Therefore, there is more scope and opportunities for the local businesses to capitalize on these projects. The private sector can invest in the renewable-energy projects, electricity generation through coal and liquefied natural gas in different provinces of Pakistan. These opportunities can enable the local businesses to contribute towards economy of Pakistan by participating in these energy sector projects. Considering the importance of the participation in these CPEC projects, it is important to examine the factors that could contribute in enhanced participation by these SMEs in the CPEC projects. Exploring and understanding the factors that determine the participation of the SMEs in the CPEC projects would help the local SMEs to identify their respective strengths and gainfully participate in the CPEC projects.

The present research advances our understanding about the internationalization theory (Johanson & Vahlne, 1977) and the upper echelon theory (UET) (Hambrick, 2007). For instance, our research extends the scope of the internationalization theory by exploring the top managers/owners background factors in innovation and CPEC participation that have been ignored so far by researchers. Moreover, the background factors are also rarely discussed in innovation and foreign marketing entry with respect to UET.

## 1.1 | Operationalization of the factors

### 1.1.1 | Energy sector SMEs

It demonstrates all those enterprises who are engaged in the production of power products and providing different materials and services to power generations. Currently, CPEC has started work on electricity, gas, and oil exploration in Pakistan, and energy sector companies/firms are engaged to support the process and production. Hence, enterprises connected with these exploration and development are taken into account.

### 1.1.2 | Innovation

#### *Product innovation*

It indicates the development of new products with respect to power generation such as electricity tools, oil exploration machines, gas supply processors, and other related materials that help in exploration and extraction as well as efficient use of gas, electricity, and oil.

*Process innovation*

It is the implementation of a newfangled or ominously upgraded production or delivery method, for instance, significant changes in operations, techniques, equipment, and/or software that assist exploration and extraction of power generations.

*Marketing innovation*

It is the process of implementing new ways of marketing methods that are associated with significant changes in product design, product attributes, product placement, production promotion, and packaging.

*Organization innovation*

It involves innovation and newness in different sectors, processes, and approaches that are directly or indirectly connected with product, process, marketing, technology, strategy, idea, and service.

### 1.1.3 | Participation in CPEC

It demonstrates the behaviors and capacities of firms (hereby energy sector SMEs) who are already engaged or perceived to be engaged in CPEC projects working in China and Pakistan. It is deemed as an internal and external trade activity where Pakistani SMEs will supply different types of products and services to the mega projects of CPEC work in China or Pakistan.

## 1.2 | Theoretical background

UET argues on the importance of the top management background and psychological factors in determining the survival and competitive advantage over its competitors (Hambrick, 2007). In this context, it takes two different lines of thought. One line focuses on the demographic factors such as age, experience, and educational level whereas the other illustrates the psychological attributes of top managers. Both the lines (demographics and psychological) are discussed in the context of organizational success and performance (Ferrier & Lyon, 2004; Hall & Pedace, 2016). However, minor attention is given to the demographic factors concerning innovation and internationalization. We consider top management attributes, namely, age, education, experience, and financial literacy, as crucial factors of innovation that can configure internationalization. Specifically, we discover how top managers of energy sector SMEs are engaged in innovative projects that lead to participating in CPEC. Given the competitive environment, it is very important for the organizations to contest for, and win, the projects for their organizations (Lee & Choi, 2003). Although the organizations must consider their expertise and knowledge base for winning and participation in the upcoming projects, the importance of top management cannot be ignored in this context. In this study, we considered the demographics of the top management in winning important projects, such as their participation in the mega projects in collaborative ways.

In the context of the mega projects, where multiple organizations work together to achieve the targets of the projects, the important thing is the innovativeness of the organization, which is only possible through the idiosyncratic characteristics of the top management (Corley & Schinoff, 2017). In this backdrop, we consider the demographics of the top management and their impacts on their participation in the projects started by the CPEC. Besides, we are also concerned about the various forms of innovative capabilities of the organization such as process innovation, product innovation, marketing innovation, and organizational innovation. In the next section, we draw on these relationships between the demographics of the top management, the organizational innovativeness (process, product, marketing, and organization), and their impact on the CPEC participation.

The internationalization theory (Johanson & Vahlne, 1977) demonstrates why some firms enter into a new market proactively than other firms. The theory further illustrates that a firm with unique capabilities, resources, and skills is likely to make a quick entry into international markets as compared with other firms that have limited resources. We deem participation in the CPEC as an alternative to international markets that will provide a bundle of international business opportunities to Chinese and Pakistani firms. The theory has been rarely assessed in the context of top managers' attributes, innovation, and internationalization, and none of the studies has touched it with the CPEC. Therefore, our research advances our understanding of the internationalization theory and unleashes what attributes lead to innovation—resulting in participation in the CPEC. The consequences of this research facilitate owners/managers of Pakistani and Chinese SMEs in expanding their business operations through the CPEC. Moreover, this research enables them in recognizing the most appropriate and substantial attribute that spurs innovation to enjoy internationalization proactively. In the context of internationalization of the SMEs, the emerging firms need to be more innovative as the processes, products, and marketing strategies are likely to be radically different from those of a typical conventional SME whose target is to serve the indigenous market (Goel & Nelson, 2018; Hsieh, Wu, Lu, & Chen, 2020).

### 1.3 | Demographics of the top management and CPEC participation

There is a strong association between the top management profile and the speed of internationalization as well as the success of firms. In the context of the SMEs, managers' participation in the international level projects is now considered important for their survival and competitiveness. Research shows that there are higher chances of an organization participating in the mega projects if the top management is highly skilled and highly educated and has expertise in the financial management of the organization (Fangrong & Ding, 2013). Among all these, the financial management expertise is the most important, which determines the successful implementation of the projects within the scope and budget of the assigned project (Braojos-Gomez,

Benitez-Amado, & Llorens-Montes, 2015). Concerning our research, we deem participation in CPEC projects as an alternative of internationalization for SMEs through which they can import/export their products, can participate in international business activities, and can build an international network.

Studies have shed light on the role of top managers' characteristics concerning internationalization and export performance. For instance, Ramón-Llorens, García-Meca, and Duréndez (2017) scrutinized the academic level of managers as a key factor of internationalization speed. Manolova, Brush, Edelman, and Greene (2002) state that top managers' factors and characteristics (social capital, education, and experience) are the crucial factors of internationalization speed. Saeed and Ziaulhaq (2019) highlight top managers' experience as the best strategy of the internationalization process. One of the most recent studies conducted by Wrede and Dauth (2020) claims that top management demographic factors significantly influence the internationalization process of firms.

According to the UET (Hambrick, 2007), the demographic characteristics of the top management are one of the most important predictors of the competitiveness and success of the organizations. Research has shown that there are different characteristics that make individuals competitive and competent, such as the age that is related to the experience of the top management in that older managers are likely to have longer experience in multidimensional performance. However, the financial literacy is more important in the context of the SMEs, as mostly the top management are directly involved in the financial matters of the firms, where they have to master their skills in this domain (Ates, Garengo, Cocca, & Bititci, 2013). These financial skills are important in the context of the SMEs because SMEs are generally constrained to operate with limited financial resources. Herrmann and Datta (2005) claimed that top management backgrounds such as age, experience, education, and functional activities influence the internationalization process and international diversification. In the context of Pakistan, CPEC is going to offer opportunities for SMEs for cooperation with other organizations, which in turn will require more financial skills. Research also exhibited a positive relationship between the financial literacy of the top management and their participation in the national level projects, and they are confident and responsible (Santos, 2017). Additionally, a positive significant relationship is found between the top management team, innovation, and internationalization (Wrede & Dauth, 2020). Given these arguments, it is expected that the demographics of the top management are positively related to their participation in the projects of CPEC; therefore, our first set of the hypothesis is as follows:

- H1.** Age of the top managers/owners is positively related to participation in CPEC.
- H2.** Education of the top managers/owners is positively related to participation in CPEC.
- H3.** Experience of the top managers/owners is positively related to the participation in CPEC.

- H4.** Financial literacy of the top managers/owners is positively related to the participation in CPEC.

## 1.4 | Demographics of top management and innovation

According to the resource-based view (RBV) of the firm (Barney, 1991), innovation is very important for an organization to be competitive vis-à-vis the competitors. This argument suggests that the innovative capabilities are inevitable regardless of the nature of the knowledge base of the organization. For example, the RBV theory states that if a firm has unique knowledge (being an intangible resource) about markets and it cannot be imitated by other organizations in the same industry, it will over-perform their counterparts. But we have to acknowledge that no uniqueness is forever. All these innovations are somehow time bound, and sooner or later they become outdated; therefore, continuous innovativeness is important for the firms to maintain its competitiveness for a long term (Briest, Lukas, Mölls, & Willershausen, 2020). Alternatively, if the knowledge is common and shared by other organizations equally, firms will not achieve desirable advantages. In all such cases, only their innovative capabilities will make them more competitive against their competitors (Joo, McLean, & Yang, 2013). In this backdrop, we consider the innovativeness of the professionals working in the organization as an important predictor of the innovativeness within the organizations. For example, age of the professionals would make them more knowledgeable as they would have served in different environments and were exposed to different scenarios where they would have faced different situations and would have contributed by suggesting innovative ways for the improvement of the processes of the organizations. Hence, it can be deduced that such experienced (read more aged) managers can contribute more effectively in the innovative product development of their respective organizations. More exposure to the marketing strategies while working for longer period would give more innovative ideas for the marketing of their products while considering the nature of the new markets.

Similarly, the education level of the top management also helps the organizations in developing their processes and products. If they have learned the new trends through the education system and have had the opportunities in the market to implement their theoretical knowledge, they would be better placed to improve the processes, products, and the market strategy of the firms (Roxas, 2013). In the context of the SMEs, the top management may be the sole proprietor, and the education level may vary from the SME to SME. Thus, frequently, the top decision maker in an SME is the sole decision maker in the firm. It is, therefore, important to assign due weightage to the impact of the education level of the top management on the innovativeness of the firms. Again, as sole proprietors personally look after the operational and financial aspects of the companies, therefore, it is also important for the top management to have more financial literacy to make the organization more competitive and successful. The research demonstrated that the financial literacy of

the top management gives them more confidence to avail new investment opportunities and is able to take informed decision more independently as compared with those who have less or no financial literacy (Corley & Schinoff, 2017). Because most, if not all, of the innovative initiatives have a degree of financial implications, there are greater chances of the top management with higher financial literacy of being willing to invest in the innovative initiatives as compared with those who have lower or no financial literacy. The former would take more informed decision with more confidence and positivity. We considered the innovativeness multidimensionally, such as process innovation, product innovation, marketing innovation, and the organizational innovativeness. We believe the top management's financial literacy would equally positively affect the organizational innovativeness. Hence:

- H5.** Age of the top managers/owners is positively related to the organizational innovativeness (process, product, marketing, and organization innovativeness).
- H6.** Education level of the top managers/owners is positively related to the organizational innovativeness (process, product, marketing, and organization innovativeness).
- H7.** Experience of the top managers/owners is positively related to the organizational innovativeness (process, product, marketing, and organization innovativeness).
- H8.** Financial literacy of the top managers/owners is positively related to the organizational innovativeness (process, product, marketing, and organization innovativeness).

## 1.5 | Innovation and CPEC participation

CPEC participation is considered analogously to be the project winning capabilities of the organizations. In this analogy, we considered the capabilities of the organizations to win more projects, and their winning is determined by their self-efficacy levels. Once they consider themselves as capable enough to participate in mega projects, they would go for it with some homework and some experience at hand, of winning projects and completing them. What determines the confidence and their capabilities is somewhat not very clear and depends on the industry they are working in and what is their zone of proximal development. Their zone is determined by their past experiences of doing similar projects with other more resourceful partners. But the foremost quality of the organization is being flexible and innovative (Carnabuci & Dioszegi, 2015). The research shows that the flexibility and innovative capabilities of the firms help them win big projects. However, the innovativeness capability of the firms is predicted by the professionals working in the organizations. In turn, this depends on the priorities and capabilities of the top management. The only actor in the organizations that triggers the innovativeness is the top management and its confidence in its professionals. In

this line of thought, we argue that the organizational capabilities to innovate their different domains are very important to participate in big projects with bigger partners (Lee & Choi, 2003). The participation warrants innovativeness in the processes of the organizations as the SMEs have to show their flexibilities and their internal urge to innovate the ways of dealing with different processes. In addition, the products need to be developed innovatively in order to win the projects particularly when there are similar SMEs with similar background, capabilities, and financial standings also competing for the contracts. In these circumstances, only the innovative product development would give your edge over the competitors in winning a specific project (Regan, 2000). Finally, the marketing capabilities, given the nature of SMEs with low budgets for the marketing, and the innovative ways of marketing would help them reduce the cost and effectively and efficiently market their product and services. Once they are capable of cutting the cost of marketing through innovative marketing strategies, the SMEs would be confident in participation in the mega projects with the bigger partners, as is the case with the SMEs and the CPEC participation. In this backdrop, our next hypothesis is as follows:

- H9.** Product, process, marketing, and organization innovation of energy sector SMEs are positively related to participation in CPEC.

## 1.6 | Mediating role of innovation

Top managers, owners, and executives are the responsible authorities in making strategic decisions of their firms (Anwar et al., 2018; Papadakis & Barwise, 2002). Their demographic factors such as educational level, experience, age, and psychological traits influence the operational activities and decision-making process (Tian, Zhou, & Hsu, 2020). In this perspective, a key explanation is given by the UET (Hambrick, 2007); top management demographics such as age, education, and experience have a significant influence on firms' behaviors and activities. This in turn influences the firm's performance and productivity. In this perspective, one zone of the research has claimed that top management background knowledge and factors influence internationalization activities and export performance (Filatotchev, Liu, Buck, & Wright, 2009) whereas others believe that many managers of SMEs are unable to succeed in international markets entry primarily due to lower levels of their top management's intellect, education, and exposure (Nguyen et al., 2019; Roy et al., 2016). In the second statement, studies have claimed that top managers of SMEs need support, resources, and capabilities to configure internationally orientated activities prior to entering in a new territory (Li, Yi, & Cui, 2017). This claim is quite true because managers should be aware of market trends, customer choices, and products acceptance before entering in an unknown market. In response to this, managers can emphasize on different types of innovation related to product, process, marketing, and organization. For instance, Johanson and Vahlne (1977) theorized that top managers of businesses



organizations need adequate knowledge and information of international markets in order to stimulate their activities in a unique way while entering into a foreign market. Harmancioglu, Grinstein, and Goldman (2010) also stressed that top management involvement is the key to innovation for high performance and desirable outcomes. Colder (2000) states that senior executives first approach innovation and then enter into international markets.

Talke, Salomo, and Kock (2011) described that top management diversity influences firms' performance through configuring innovation tactics. If business managers try to spur their performance, they need to emphasize on different innovative strategies and innovative activities (Talke, Salomo, & Rost, 2010). Harmancioglu et al. (2010) claimed that top management involvement and functions are necessary for innovative activities to enhance performance outcomes and consequences. Considering the current global atmosphere, it is necessary for executives of enterprises to have adequate financial knowledge and have understanding of financial terms for adopting innovation in emerging economies such as China (Tian et al., 2020). Colder (2000) suggested that managers should be aware of new products and new approaches that are applied and opted in international markets in order to gain a long-term survival. Top management diversity and background factors such as age, education, and experience have a significant influence on innovation activities and innovative strategies that result in high performance (Alexiev, Jansen, Van den Bosch, & Volberda, 2010). To summarize, considering the ample evidence (Boone, Lokshin, Guenter, & Belderbos, 2019; Camelo, Fernández-Alles, & Hernández, 2010; Hsu, Hui-Fen Chen, & Lin, 2008; Shen, Lan, Xiong, Lv, & Jian, 2020), we perceive that top management background factors like age, education, experience, and financial literacy influence the participation of CPEC indirectly through different types of innovation. Therefore, we hypothesize:

**H10.** Product, price, marketing, and organization innovation mediate the relationship between age of top managers/owners and participation in CPEC.

**H11.** Product, price, marketing, and organization innovation mediate the relationship between education level of top managers/owners and participation in CPEC.

**H12.** Product, price, marketing, and organization innovation mediate the relationship between experience of top managers/owners and participation in CPEC.

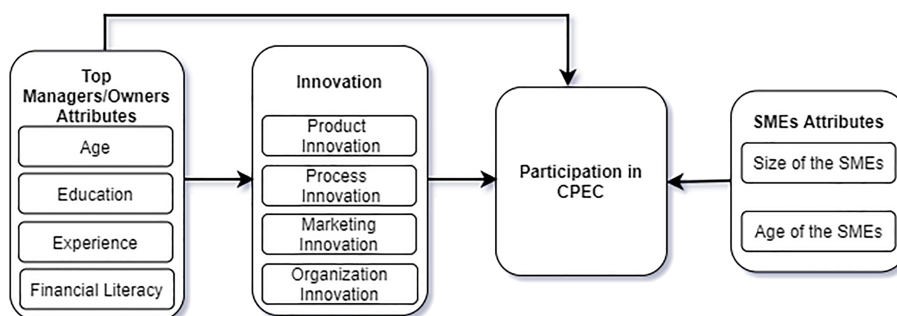
**H13.** Product, price, marketing, and organization innovation mediate the relationship between financial literacy of top managers/owners and participation in CPEC.

## 1.7 | Research model

Figure 1 indicates conceptual model of the study.

**TABLE 1** Frequency analysis of the enterprises

Description	Frequency	Percent
Size of the firms		
1. 20–50 employees	30	14.4
2. 51–100 employees	25	12.0
3. 101–150 employees	53	25.4
4. 151–200 employees	63	30.1
5. 201–250 employees	38	18.2
Age of the firms		
1. 10 years and less	41	19.6
2. 11–20 years	65	31.1
3. 21 and 30 years	64	30.6
4. 31 years and above	39	18.7
Education of owners/managers		
1. Bachelor and below	46	22.0
2. Master	70	33.5
3. MS/MPhil	72	34.4
4. PhD	21	10.0
Age of the owner/top managers		
1. 20–30 years	11	5.3
2. 31–40 years	41	19.6
3. 41–50 years	108	51.7
4. 50 plus years	49	23.4
Total	209	100.0



**FIGURE 1** Research model. CPEC, China–Pakistan Economic Corridor; SMEs, small and medium-sized enterprises [Colour figure can be viewed at [wileyonlinelibrary.com](http://wileyonlinelibrary.com)]

**TABLE 2** Descriptive statistics

MV descriptive	Mean	Median	SD	Kurtosis	Skewness
AgeF	2.483	2.000	1.008	−1.080	0.018
AgeR	2.976	3.000	0.827	0.170	−0.364
CPEC1	3.493	4.000	0.620	−0.293	−0.216
CPEC2	3.397	3.000	0.579	−0.730	−0.336
CPEC3	3.469	3.000	0.579	−0.550	−0.101
CPEC4	3.455	3.000	0.544	−1.045	−0.267
Education	2.397	2.000	1.012	−0.452	0.283
Size	3.258	3.000	1.287	−0.877	−0.384
be1	3.474	3.000	0.642	0.441	−0.174
be2	3.431	3.000	0.616	−0.224	0.143
be3	3.478	3.000	0.612	−0.331	−0.107
be4	3.469	4.000	0.619	0.417	−0.491
be5	3.488	3.000	0.627	−0.258	−0.013
flt1	3.445	3.000	0.609	0.447	−0.235
flt10	3.388	3.000	0.640	0.389	−0.123
flt11	3.340	3.000	0.582	0.691	0.063
flt12	3.301	3.000	0.570	0.975	0.202
flt13	3.349	3.000	0.593	0.864	0.256
flt2	3.311	3.000	0.590	0.727	0.066
flt3	3.397	3.000	0.611	0.472	−0.107
flt4	3.306	3.000	0.564	1.250	0.404
flt5	3.450	3.000	0.640	0.447	−0.086
flt6	3.311	3.000	0.565	0.980	0.224
flt7	3.364	3.000	0.620	0.470	−0.075
flt8	3.311	3.000	0.557	1.303	0.454
flt9	3.397	3.000	0.649	0.392	−0.088
mkti1	3.407	3.000	0.650	0.496	0.088
mkti2	3.493	3.000	0.650	−0.210	0.027
mkti3	3.397	3.000	0.649	0.139	0.547
mkti4	3.541	4.000	0.663	0.469	−0.250
mkti5	3.445	3.000	0.669	0.404	0.058
orgi1	3.464	3.000	0.656	−0.255	−0.225
orgi2	3.445	4.000	0.633	0.204	−0.820
orgi3	3.459	3.000	0.611	−0.395	−0.288
orgi4	3.464	4.000	0.595	0.350	−0.753
orgi5	3.517	4.000	0.692	−0.178	−0.322
orgi6	3.560	4.000	0.560	0.836	−0.815
orgi7	3.488	4.000	0.706	−0.257	−0.450
orgi8	3.574	4.000	0.607	0.907	−0.739
orgi9	3.517	4.000	0.678	−0.147	−0.524
pdi1	3.507	4.000	0.563	−0.686	−0.271
pdi2	3.493	3.000	0.537	−1.093	0.029
pdi3	3.483	4.000	0.554	−0.846	−0.273
pdi4	3.488	4.000	0.571	−0.641	−0.418
pdi5	3.464	3.000	0.545	−0.983	−0.125
pr5	3.474	3.000	0.627	0.451	−0.311

(Continues)



**TABLE 2** (Continued)

MV descriptive	Mean	Median	SD	Kurtosis	Skewness
pri1	3.493	3.000	0.635	0.478	−0.199
pri2	3.498	4.000	0.635	−0.238	−0.104
pri3	3.474	3.000	0.603	−0.337	0.102
pri4	3.545	4.000	0.663	0.538	−0.466

## 2 | METHODOLOGY

### 2.1 | Sample and data

To test the model, we gathered evidence from energy sector SMEs who are operating in the major cities (Rawalpindi, Islamabad, and Lahore) of Pakistan. The reason of choosing energy sector SMEs is because the first priority by policymakers is for this sector. We followed the deductive approach and the convenience sampling method. The questionnaire was prepared in English language because it is easily understood generally by the educated people of Pakistan and in particular by all top managers of SMEs operating in the energy sector. Moreover, the documental language of the business sector is English in Pakistan. We used a formal procedure to finalize the survey before starting data collection. First, we carried out the pretesting of the survey in which the questionnaire was read and verified by experts in relevant fields. There were two sections in the questionnaire. In the first section, questions about innovation and intention to participate in CPEC were asked. In the second section, we asked the respondents to provide data on the demographic factors of top managers/owners and their enterprises. In addition to these two sections, we had also included a cover letter ensuring data's confidentiality to avoid social desirability bias.

We have taken registered firms lists from the chamber of commerce and industry in Islamabad, Rawalpindi, and Lahore. These lists included SMEs of emerging and nonenergy sectors and contained manufacturing, trading, and services enterprises. The lists

identified the nature of businesses (manufacturing, trading, and services) and also sector wise: marble, pipe factory, energy, international trade, consultants, and electric. We randomly surveyed energy sector SMEs from these lists to test the hypothesized model. We distributed 600 questionnaires among the enterprises (200 in each city). We requested top managers to participate in the survey because of the knowledge, power, and awareness of business performance and operational activities. After follow-ups, we received 71 responses from Islamabad, 97 from Rawalpindi, and only 41 from Lahore with response rates of 35.5%, 48.5%, and 20.5%, respectively. All those enterprises that participated in the survey are discussed in Table 1.

### 2.2 | Measurement of the variables

#### 2.2.1 | Demographic factors

In this part, we asked managers/owners about their demographic factors such as their age, education, experience, and financial literacy. The age was measured with 5-point options, indicating 1 = 20 to 30 years, 2 = 31–40 years, 3 = 41–50 years, 4 = 51–60 years, and 5 = 61 years and above. Educational background was also measured using 5-point options, displaying 1 = intermediate and below, 2 = bachelors, 3 = master (16 years), 4 = MS, MPhil (18 years), and 5 = PhD.

We used five items to measure the experience that illustrates experience in trading, imports, and exports. To measure financial

**TABLE 3** Multicollinearity

Factors	CPEC	Marketing innovation	Organization innovation	Process innovation	Product innovation
Size	1.081	-	-	-	-
AgeF	1.068	-	-	-	-
AgeR	1.218	1.108	1.108	1.108	1.108
Business experience	1.225	1.051	1.051	1.051	1.051
CPEC		-	-	-	-
Education	1.393	1.148	1.148	1.148	1.148
Financial literacy	1.271	1.017	1.017	1.017	1.017
Marketing innovation	1.930	-	-	-	-
Organization innovation	1.527	-	-	-	-
Process innovation	1.882	-	-	-	-
Product innovation	1.203	-	-	-	-

Abbreviation: CPEC, China–Pakistan Economic Corridor.

literacy, we also used 13 items related to the management and effective use of financial resources for business operation. The items for experience and financial literacy are obtained from Ying, Hassan, and Ahmad (2019).

## 2.2.2 | Innovation

We used four types of innovation, namely, organization innovation, product innovation, process innovation, and marketing innovation, and measures are adopted from the previous study of Anwar, Zaman Khan, and Ali Shah (2020). The sample item of product innovation is “Developing newness for current products/services leading to improved ease of use for customers and to improved customer satisfaction”; process innovation, “Increasing output quality in built-up processes, techniques, equipment and software”; marketing innovation, “Renewing the distribution channels without changing the logistics processes related to the delivery of the products/services”; and organization innovation, “Renewing the human resources management systems.”

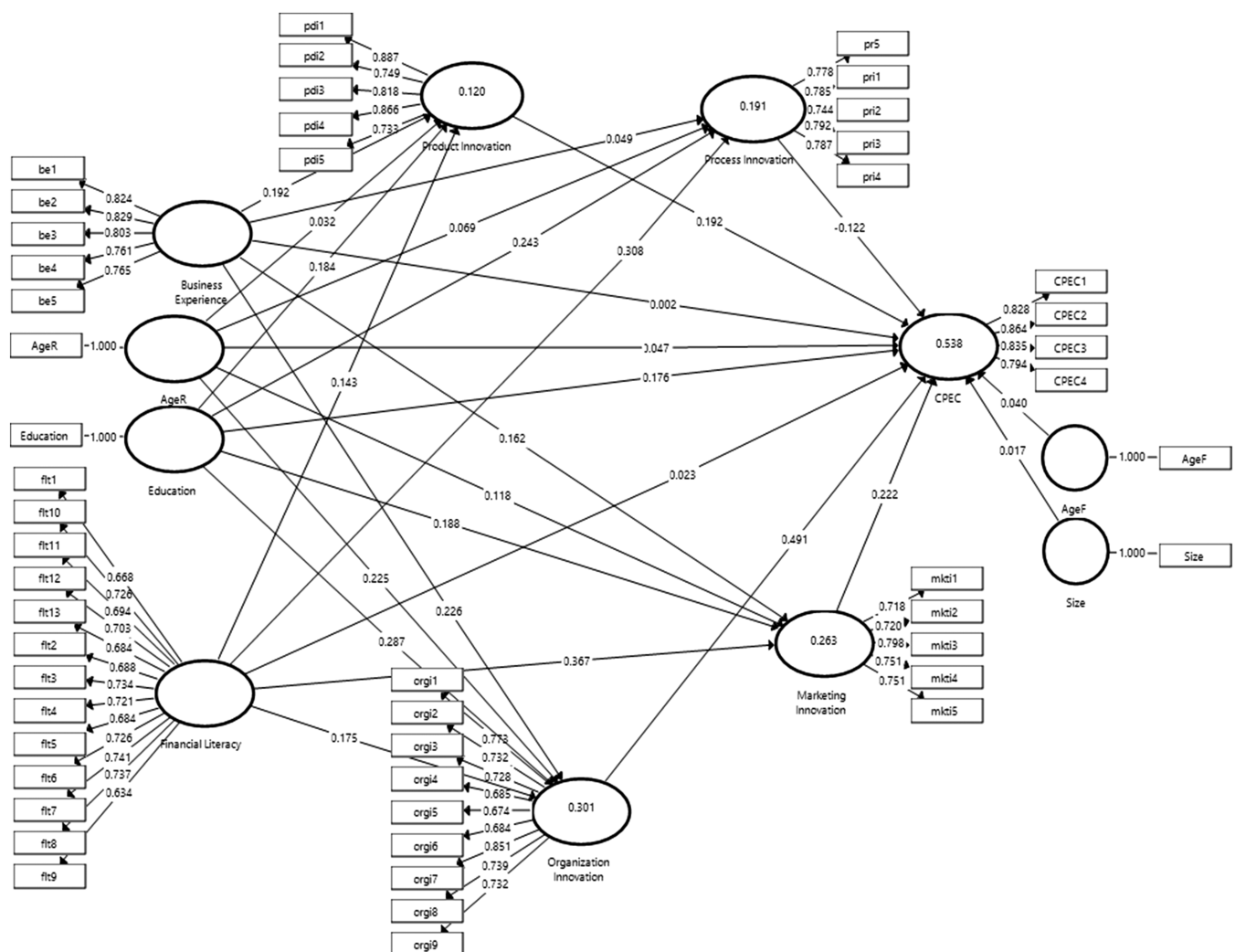
**TABLE 4** Validity and reliability

Construct reliability and validity	Cronbach's alpha	Composite reliability	Average variance extracted
Business experience	.858	.897	.635
CPEC	.850	.899	.690
Financial literacy	.915	.927	.500
Marketing innovation	.804	.864	.560
Organization innovation	.893	.913	.540
Process innovation	.837	.884	.605
Product innovation	.870	.906	.661

Abbreviation: CPEC, China–Pakistan Economic Corridor.

## 2.2.3 | Participation in CPEC

It is another name of doing and participation in international trade and business for Chinese and Pakistani businesses. In other words, it is



**FIGURE 2** Measurement model. CPEC, China–Pakistan Economic Corridor

**TABLE 5** Cross loadings

Cross loadings	Business experience	CPEC	Financial literacy	Marketing innovation	Organization innovation	Process innovation	Product innovation
CPEC1	.22	<b>.828</b>	.196	.25	.577	.211	.277
CPEC2	.233	<b>.864</b>	.241	.339	.546	.276	.264
CPEC3	.226	<b>.835</b>	.189	.336	.485	.284	.375
CPEC4	.23	<b>.794</b>	.142	.277	.538	.238	.294
be1	<b>.824</b>	.231	−.009	.127	.298	.054	.125
be2	<b>.829</b>	.243	.193	.273	.226	.157	.283
be3	<b>.803</b>	.230	.066	.138	.237	.112	.201
be4	<b>.761</b>	.208	.119	.262	.257	.124	.216
be5	<b>.765</b>	.162	.060	.123	.203	.053	.095
flt1	.045	.138	<b>.668</b>	.216	.082	.223	.184
flt10	.018	.077	<b>.726</b>	.226	.119	.254	.072
flt11	.027	.116	<b>.694</b>	.283	.135	.223	.134
flt12	.156	.125	<b>.703</b>	.276	.214	.268	.081
flt13	.14	.199	<b>.684</b>	.323	.190	.257	.111
flt2	.054	.098	<b>.688</b>	.223	.163	.143	.095
flt3	.091	.114	<b>.734</b>	.251	.158	.172	.149
flt4	.013	.168	<b>.721</b>	.306	.146	.249	.084
flt5	.163	.316	<b>.684</b>	.239	.171	.179	.226
flt6	.197	.176	<b>.726</b>	.345	.237	.269	.109
flt7	.057	.123	<b>.741</b>	.313	.152	.286	.145
flt8	−.002	.193	<b>.737</b>	.358	.194	.232	.101
flt9	.074	.216	<b>.634</b>	.262	.101	.246	.139
mkti1	.014	.228	.298	<b>.718</b>	.230	.509	−.034
mkti2	.236	.289	.250	<b>.720</b>	.219	.446	.127
mkti3	.22	.214	.344	<b>.798</b>	.111	.468	.114
mkti4	.218	.295	.274	<b>.751</b>	.175	.505	.223
mkti5	.192	.315	.340	<b>.751</b>	.171	.411	.136
orgi1	.222	.593	.175	.226	<b>.773</b>	.278	.230
orgi2	.224	.544	.29	.191	<b>.732</b>	.232	.163
orgi3	.257	.557	.138	.181	<b>.728</b>	.275	.236
orgi4	.262	.537	.144	.130	<b>.685</b>	.179	.198
orgi5	.236	.231	.183	.089	<b>.674</b>	.235	.096
orgi6	.207	.364	.065	.165	<b>.684</b>	.193	.183
orgi7	.22	.509	.247	.226	<b>.851</b>	.334	.188
orgi8	.245	.427	.104	.159	<b>.739</b>	.188	.164
orgi9	.151	.363	.158	.194	<b>.732</b>	.252	.126
pdi1	.187	.367	.152	.186	.193	.301	<b>.887</b>
pdi2	.154	.268	.178	.134	.100	.247	<b>.749</b>
pdi3	.227	.304	.132	.148	.242	.294	<b>.818</b>
pdi4	.233	.318	.121	.112	.268	.200	<b>.866</b>
pdi5	.192	.216	.147	.059	.194	.161	<b>.733</b>
pr5	.144	.251	.302	.474	.245	<b>.778</b>	.291
pri1	.011	.286	.308	.480	.308	<b>.785</b>	.233
pri2	.146	.206	.17	.468	.214	<b>.744</b>	.152
pri3	.127	.189	.321	.477	.213	<b>.792</b>	.260
pri4	.090	.245	.19	.514	.303	<b>.787</b>	.221

Abbreviation: CPEC, China–Pakistan Economic Corridor. The bold values indicates relevant factor loading.

aligned with internationalization as the enterprises of both countries will participate in it. Hence, the measures used for internationalization process fit for the participation of CPEC. We obtained four items from the study of Anwar et al. (2018) and modified according the objectives of the study.

To measure experience, financial literacy, innovation, and participation in CPEC, we used 5-point Likert scales: 1 = *strongly disagree*, 2 = *disagree*, 3 = *neutral*, 4 = *agree*, and 5 = *strongly agree*. All the items are given in Appendix A.

### 3 | DATA ANALYSIS AND RESULTS

We executed analysis of the data through SmartPLS that are discussed below. SmartPLS is recommended for a complex model (e.g., especially mediation), small sample size, and abnormal data (Hair, Hollingsworth, Randolph, & Chong, 2017). Moreover, SmartPLS provides different types of validity and reliability during

analysis that improve the validity of the results. Additionally, it separates measurement errors from each item and enhances the soundness of the results. However, other software such as SPSS do not provide all the merits. Considering our model, we decided SmartPLS as the best software to test the mediating role of different types of innovation between top managers' attributes and participation in CPEC.

#### 3.1 | Descriptive statistics

Descriptive statistics of the research display mean, standard deviation (SD) normality, and multicollinearity. We found (refer to Table 2) that the average mean (M) of the items is 3 and their average SD is 0.50 to 0.60. Skewness and kurtosis values confirmed that the data are normally distributed as the values are found in the acceptable range  $\pm 2$  (George, 2011). Moreover, our results display that the data are free of multicollinearity issue (see Table 3) as variance inflation factor (VIF) of

**TABLE 6** Correlation matrix

Factors	1	2	3	4	5	6	7	8	9	10	11
1. AgeF	1.000										
2. AgeR	.106	1.000									
3. Buss. experience	-.054	.030	.797								
4. CPEC	.073	.313	.274	.831							
5. Education	.140	.309	.191	.474	1.000						
6. Financial literacy	-.003	.048	.118	.232	.064	.704					
7. Mkt. innovation	-.007	.198	.245	.363	.279	.403	.748				
8. Org. innovation	-.002	.329	.308	.644	.410	.230	.241	.735			
9. Process innovation	.025	.161	.134	.305	.294	.332	.621	.331	.778		
10. Product innovation	.030	.102	.245	.366	.239	.179	.160	.247	.298	.813	
11. Size	.192	.087	.024	.025	.127	-.049	.014	-.050	.080	.032	1.000

Abbreviation: CPEC, China–Pakistan Economic Corridor.

**TABLE 7**  $f^2$  and  $R^2$  tests

$f^2$	CPEC	Marketing innovation	Organization innovation	Process innovation	Product innovation
Size	.001	-	-	-	-
Age of firms	.003	-	-	-	-
Age of respondents	.004	.017	.065	.005	.001
Business experience	.000	.034	.069	.003	.040
Education	.048	.042	.102	.064	.033
Financial literacy	.001	.179	.043	.115	.023
Marketing innovation	.055	-	-	-	-
Organization innovation	.342	-	-	-	-
Process innovation	.017	-	-	-	-
Product innovation	.066	-	-	-	-
$R^2$	.538	.263	.301	.191	.120
$R^2$ adjusted	.514	.249	.287	.176	.102

Abbreviation: CPEC, China–Pakistan Economic Corridor.

all the constructs is placed in the cutoff range (less than 3) as per the recommendation of Fox and Monette (1992).

### 3.2 | Measurement model assessment

In the first attempt of the confirmatory factor analysis via SmartPLS, we ensured validity, reliability, and cross loading of the items and constructs (see Figure 2). The model fits in terms of standardized root mean residual (SRMR) = 0.090 that is below 0.10, and normed fit index (NFI) above 0.90 displays adequate fitness (Browne & Cudeck, 1992).

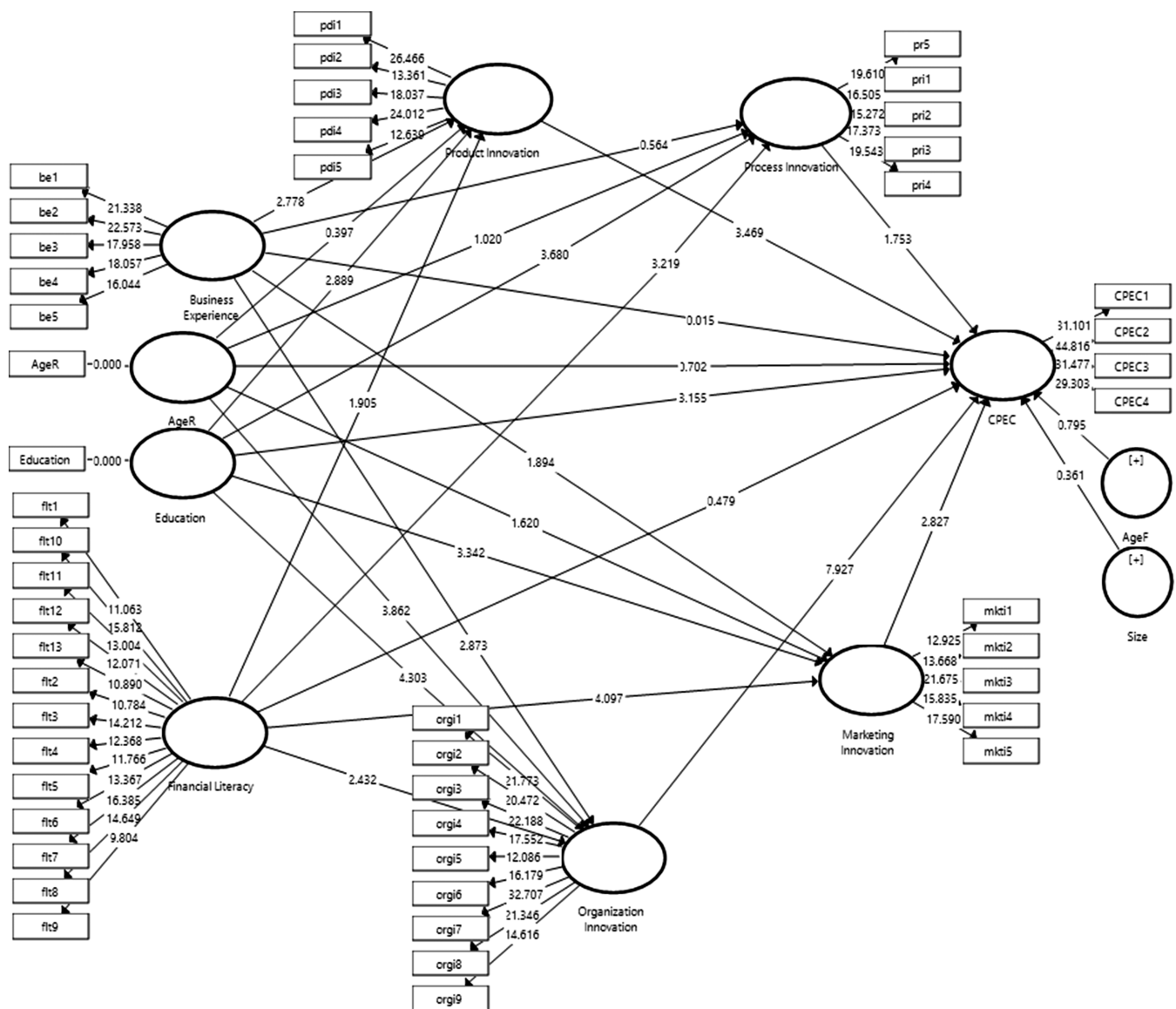
Table 4 displays validity and reliability of the data. Our results confirmed satisfactory convergent validity ( $\geq 0.50$ ), discriminant validity ( $\geq 0.70$ ), and Cronbach's alpha ( $\geq 0.70$ ) as per the suggestion of Yopp (1988) and Curry, Campbell, and Christian (1994). Our analysis

revealed that there is no cross loading (see Table 5) in the standardized loading of the items and overall, all the items show desirable standardized loading ( $\geq 0.70$ ) towards their respective items.

$R^2$  illustrates that 54.8% variation in the participation of CPEC is explained by age, educational background, experience, and financial literacy of the top managers/owners through product, process, marketing, and organization innovation. However, age, educational background, experience, and financial literacy of the top managers/owners explain 12.0% variance in product, 19.10% in process, 26.3% in marketing, and 30.10% in organization innovation.

### 3.3 | Correlation matrix

The correlation matrix displays the relationship between the variables that are shown in Table 6. The table illustrates a positive correlation



**FIGURE 3** Structural model. CPEC, China-Pakistan Economic Corridor

between age of the respondents and the innovation types: product innovation ( $r = .102$ ), process innovation ( $r = .161$ ), organization innovation ( $r = .329$ ), and marketing innovation ( $r = .198$ ). Business experience is also positively correlated with all types of innovation: product innovation ( $r = .245$ ), process innovation ( $r = .134$ ), organization innovation ( $r = .308$ ), and marketing innovation ( $r = .245$ ). Educational background is also positively correlated with all kinds of innovation: product innovation ( $r = .239$ ), process innovation ( $r = .294$ ), organization innovation ( $r = .410$ ), and marketing innovation ( $r = .279$ ). We also found a positive relationship between age and educational background of the respondents and CPEC ( $r = 0.313$  and  $r = .474$ , respectively). Product ( $r = .366$ ), process ( $r = .305$ ), organization ( $r = .644$ ), and marketing ( $r = .363$ ) innovation are positively correlated to CPEC participation.

" $f^2$ " displays the size effect of each exogenous variable in the model (see Table 7). Generally,  $f^2$  values display  $\geq 0.02$  is small,  $\geq .15$  is medium, and  $\geq .35$  is large. In our model, age, educational background, experience, and financial literacy of top managers/owners have a small variance in the participation of CPEC as well as in the types of innovation (product, process, marketing, and organization) because

the values of  $f^2$  are very low. However, only organization innovation displays a medium variance in the participation of CPEC whereas other types of innovation, namely, product, process, and marketing, have a low variance in the model.

### 3.4 | Structural model

We tested the hypothesized model through the bootstrapping of 500-resampling methods in SmartPLS that is present in Figure 3.

Tables 8–10 display direct, indirect, and total effects, respectively. Our results show that age of the top managers/owners has an insignificant influence on CPEC ( $\beta = .047$ ,  $p = .443$ ,  $t = 0.702$ ); so results did not support H1. Educational background has a significant influence on CPEC ( $\beta = .176$ ,  $p = .002$ ,  $t = 3.155$ ), which supported H2. Experience of top managers/owners does not have a significant influence on participation in CPEC ( $\beta = .002$ ,  $p = .988$ ,  $t = 0.015$ ), which did not support H3. Financial literacy also has an insignificant influence on participation in CPEC ( $\beta = .023$ ,  $p = .632$ ,  $t = 0.479$ ) that also not supported H4.

**TABLE 8** Structural model

Direct effects	$\beta$	t statistics	p values
Age of firms → CPEC	.040	0.795	.427
Age of respondents → CPEC	.047	0.702	.483
Size → CPEC	.017	0.361	.719
Age of respondents → marketing innovation	.118	1.620	.106
Age of respondents → organization innovation	.225	3.862	.000
Age of respondents → process innovation	.069	1.020	.308
Age of respondents → product innovation	.032	0.397	.691
Business experience → CPEC	.002	0.015	.988
Business experience → marketing innovation	.162	1.894	.059
Business experience → organization innovation	.226	2.873	.004
Business experience → process innovation	.049	0.564	.573
Business experience → product innovation	.192	2.778	.006
Education → CPEC	.176	3.155	.002
Education → marketing innovation	.188	3.342	.001
Education → organization innovation	.287	4.303	.000
Education → process innovation	.243	3.680	.000
Education → product innovation	.184	2.889	.004
Financial literacy → CPEC	.023	0.479	.632
Financial literacy → marketing innovation	.367	4.097	.000
Financial literacy → organization innovation	.175	2.432	.015
Financial literacy → process innovation	.308	3.219	.001
Financial literacy → product innovation	.143	1.905	.057
Marketing innovation → CPEC	.222	2.827	.005
Organization innovation → CPEC	.491	7.927	.000
Process innovation → CPEC	-.122	1.753	.080
Product innovation → CPEC	.192	3.469	.001

Abbreviation: CPEC, China–Pakistan Economic Corridor.



**TABLE 9** Indirect effects

Indirect effects	$\beta$	t statistics	p values
Age of respondents → product innovation → CPEC	.006	0.387	.699
Age of respondents → process innovation → CPEC	-.008	0.773	.440
Age of respondents → marketing innovation → CPEC	.026	1.281	.201
Age of respondents → organization innovation → CPEC	.112	3.597	.000
Education → product innovation → CPEC	.035	2.218	.027
Education → process innovation → CPEC	-.030	1.398	.163
Education → marketing innovation → CPEC	.041	2.399	.017
Education → organization innovation → CPEC	.143	3.688	.000
Business experience → product innovation → CPEC	.037	2.113	.035
Business experience → process innovation → CPEC	-.006	0.446	.656
Business experience → marketing innovation → CPEC	.035	1.505	.133
Business experience → organization innovation → CPEC	.112	2.548	.011
Financial literacy → product innovation → CPEC	.027	1.554	.121
Financial literacy → process innovation → CPEC	-.038	1.530	.127
Financial literacy → marketing innovation → CPEC	.081	2.046	.041
Financial literacy → organization innovation → CPEC	.087	2.304	.022

Abbreviation: CPEC, China–Pakistan Economic Corridor.

We found that age of the respondents has a significant influence on organization innovation ( $\beta = .225$ ,  $p = .000$ ,  $t = 3.862$ ) but an insignificant influence on other types of innovation: product ( $\beta = .032$ ,  $p = 0.691$ ,  $t = 0.397$ ), process ( $\beta = .069$ ,  $p = .308$ ,  $t = 1.020$ ), and marketing ( $\beta = .118$ ,  $p = .106$ ,  $t = 1.162$ ). The results partially support H5 of the research.

Our results show that educational background of the respondents has a significant influence on innovation: product ( $\beta = .184$ ,  $p = .004$ ,  $t = 2.889$ ), process ( $\beta = .243$ ,  $p = .000$ ,  $t = 3.680$ ), marketing ( $\beta = .188$ ,  $p = .001$ ,  $t = 3.342$ ), and organization ( $\beta = .287$ ,  $p = .000$ ,  $t = 4.303$ ), hereby supporting H6 of the research.

Our results show that business experience has a significant influence on organization ( $\beta = .226$ ,  $p = .004$ ,  $t = 2.873$ ) and product innovation ( $\beta = .192$ ,  $p = .006$ ,  $t = 2.778$ ), whereas it has an insignificant influence on process ( $\beta = .049$ ,  $p = .573$ ,  $t = 0.564$ ) and marketing ( $\beta = .162$ ,  $p = .059$ ,  $t = 1.894$ ) innovation, thereby partially supporting H7.

We found that financial literacy has an insignificant influence on product innovation ( $\beta = .143$ ,  $p = .057$ ,  $t = 1.905$ ) whereas it has a significant influence on process ( $\beta = .308$ ,  $p = .001$ ,  $t = 3.219$ ), marketing ( $\beta = .367$ ,  $p = .000$ ,  $t = 4.097$ ), and organization ( $\beta = .175$ ,  $p = .015$ ,  $t = 2.432$ ) innovation, which partially supported H8.

Our analysis revealed that only process innovation has an insignificant influence on CPEC ( $\beta = -.122$ ,  $p = .080$ ,  $t = 1.753$ ), whereas other types of innovation display a significant influence on CPEC: product ( $\beta = .192$ ,  $p = .001$ ,  $t = 3.469$ ) and marketing ( $\beta = .222$ ,  $p = .005$ ,  $t = 2.827$ ), displaying a partial support for H9.

Considering the mediating role of innovation, our results show that the age of the top managers/owners has an insignificant indirect influence on participation in CPEC through product ( $\beta = .006$ ,  $p = .699$ ,  $t = 0.387$ ), process ( $\beta = -.008$ ,  $p = .440$ ,  $t = 0.773$ ), and marketing ( $\beta = .026$ ,  $p = .201$ ,  $t = 1.281$ ) innovation whereas a significant indirect influence on CPEC through organization innovation ( $\beta = .112$ ,  $p = .000$ ,  $t = 3.597$ ), which partially supported H10. In other words, we can say that only organization innovation plays a partial mediating role between age of the top management/owners and CPEC whereas other types of innovation, namely, product, process, and marketing, do not mediate the relationship.

We found that educational background of top managers/owners has a significant indirect influence on the participation of CPEC through product ( $\beta = .035$ ,  $p = .027$ ,  $t = 2.218$ ), marketing ( $\beta = .041$ ,  $p = .017$ ,  $t = 3.399$ ), and organization ( $\beta = .143$ ,  $p = .000$ ,  $t = 3.688$ ) whereas an insignificant indirect influence on CPEC through process innovation ( $\beta = -.030$ ,  $p = .163$ ,  $t = 1.398$ ), hereby partially supporting H11. It confirms that product, marketing, and organization innovation partially mediate whereas process innovation does not mediate the relationship between age of the managers/owners and the participation in CPEC.

In our results, business experience has a significant indirect influence on the participation of CPEC through product ( $\beta = .037$ ,  $p = .035$ ,  $t = 2.113$ ) and organization innovation ( $\beta = .112$ ,  $p = .011$ ,  $t = 2.548$ ) whereas an insignificant indirect influence through process ( $\beta = -.006$ ,  $p = .656$ ,  $t = 0.446$ ) and marketing innovation ( $\beta = .035$ ,  $p = .133$ ,  $t = 1.505$ ) that also partially supported H12. The results

**TABLE 10** Total effects

Total effects	$\beta$	t statistics	p values
Age of firms → CPEC	.041	0.795	.427
Age of respondents → CPEC	.179	2.705	.007
Age of respondents → product innovation	.032	0.397	.691
Age of respondents → marketing innovation	.118	1.620	.106
Age of respondents → organization innovation	.224	3.862	.000
Age of respondents → process innovation	.069	1.020	.308
Business experience → CPEC	.180	2.696	.007
Business experience → marketing innovation	.161	1.894	.059
Business experience → organization innovation	.226	2.873	.004
Business experience → process innovation	.047	0.564	.573
Business experience → product innovation	.192	2.778	.006
Education → CPEC	.364	5.849	.000
Education → marketing innovation	.188	3.342	.001
Education → organization innovation	.287	4.303	.000
Education → process innovation	.241	3.680	.000
Education → product innovation	.184	2.889	.004
Financial literacy → CPEC	.180	3.040	.002
Financial literacy → marketing innovation	.367	4.097	.000
Financial literacy → organization innovation	.175	2.432	.015
Financial literacy → process innovation	.310	3.219	.001
Financial literacy → product innovation	.143	1.905	.057
Marketing innovation → CPEC	.221	2.827	.005
Organization innovation → CPEC	.498	7.927	.000
Process innovation → CPEC	-.123	1.753	.080
Product innovation → CPEC	.191	3.469	.001
Size → CPEC	.017	0.361	.719

Abbreviation: CPEC, China–Pakistan Economic Corridor.

display that product and organization innovation partially mediate whereas marketing and process innovation do not mediate the path between age of the top managers/owners and the participation in CPEC.

Our findings show that financial literacy has an insignificant indirect influence on the participation in CPEC through product ( $\beta = .027$ ,  $p = .121$ ,  $t = 1.530$ ) and process innovation ( $\beta = -.038$ ,  $p = .127$ ,  $t = 0.387$ ) whereas a significant indirect influence on marketing ( $\beta = .081$ ,  $p = .041$ ,  $t = 2.046$ ) and organization innovation ( $\beta = .087$ ,  $p = .022$ ,  $t = 2.304$ ), which also partially supported H13. It reveals that the relationship between financial literacy and the participation in CPEC is partially mediated by marketing and organization innovation whereas product and process innovation do not mediate.

## 4 | DISCUSSION AND CONCLUSION

Based on the UET, this study examined the influence of top management attributes, namely, age, education, experience, and financial literacy, on the participation of SME firms in CPEC with mediating role

of different types of innovation: product, process, marketing, and organization. By putting forward the types of innovation as mediators, this study explains why some managers/owners achieve high innovative proficiencies whereas others benefit little, if at all, concerning CPEC and internationalization. Broadly speaking, our study makes a significant contribution to UET. For instance, the UET is mostly debated in terms of the relationship between top managers' characteristics and organization outcomes: performance, efficiency, and competitiveness (Nguyen, Rahman, & Zhao, 2018; Solakoglu & Demir, 2016; Tanikawa & Jung, 2019). However, little is known on the relationship between top management background factors, types of innovation, and internationalization, and no attempt has been made so far with respect to participation in CPEC. Consequently, CPEC is being proclaimed as a game-changer for Pakistan; research into various aspects of participation of Pakistani firms, big or small, is of utmost importance for the future economic growth of the country. The results supplement and enrich the discussion of UET in the field of international business and international trade. As noted in our introduction, previous studies have mainly emphasized internationalization and innovation performance as well as the functioning of other

capabilities in the context of UET (Hambrick, 2007). However, our findings extend and advance our understanding of the UET and reveal that other parameters, for example, innovation and CPEC, can also be aligned with top management background factors. The below section demonstrates how top managers' background factors influence innovation and the participation of CPEC. Moreover, our research contributes to the internationalization theory (Johanson & Vahlne, 1977) that has been neglected in the context of top management attributes and innovation. Researchers have not yet recognized how top management background factors facilitate innovation and entry into internationalization markets. Our research reveals that some of the attributes (e.g., education) are more vital for innovation and internationalization as compared with other characteristics. Using the empirical evidence of energy sector SMEs, our research distinguishes the importance of top management attributes in different types of innovation and how it leads to participation in international trade. Contributions of this research for internationalization theory can benefit future researchers who evaluate other trade zones such as Belt and Road. This research delineates the importance of top managers' attributes in the success of internationalization in highly competitive markets. Consequently, to the internationalization theory, findings of this research assist managers in entering new markets through innovative ways.

Our results display that age, experience, and financial literacy of top managers/owners do not significantly influence participation in CPEC but the educational background has a significant influence on CPEC. With respect to age and experience, our findings are not matched with the work of Ates et al. (2013) because the authors revealed that age of top managers is very crucial in multinational companies when they intend to expand their trade. Our results also do not support Reuber and Fischer (1997) who revealed that international experience provides better opportunities to SMEs in entering into international markets and territory. However, our results favor Domurath and Patzelt (2019) who claimed that prior domestic experience diminishes sales intensity of newly born ventures in international markets. Concerning financial literacy, our results are different from previous studies (Jones & Coviello, 2005; Madhok, 1997; Reuber & Fischer, 1997) that pointed out commercial knowledge and literacy as a significant predictor of international and export performance as it enables enterprises in discovery and exploitation of new opportunities. However, our results display that financial literacy does not directly influence internationalization, with respect to CPEC. However, we found that top managers/owners with a high level of educational background significantly influence participation in CPEC, consistent with Saxenian (2012) who revealed that highly educated managers are more likely to trade in international markets because of their awareness and education of foreign trade and regulations. Moreover, Bilkey (1978) also described that a lack of knowledge about market and business can come export barriers. Favoring the notion, Roper and Malshe (2013) also claimed that lack of knowledge is one of the biggest barriers in the internationalization process.

Our results show that the age of the top managers/owners does not have a significant influence on product, process, and marketing

innovation whereas it has a significant influence on organization innovation. Our findings are not related to Cormican and O'Sullivan (2004) because their results display a significant positive association between age (of senior managers) and product innovation. Similarly, Rodenbach and Brettel (2012) claimed that the CEO age influences the development of dynamic capabilities in a competitive environment. However, our findings are relevant to Hambrick and Mason (1984) who claimed that older managers and CEOs are conservative and risk-averse and have difficulty in recognition of new opportunities and new adaptation. We securitized that older managers/owners have a low level of ability towards product, process, and marketing innovation but they have a better understanding of organizational innovation.

We found that the educational background of top managers/owners is a significant predictor of product, process, marketing, and organizational innovation. Our results are consistent with Roxas (2013) who demonstrated that the educational level of top managers displays significant benefits in product innovation, process, and organizational change. Similarly, Lin, Lin, Song, and Li (2011) also revealed that the educational background of managers significantly facilitates innovative activities and innovation in an organization. Energy sector SMEs are more innovative oriented; hence, educational managers get to facilitate them in achieving innovation such as product, process, marketing, and organization.

Our results revealed that top managers/owners with business experience can bring product and organizational innovation whereas they do not have a significant level of ability in spurring process and marketing innovation. Our results are not related to Krasnikov and Jayachandran (2008) as they claimed that CEOs with international and functional experience have higher capabilities of R&D, marketing innovation, and dynamic capabilities. However, our findings favor Ying et al. (2019) who found that business experience enables managers/owners of SMEs in acquiring useful information and resources that are evident for high profitability and performance. Indeed, enterprises need sufficient information and resources for building new products and configuring innovation that can be gained through business experience.

In our research, we found that financially literate managers/owners have a higher intensity of process, marketing, and organization innovation whereas they do not have satisfactory proficiency of product innovation. Our findings do not fully support Purnomo (2019) who claimed that financial literacy significantly influences creative ventures as creativity is aligned with new product development. However, our research confirms that financial literacy is a significant predictor of all types of innovation except the product.

Considering the mediation, our research revealed that only organization innovation mediates the path between age of the top managers/owners and participation in CPEC whereas product, process, and marketing innovation do not play any mediating role. Our results are different from those achieved by Cormican and O'Sullivan (2004) who claimed that senior managers first bring new ideas and unique methods of doing things in order to enter into international markets. Boermans and Roelfsema (2016) also revealed that senior managers

observe innovation and newness in international markets to export their products. However, our sample shows that senior managers/owners do not actively investigate innovative activities for the internationalization process.

We found that only process innovation does not mediate the relationship between educational background and participation in CPEC but the product, marketing, and organization innovation play a significant mediating role. Our results favor Love, Roper, and Zhou (2016) who found that managers with high qualifications engage in innovative activities in order to spur their international process and export. Our research displays that managers with high qualifications tend to build new products, bring newness in different approaches, and adopt new ways of marketing to participate in the CPEC.

Our research shows that product and organization innovation mediate whereas process and marketing innovation do not mediate the relationship between business experience and the participation of CPEC. Our results partially favor Love et al. (2016) who claimed that experienced managers have more ability to bring innovation for international markets as compared with nonexperienced or less experienced managers. We argue that managers with high experience might persistently engage in new product development and new way of doing things in order to make a successful entry into CPEC.

Our analysis displayed that only marketing and organization innovation mediate the path between financial literacy and the participation in CPEC whereas product and process innovation do not play any such mediating role, in line with Mabula and Dongping (2019) and Tian et al. (2020) who pointed out that financially literate people exploit trends and demands of markets and innovate their organizations to increase export activities.

#### 4.1 | Implications for practice

Our study offers several imperative practitioner implications, helping to explain how top managers/owners, CEOs, and entrepreneurs can get benefits by participating in CPEC. First, it suggests top managers/owners to emphasize on innovative activities in order to succeed in international markets or more properly operating in an environment, which is not strictly similar to the domestic market. For instance, trading in international business and CPEC is not an easy task; our research points out the prerequisite abilities that are needed to attain the desired goals. Our results show that enterprises need different innovative tactics to participate in the CPEC. Second, we deduce that the innovative policies with respect to the product, process, marketing, and organization are aligned with top managers/owners background factors: education, experience, age, and financial literacy. Hence, SMEs need to emphasize on educated, experienced, and (financially) literate managers in order to bring up innovation. In particular, if SMEs intend to bring product innovation, they need to focus on hiring experienced and highly educated managers, for improving process and marketing innovation. Financially literate and highly educated managers can be instrumental in bringing about organization innovation; SMEs are advised to focus on hiring and

retaining senior, experienced, financially literate, and highly educated managers. However, our research also recommends SMEs to investigate the insignificant influence of the background factors (age, education, financial literacy, and experience) on the types of innovation (product, process, and marketing). Perhaps an articulated investigation of the insignificant relationship can facilitate SMEs in formulating their strategies and policies for favorable results.

In short, in order to get prepared for operating in the CPEC, SMEs need highly educated, literate, and experienced managerial staff who can bring innovativeness and novel ideas with respect to product, process, marketing, and organization. Especially energy sector SMEs are engaged in newness and unique production to reduce costs and enhance efficiency. Therefore, innovation is worthy for them, which can be spurred through capable and skilled managers. We also scrutinized that various innovative capabilities commit energy sector SMEs towards trading in CPEC.

Although the CPEC is the trade project of China and Pakistan, other neighboring countries can get advantages by expanding export and import through CPEC. SMEs from other countries need educated, experienced, and literate managers to build a favorable relationship with Chinese and Pakistani entrepreneurs in order to open the door to CPEC. Specifically, they need to share innovative ideas with Chinese and Pakistani entrepreneurs to make a successful trade partnership concerning CPEC. Multinational companies also need to start to joint ventures and partnerships with Chinese and Pakistani entrepreneurs to get benefits of the CPEC.

#### 4.2 | Limitations and future studies

Our research has several limitations that may create opportunities for future researchers. First, we used primary data in the cross-sectional nature that provides a specific snapshot. However, in-depth interviews and qualitative data may give more valid and useful insights for implications. Therefore, we suggest interviews with managers to articulate the results in a better way. Second, this research gathered data from 209 Pakistani energy sector SMEs. Therefore, the findings and implications are heavily aligned with the energy sector; thus, our findings may not be generalized to other sectors. In the future, different countries and different industries may be studied to increase the generalizability of our findings. Specifically, data from Chinese SMEs would provide more authentic implications in the context of CPEC. Third, the sample was based on only SMEs, and other firms such as listed and large were not surveyed. Future researchers could add samples of other firms to make the results more valid and reliable. Calof (1993) and Wu and Ang (2020) claimed that large firms have opportunities and abilities in the export business due to their setup, network, and resources. Therefore, it will be worthwhile to explore if CEOs and top management team of listed firms are ready to participate in CPEC. Fifth, our hypothesized model was based on top managers/owners background factors, namely, age, education, experience, and financial literacy, towards innovation and participation in CPEC. We suggest future

researchers consider other factors such as networking, psychological factors, and dynamic capabilities to unleash how certain abilities influence innovation and the participation in CPEC.

## 5 | CONCLUSION

To conclude, our results show that demographic factors of top managers/owners do not directly influence participation in CPEC. The demographic factors such as age of the managers/owners only influence organization innovation, business experience significantly influences product and organization innovation, financial literacy significantly influences process, marketing, and organization innovation, whereas educational background has a significant influence on all types of innovation (product, process, marketing, and organization). Moreover, we find that only product and organization innovation mediate the relationship between age of the top managers/owners and the participation in CPEC whereas process and marketing innovation do not play mediating role. Product, marketing, and organization innovation mediate the relationship between educational background and CPEC whereas process innovation does not. Only the product and organization innovation play mediating role between experience and CPEC. Additionally, only marketing and organization innovation are the significant mediators between financial literacy and CPEC whereas product and process have no mediating role. Our research recommended energy-based SMEs to emphasize on highly educated, senior, and experienced managers to spur their innovative activities and participate in the CPEC.

## REMARKABLE NOTE

In this research, we deem participation in CPEC projects as an alternative of internationalization for SMEs through which they can import/export their products, can participate in international business activities, and can build international network. Therefore, where discuss participation in CPEC, it deliberately delivers alternative meanings of internationalization process.

## ACKNOWLEDGMENTS

This research is funded by the Higher Education Commission (HEC), Pakistan, under the National Research Programs for Universities (NRPU). The project number is 8559/Sindh/NRPU/R&D/HEC/2017. We thank HEC for granting the project.

## ORCID

Muhammad Anwar  <https://orcid.org/0000-0002-2685-4747>

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**How to cite this article:** Shah SZA, Anwar M, Hussain CM. Top managers' attributes, innovation, and the participation in China–Pakistan Economic Corridor: A study of energy sector small and medium-sized enterprises. *Manage Decis Econ*. 2021; 42:385–406. <https://doi.org/10.1002/mde.3242>

## APPENDIX A

### Managers age

1 = 20 to 30 years

2 = 31–40 years

3 = 41–50 years

4 = 51–60 years

5 = 61 years and above

### Educational level

1 = intermediate and below

2 = bachelors

3 = master (16 years)

4 = MS, MPhil (18 years)

5 = PhD

### Experience

1. Domestic business experience

2. Exports and imports experience

3. Problem-solving experience

4. Decision-making experience

5. Resource management and utilization experience

### Financial literacy

1. The manager of this business has basic accounting knowledge

2. We have skills of minimizing losses by minimizing bad debts

3. We have required skills to ascertain the financial trends of the firm

4. The firm is able to correctly calculate interest rates on my loan payments

5. We are aware of the costs and benefits of accessing credit

6. We are aware of the operations of lending firms relating to our financial needs

7. The entrepreneur can prepare basic books of accounts

8. My enterprise operates a savings account

9. The management of this business can compute the cost of its loan funds

10. My enterprise has bought formal insurance for our businesses

11. We receive training on proper bookkeeping skills

12. My enterprise makes monthly income returns to the lender

13. We have the ability to analyze our financial performance periodically

(Continues)

## Product innovation

1. Increasing built-up quality in components and materials of current products/services
2. Decreasing manufacturing/delivering cost and materials of current products/services
3. Developing newness for current products/services leading to improved ease of use for customers and to improved customer satisfaction with respect to electric and energy
4. Developing new products/services with technical specifications and functionalities totally differing from the current ones
5. Developing new services with components and materials totally differing from current ones used in electric and energy accessories

## Process innovation

1. Determining and eliminating nonvalue adding activities in production/delivering processes
2. Decreasing variable cost components in built-up processes, techniques, equipment, and software for electric and energy usage
3. Increasing output quality in built-up processes, techniques, equipment, and software
4. Determining and eliminating nonvalue adding activities in delivery-related processes
5. Decreasing variable cost and/or increasing delivery-related logistics processes

## Marketing innovation

1. Renewing the design of the current or new products/services through changes such as in appearance, shape, and volume without changing their basic technical and functional features
2. Renewing the distribution channels without changing the logistics processes related to the delivery of the products/services
3. Renewing the product/service promotion techniques employed for the promotion of current and/or new products/services
4. Renewing the product/service pricing techniques employed for the pricing of the current and/or new products/service
5. We are focusing market demands and trends and readiness for change in market proactively

## Organization innovation

1. Renewing the routines, procedures, and processes employed to execute the firm activities in innovative manner
2. Renewing the supply chain management systems to facilitate electric and energy companies
3. Renewing the production and quality management systems
4. Renewing the human resources management systems
5. Renewing the in-firm management information system and information sharing practice
6. Renewing the organization structure to facilitate coordination between different functions like marketing and manufacturing
7. Renewing the organization structure to facilitate teamwork for electricity and energy
8. Renewing the organization structure to facilitate project-type organization
9. Renewing the organization structure to facilitate strategic partnerships and long-term business collaborations

## Participation in CPEC

1. Encouraging staff to participate in CPEC
2. Expanding the firm's international operations for the purpose to participate in CPEC
3. Supporting start-up business activities dedicated to CPEC
4. Financing start-up business activities to participate in CPEC

Abbreviation: CPEC, China–Pakistan Economic Corridor.