


Article

Linking Entrepreneurial Skills and Opportunity Recognition with Improved Food Distribution in the Context of the CPEC: A Case of Pakistan

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Abstract: Far-reaching changes in the domestic and global markets are crafting big avenues for farmers and agribusiness entrepreneurs. This study examines the agriculture entrepreneurship and farmers' performance in the context of the China-Pakistan Economic Corridor (CPEC). A survey was conducted to collect primary data from three agricultural zones adjacent to the under-construction CPEC in Pakistan. According to the results, market orientation, entrepreneurial orientation, innovation orientation, and opportunity recognition positively influence agriculture entrepreneurship thereby facilitating timely distribution of food commodities in ensuring food security. Our findings also indicate that uptake of entrepreneurship complements farmers' marketing, operational and economic performance. These findings do imply that improving farmers' entrepreneurial skills is the essential element for their improved performance in terms of locating potential markets and timely delivery of primary commodities, such as food items. It suggests that farmers might seek enormous economic opportunities arising from improved infrastructure, output linkages, connectivity and access to global markets through the CPEC. Based on the findings, the study provides implications for policymakers to channelize the potential endeavors for facilitating the farmers' access to new markets and getting the foremost advantage of Belt and Road Initiative. The study also extends the existing literature on agriculture entrepreneurship-opportunity recognition and access to new markets in a befitting manner.

Keywords: market; agriculture entrepreneurship; food distribution; infrastructure; performance; Belt and Road Initiative

1. Introduction

Farmers' roles are changing in developing and emerging economies where they need to develop new skills to be competitive and more entrepreneurial [1]. Entrepreneurship is a process whereby individuals (entrepreneurs) and firms explore, create and exploit economic opportunities [2], leveraging their skills to push down uncertainties and enhance gains in a proactive way [3]. The emerging economies are highly characterized by growing market and innovation orientation, and expanding their economic foundations in pursuit of global opportunities overlooked so far [4,5], simultaneously increasing market access, individual(s) entrepreneurial capabilities and

performance [6]. In present century, the formation of regional and global strategic ties has triggered the entrepreneurial opportunities and led the world toward geo-economic partnerships to escalate infrastructural development, access to new markets, and improved food distribution [7]. Accordingly, these opportunities can potentially bring social, economic and business gains to emerging market economies through the inflow of knowledge, capital and increased employment [8,9]. Within this framework, economies with entrepreneurial behavior find a profound environment to seek both explicit and implicit benefits through improved connectivity, innovativeness, opportunity recognition and access to new markets [10]. However, infrastructure is one of the biggest problems for many developing countries, such as Pakistan, particularly in the case of roads and rails connecting rural farmers to domestic and foreign markets [11]. According to the World Economic Forum's Global Competitiveness Report 2017–18, Pakistan ranks 77th in quality of roads infrastructure [12]. This creates many problems for agriculture entrepreneurs in the form of higher transportation cost for exporting surplus food (or its by-products), marginal access to local and foreign markets, and therefore, leading to mar their competitiveness [13,14] with competing products and nations along with causing huge fluctuations in food prices and hence creating distortions in food supply and demand [15].

Developing countries have been trying to achieve substantial progress towards the achievement of sustainable development goals (SDGs), although the progress is highly variable across the proposed goals, countries and regions [16]. Eradicating poverty and hunger lie at the heart of SDGs which is related more with food distribution rather than agricultural intensification [17]. Several researchers support the idea that current global food production is sufficient, but the available food is not being distributed equally due to infrastructural, market, cost and physical constraints [17–19]. China's new global initiative, the Belt and Road Initiative (BRI), might play a central role to overcome infrastructure and connectivity problems thereby improving regional integration [20] particularly for Pakistan being highly dependent on primary exports. Under this initiative, several special economic zones, energy, and infrastructural projects (i.e., roads and rails) are being established to strengthen trade, augment financial ties among counterparts and improve connectivity among China, Asia, and the Europe [7,21,22]. The CPEC provides a profound connection between economic hubs or nodes, connects the economic agents along a defined geography and improves market access for agriculture entrepreneurs in Pakistan [7]. Therefore, the CPEC provides colossal opportunities to overcome development issues including poverty and hunger by improving access, linkages and connectivity among local and international markets and fostering sustainable food distribution among the local and regional markets. Likewise, it might play a game-changing role for agriculture sector as it links the majority of big cities, agricultural and industrial zones in the country [13]. On the CPEC front, however, agriculture sector development is one of the seven key areas of cooperation, wherein China is especially interested in investing in or improving irrigation, processing of fruits and vegetables, cotton productivity, post-harvest infrastructure and technology parks [7,23]. Such an intervention is highly useful for agriculture sector being a key contributor in the financial system and comprising a big chunk of country's economy and consumes almost 42 percent of the labor force while contributing around 19 percent to GDP [24]. The agriculture sector is the primary supplier of raw inputs to downstream industrial sector which is significantly contributing to the country's exports. On the other hand, it is the largest market for local industrial/manufactured goods, such as fertilizers, pesticides, and agriculture equipment. This sector comprises of five sub-sectors viz, livestock, major crops, minor crops, forestry, and fisheries, whereas livestock sub-sector is the largest one with 59 percent share in agricultural GDP [25]. However, this sector's contribution to foreign exchange earnings is not as high as it ought to be [26]. Nonetheless, one of the objectives behind the CPEC development is to restructure the country's agriculture sector where fostering infrastructure can definitely serve in allaying the barriers and bottlenecks on the way from production to export [7,27]. Besides having surplus agricultural production in the form of grains and sugars, Pakistan currently exports only one percent of food products to China, while China is the world's biggest importer of agricultural products with over \$100 billion food imports a year [28]. According to Ahmed and Mustafa [29] the

CPEC crafts several opportunities for the agriculture sector by enhancing farmers' access to Chinese markets and beyond. Thus, it is obvious that this project is an excellent opportunity which can spur considerable growth for agriculture and allied sectors [29,30] but at the same time ensuring sustainable development by combating food insecurity via improved distribution with possible implications for increased farm productivity

For the past three decades, it has been widely acknowledged that market orientation, innovation orientation and entrepreneurial thrust have greatly transformed farmers' role from ordinary producers to entrepreneurs [31–33]. According to Awan and Mustafa [33], increasing economic pressure coupled with growing food demand has altered the farmers' role in Pakistan as today's farmer elsewhere in the world is employing entrepreneurial gadgets to create, chase and explore economic opportunities. Likewise, while studying the role of agriculture entrepreneurship in India and China, Zhang, Qi [34] note that innovation orientation and market orientation have assisted the farmers in moving beyond traditional means of farming, and therefore, being agricultural entrepreneurs, farmers are aggressive to goals, flexible in decision making, efficient in technological adoption, proactive and consistent in pursuit of better performance. Whereas, Rahaman, Rahman [35] conducted an empirical study in Bangladesh and found that agriculture entrepreneurship contributes to boost farmers' capabilities, improve food production and distribution, enhances their profitability and encourages nascent agriculture entrepreneurs to gain a competitive advantage in new markets. Likewise, in Malaysia, Ismail [36] notes a significant role of farmers' skills and innovation orientation in seeking trade advantage and internationalization. Further, Ismail, Domil [37] in another study on Malaysia, argue that there is vast room for budding, but resource-constrained, entrepreneurs to grow faster and gain sizable business expansion in internationalization. Cannavale and Nadali [38] examined the role of entrepreneurial orientation and farmers performance in Iran and complement that EO equips farmers with knowledge-based market information which enhances their risk-taking ability and leads to improved performance. However, empirically, there are mixed findings related to nascent entrepreneurship development and hunting opportunities in new markets. Only a few studies [39,40] contradict and report that although budding agriculture entrepreneurs contribute to growth, they fetch lower trade advantage.

This study contributes to finding the impact of opportunity recognition on agriculture entrepreneurship and farmers entrepreneurial performance. The CPEC is providing agriculture sector with numerous opportunities conditioned upon farmers' potential capabilities to harvest such gains which then rely heavily on their entrepreneurial skills and performance to imitate arising opportunities and seek profound economic gains [27,29]. The uptake of agriculture entrepreneurship has been widely acknowledged in opportunity recognition [41,42], resource leveraging [43], enhancing the range of product markets [44] and employing advanced means of logistics to access new markets [45,46], ultimately alleviating farmers' status and development of the agriculture sector.

To summarize, utilizing the profound and untapped opportunities arising along the CPEC would become unrealized, thereby becoming a challenge with lower entrepreneurial skills. In this regard, this study specifically aims (1) to investigate the current status of entrepreneurial skills being practiced by farmers, (2) to examine the influence of opportunity recognition on agriculture entrepreneurship, and (3) to find the impact of agriculture entrepreneurship and opportunity recognition on farmers performance. Additionally, this study, through an evidence-based approach, highlights the scope of agriculture entrepreneurship development in improving the food distribution while taking advantage of the CPEC and BRI.

To accomplish the proposed research objectives, this article is constructed as follows: The subsequent section presents the conceptual framework and research hypotheses development. Subsequently, research methodology results and discussions are presented. Finally, conclusions, outlook, limitations, and future research recommendations are examined.

2. Conceptual Framework and Research Hypothesis Development

2.1. Conceptual Framework

Fostering farmers' entrepreneurial skills is fundamentally required to improve performance and facilitate the uptake of entrepreneurial opportunities [47]. Advanced entrepreneurial capabilities and skills are prerequisites in a rapidly changing market environment to seek and build on new opportunities which require proactively behaving entrepreneurs to effectively capture the potential and its further expansion on a sustainable basis [4]. However, discovering new opportunities has been associated with personal disposition, prior experience, gaining specific event information, and farmers' skills and insights [48]. Opportunity recognition helps farmers in systematically formulating plans to engage in entrepreneurial activity, helping to generate, organize and interpret information into various domains of knowledge, boosting performance and chasing new opportunities. Thus, opportunity recognition is an idea that has enormous potential to substantially add in the level of understanding about agriculture entrepreneurship and shows how new market opportunities get initiated and proactively pursued. Further, improved connectivity, networking, and better logistical facilitation would pave a nice way to increased/better food production as well as food distribution. It would work as a double-edged sword—on one hand providing timely inputs, information, implements, technology with improved infrastructure leading to increased food productivity but also helping out to reach neglected or difficult areas with poor linkages—and would further the economic gains for the farmers by targeting otherwise neglected markets due to poor connectivity, information transfer and price transmission. Despite its potential, the role of opportunity recognition in agriculture entrepreneurship and farmers' performance remains understudied due to lack of adequate tools to rigorously investigate it.

We establish a framework and postulate a mediating role of agriculture entrepreneurship between opportunity recognition and farmers' entrepreneurial performance. For this purpose, one superior order latent variable is formulated from the first order-latent variables. To explain this point, second-order latent variable agriculture entrepreneurship is reflexively formulated by the first-order latent variables viz: market orientation (MO), innovation orientation (IO), and entrepreneurial orientation (EO). To utilize superior-order latent variable, structural model is crucial which allows greater statistical robustness and theoretical parsimony while avoiding model complexity [49]. Hair, Hult [50] summarize this point as a theoretical utility, i.e., theory requires general constructs consisting of particular facets or dimensions. It also makes two hypotheses, based on the influence of opportunity recognition on agriculture entrepreneurship, and the impact of agriculture entrepreneurship on farmers' entrepreneurial performance (see Figure 1).

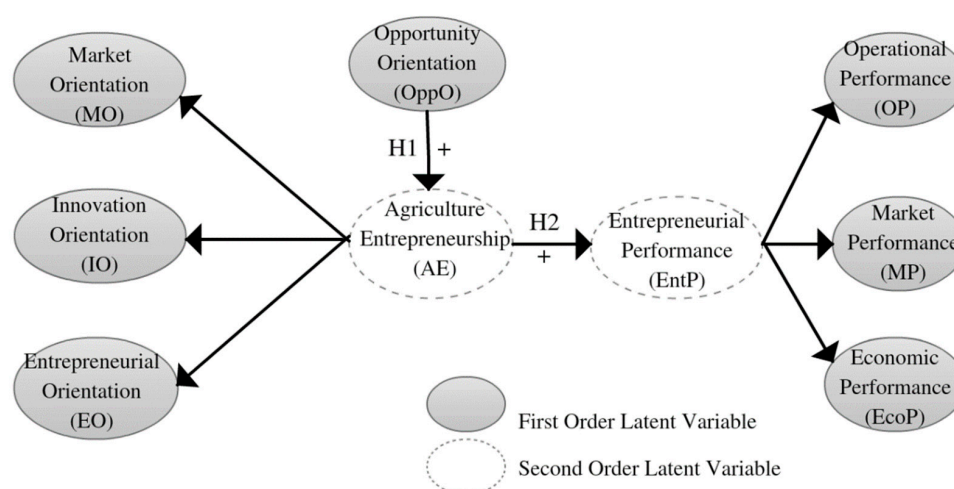


Figure 1. Conceptual Framework of Agriculture Entrepreneurship and Farmers' Performance.

2.2. Market Orientation and Entrepreneurial Performance

Market orientation has been globally recognized to have a significant impact on entrepreneurial performance [51,52]. The literature on entrepreneurship explains two perspectives of market orientation and its viability in entrepreneurial performance [53,54]. The first one pertains to revealed behavioral aspects [55] by taking market intelligence as the key element rather than customer focus. Conversely, the second opinion is based on cultural aspects [56] which mainly focuses on behavioral dimensions, such as competitor orientation, customer orientation, and inter-functional coordination. Both opinions have their rigorous suitability and implications in assessing the market orientation and entrepreneurial performance. In this regard, a study by Bjerke and Hultman [57] reveal the robustness of market orientation among emerging entrepreneurs and its role in seeking opportunities inter alia trade and internationalization. In addition, Kraus, Harms [58] note that market orientation escorts farmers toward entrepreneurial orientation, which adds risk orientation, resources leveraging, capacity building, innovativeness, communication with counterparts and leads towards leapfrog growth in the business. Consequently, it allows nascent entrepreneurs to hunt advantage of overlooked business opportunities and gains that promote sustainable entrepreneurship development [59].

2.3. Entrepreneurial Orientation and Market Capture

In the recent past, academic and business organizations have centered their focus on entrepreneurial orientation (EO) in understanding its role for seeking trade advantage in internationalization [60,61]. EO has helped emerging entrepreneurs in innovation, opportunity orientation, risk-taking and compliance with proactive behavior to seek economic opportunities locally and globally [62]. In addition, entrepreneurial orientation has been deliberated to have mammoth contributions in economic and non-economic development of economies [63]. Several studies have analyzed the substantial role of emerging entrepreneurs in international trade and the development of business activity across the world. Currently, numerous emerging firms have improved, sustained, flourished, and recognized their sizeable economic worth through EO in internationalization and thinking beyond borders [64], thereby reducing reliance on domestic markets [65]. According to the review by Ho, Nguyen [66], EO has the ability to equip emerging entrepreneurs with multi-dimensional strategies to compete, innovate, grow, and gradually capture large scale market shares. Furthermore, EO in internationalization leads emerging entrepreneurs toward competence, innovation, and reshaping the economies [67].

2.4. Innovation Orientation and Productivity Enhancement

Innovation orientation (IO) has been found as a driver of business productivity and an accelerator of economic growth [68,69]. IO involves transformation of knowledge to create new products, services, and businesses [70]. The significant relationship between business outputs and innovation orientation has been revealed extensively [71,72]. Numerous researchers have attempted to show that emerging agriculture entrepreneurs are likely to be more innovative due to their small size, which enables them to seek advantage of their geographical location [73–75]. However, emerging firms need more research and development (R&D) activity to continue innovation orientation as firms engaging in R&D activities increase their existing knowledge pool ultimately enabling them to embrace commercial gains [75]. Moreover, Prajogo [76] explained that innovation orientation is a contemporary tool to boost productivity, human resource management, different product attributes, orientation to new markets and enhance profitability.

2.5. Opportunity Recognition and Agricultural Entrepreneurial Uptake

The emergence of new business ideas and how such ideas can be transformed into business opportunities are central to the field of entrepreneurship [48]. Several factors causing opportunity emergence include: infrastructure transformation, prior experience, gaining new venture-specific information, personal disposition, and changes in the broader economic environment [77,78]. Several

recent researchers have contributed to advance the stance that alertness and opportunity recognition involve a number of cognitive processes and capabilities in which opportunity pattern recognition and social interactions are important [79–81]. Furthermore, hunting new business opportunities has been connected to individual skills, education, experience, and awareness. Opportunity recognition is a perspective as well as a process that helps individuals to be more aware of opportunities, resource shifts, changes and overlooked but workable possibilities [82]. It leads to systematic development and enables individuals to categorize, organize and interpret raw information into different domains of actions using appropriate knowledge on new economic opportunities [80]. Thus, opportunity orientation is the basic concept that has enormous potential to add substantially to understand how new business ideas emerge and how they can be pursued [83]. Successful entrepreneurs are those who identify and select the right opportunities and pursue these opportunities timely using their prior knowledge and networking [84]. According to Kirzner [85], entrepreneurs start to think, critically analyze, deploy resources and undertake a new business activity or expand existing venture into new product market when they envisage a new opportunity. Therefore, identification of new business opportunity lies at the heart of entrepreneurship research. In addition, an entrepreneurial process starts with opportunity orientation/recognition and undertakes new ideas that are viable to further exploration leading to the development of new products, services, and processes [86]. To our knowledge, in Pakistan, this is the first study to address agriculture entrepreneurship and opportunity recognition in the context of the CPEC.

In the light of the above arguments and with the aim of identifying agriculture entrepreneurship in Pakistan in context to new global markets through the CPEC, the first hypothesis was developed as follows:

Hypothesis H1. *Opportunity orientation positively influences the farmers in Pakistan to pursue agriculture entrepreneurship.*

2.6. Agriculture Entrepreneurship and Agrarian Performance

With an increased level of globalization and market integration, the rural economy has greatly transformed and is highly influenced by the agriculture-entrepreneurs who are the economic agent and more responsive to changes in market structure and opportunities [87,88]. Put differently, agriculture-entrepreneurs are relatively more connected to industry, supply chains and comparatively active and efficient in the creation of new networks resulting in better performance [88] which in turn solely depends on the entrepreneurial capacity of the farmers [89]. Within the emergence of entrepreneurship in agriculture, farmers seek advanced, efficient and profitable ways of production and marketing being more open to innovations contributed by their partners or other economic agents [90]. On the other hand, a few decades ago, farmers were using traditional practices and they were seen as price takers, while the agriculture sector used to be non-competitive and concentrated. Nowadays, farmers are more competitive through an increased level of market integration thus improving their operational and economic performance [91].

Agriculture entrepreneurship is significantly contributing to improve farmers' market and economic (financial and non-financial) performance in many ways [92]. Improved financial performance minimizes costs, spurs business growth, profitability and sustainability [93]. On the other hand, non-financial performance contributes to entrepreneurial skills, self-sufficiency and satisfaction among farming-entrepreneurs [94]. Alternatively, with the inclusion of entrepreneurship, financial and operational performance of agriculture has received growing interest among researchers and practitioners [95].

Several studies [96–98] have found that the emergence of entrepreneurial practices in agriculture is significantly associated with farmers' economic and market performance. Some studies [99,100] evidently reflect that agriculture entrepreneurship is positively associated with farmers' operational performance. While looking at the role of agriculture entrepreneurship in economic performance,

Fitz-Koch, Nordqvist [1] note a significantly positive contribution of the former through innovative interventions in exploring niche and rewarding markets and their performance at market place to fetch better returns for their produce. This is mainly achieved by an increased understanding of consumer behavior and societal preferences leading to timely addressing their needs for his (farmer's) gain in terms of revenue and repute thus providing a basis for sustainable enterprise development. Hence, the role of agriculture entrepreneurship is critical in economic, operational and market performance particularly in a developing country setting, such as Pakistan. Such a nexus has been found to prevail in case of many developing countries in the region, such as India, China, Bangladesh, and Iran.

A handful of research related to agriculture entrepreneurship and farmers' performance mostly deals with only one or two aspects. This study takes up three (e.g., operational, market, and economic) aspects of their performance in considerable detail with some practical insights. Therefore, in order to prove a possible association of agricultural entrepreneurship with the operational, market, and economic performance of farmers, we propose the second hypothesis as follows:

Hypothesis H2. *Adaptation of entrepreneurial practices in agriculture positively impacts the operational, market and economic performance of farmers in Pakistan.*

In a nutshell, Hypotheses H1 and H2 above aim to evaluate the importance of agriculture entrepreneurial practices in Pakistan given the dearth of literature on this subject related to study area and countries with similar conditions [101]. Therefore, the present study provides valuable and context-specific insights to address issues pertaining to agricultural entrepreneurship for its transformation to achieve sustainability in the form of increased productivity, better access to markets (input and output) and development of viable linkages with allied industries for value addition and ultimately export promotion through the CPEC.

3. Method

3.1. Research Site and the Sample

The population for this study was framed from three out of nine major economic zones in Pakistan. Under the CPEC project, several special economic zones, industrial estates, business parks and export processing zone are being established across the country [7,102]. For that purpose, Allama Iqbal Industrial City, Rashakai Economic Zone, and Bostan Economic Zone were selected as these three are key zones for agriculture sector under the CPEC (see Figure 2).

Among selected zones; (1) Allama Iqbal Industrial City has a large food processing, textile, and agriculture industry; (2) Rashakai Economic Zone specializes in fruits and food processing and packaging industry; and (3) Bostan Economic Zone is earmarked for fruit processing, agriculture machinery, cooking oil, and halal food industry. Therefore, all of the selected zones are included in the study and are critical to examine for the chosen context under the CPEC.

Among each economic zone, 100 farmers engaged in agriculture at a commercial level were randomly selected for data collection by means of systematic sampling. The systematic sampling is a probabilistic sampling technique recommended by Forza [103]. A farmer was the potential respondent of this study if he was selling more than 50 percent of his farm produce in the market. All of the farmers were primary producers and were using various channels to sell their farm produce. In order to be consistent with the key objective of food distribution, forward contactors, commission agents and millers/exporters (20 + 20 + 20) who were directly linked with food distribution and engaged in fruits, vegetable, and grain market were also interviewed. In this regard, Table 1 shows the description of farmers' selected channels for the disposal of their farm produce.



Figure 2. Research site and selected Special Economic Zones.

Table 1. Description of marketing channels for farm produce.

| Channels | Percentage |
|-------------------------------|------------|
| Local collectors | 19.74 |
| Traders/commission agents | 34.60 |
| Millers | 8.40 |
| Exporters | 17.68 |
| Nearby households (consumers) | 11.25 |
| Others | 8.33 |

Source: Author’s calculation based on the survey data.

3.2. Construct Formulation and Survey

To test the proposed hypotheses, a survey was conducted as per Forza [103]. For that purpose, a well-prepared questionnaire consisting of close-ended questions was used as the main instrument of this study, while its validity was confirmed under the directions of experts in universities and field. An actual field survey was conducted between June and September of 2018, for data collection from the farmers. After conducting a usual pilot study, the final questionnaire covered three key aspects: (1) opportunity orientation (OppO) that motivates or affects farmers in the adoption of agriculture entrepreneurship (AE), (2) adoption of various entrepreneurial practices including market orientation (MO), innovation orientation (IO) and entrepreneurial orientation (EO), and (3) farmers’ entrepreneurial performance segregated into market performance (MP), operational performance (OP), and economic performance (EcoP). Table 2 lists all constructs and respective measures used in their estimation. As can be seen, constructs and respective measures used in this study are based on Jones and Rowley [104], Krueger [77] and Mcelwee and Atherton [87]. Although, all of these studies were conducted in countries other than Pakistan, these studies have provided a validated and recognizable scale to measure the agricultural entrepreneurship, its role in farmers’ performance, and the relationship between opportunity orientation and agricultural entrepreneurship.

Table 2. Constructs and respective measures used in the study.

| Latent Variable (LV) | Manifest Variable (MV) | Measure Code |
|----------------------------------|---------------------------------------|------------------------|
| Market orientation (MO) | Customer orientation | MO1 |
| | Market Intelligence | MO2 |
| | Responsiveness to market signals | MO3 |
| | Use of e-commerce | MO4 |
| | Research & Development (R&D) | IO1 |
| Innovation orientation (IO) | Technological Adoption | IO2 |
| | Flexibility in decision making | IO3 |
| | Team work | IO4 |
| Entrepreneurial Orientation (EO) | Pro-activeness | EO1 |
| | Risk taking | EO2 |
| | Speed to market | EO3 |
| | Innovativeness | EO4 |
| | Autonomy | EO5 |
| Opportunity orientation (OppO) | Entrepreneurial alertness | OppO1 |
| | Prior knowledge | OppO2 |
| | Field experience | OppO4 |
| | Social networks | OppO5 |
| | Resource leveraging | OppO6 |
| | Active search | OppO7 |
| | Operational performance (OP) | Methods and techniques |
| Efficiency and effectiveness | | OP2 |
| Business reliability | | OP3 |
| Marketing performance (MP) | Market predictability | MP1 |
| | Competitive advantage | MP2 |
| | Size and scale | MP3 |
| Economic performance (EcoP) | Profitability | EcoP1 |
| | Financial | EcoP2 |
| | Non-financial (e.g., business skills) | EcoP3 |

Source: [77].

3.3. Empirical Model

After data collection, returned questionnaires were verified to analyze the consistency and adequacy of the responses provided by the interviewees. From a total of 296 questionnaires received, 36 were discarded due to missing sections and inconsistencies.

The remaining 260 questionnaires were further processed using SmartPLS 3.0 software [105] after data entry and cleaning. As PLS is a non-parametric technique, it is highly recommended for studies with small sample size as it has the ability to achieve high levels of statistical power by avoiding distributional assumptions [106]. Moreover, owing to the high degree of precision and flexibility, PLS provides useful tools to better understand the linkage between theory and data [107], which seems highly relevant in the current state of research in agriculture entrepreneurship, especially concerning the development of hierarchical models.

To evaluate the existence of a relationship between latent variables or constructs, PLS uses a series of non-linear equations. The researchers who reported other successful applications of non-linear structural equation models include Vanalle, Ganga [108], Valipour and Eslamian [109], and Godinho Filho, Ganga [110]. The sample sizes used in their studies were in the same range as this study and PLS revealed consistent and robust findings linking agricultural entrepreneurship with farmers' performance in the present case.

4. Results

4.1. Measurement Model

In this study, we checked model fit indexes before testing the proposed hypotheses. In this step, all the indexes for the designed structural model indicated an accepted fit (GFI = 0.92; χ^2 test statistics/df = 2.79, CFI = 0.94, AGFI = 0.93, NFI = 0.92, RMSEA = 0.05). Thus, these statistics provide justification to do further analyses. Based on the results of SEM, the proposed study hypotheses were analyzed. The results of the measurement model from the fit-structural model are shown in Table 3.

Table 3. Measurements of the model-fit-structural model.

| Goodness of Fit Measures | Recommendation Value | Structural Model (Results) |
|---|----------------------|----------------------------|
| χ^2 test statistics/df | <3.00 | 2.79 |
| GFI (goodness-of-fit index) | <0.90 | 0.92 |
| CFI (comparative fit index) | <0.90 | 0.94 |
| AGFI (adjusted-goodness-of-fit index) | <0.90 | 0.93 |
| NFI (normed fit index) | <0.90 | 0.92 |
| RMSEA (room mean square error of approximation) | <0.08 | 0.05 |

Source: Putrevu and Lord [111].

Using SmartPLS 3.0, a validation and reduction procedure was undertaken for each manifest variable (MV) of the construct before building a structural model. Based on structural equations, PLS provides a second-generation multivariate evaluation method [105,112].

To execute validation and reduction process of the manifest variables (MV) in each construct, the following statistical parameters were used to test the reliability and quality of the constructs: (a) composite reliability (CR) ≥ 0.7 , (b) average variance extracted (AVE) ≥ 0.5 , (c) loading of manifest variable (MV) ≥ 0.7 , (d) communality ≥ 0.5 ; Cronbach's Alpha ≥ 0.7 , and (d) number of items per construct ≥ 3 , following Hair, Sarstedt [112] and Peng and Lai [113]. AVE measures the convergent validity of a latent construct. It also measures the degree at which latent construct describes the variance of all its measures. CR is the best measure of internal reliability and consistency of construct. Communality explains how much of the total variation in an item is being explained by the construct and it is referred as variance extracted from that item [106].

4.2. Discriminant Validity

The discriminant validity of the constructs was examined using criterion from Hair, Sarstedt [112], whereby the average variance shared between each of the constructs and its measures should be greater than the average variance shared between one construct and all other constructs. Therefore, the square root of the AVE for each construct was found to be greater than the correlations of all constructs with other constructs. This, therefore, implies the presence of adequate discriminant validity and concludes that each construct significantly differed from the other constructs, as shown in Table 4.

Table 4. Discriminant validity among constructs.

| | AE | EcoP | EO | EntP | IO | MO | MP | OP | OppO |
|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| AE | 0.836 | | | | | | | | |
| EcoP | 0.684 | 0.847 | | | | | | | |
| EO | 0.892 | 0.672 | 0.916 | | | | | | |
| EntP | 0.815 | 0.912 | 0.782 | 0.941 | | | | | |
| IO | 0.829 | 0.529 | 0.700 | 0.655 | 0.852 | | | | |
| MO | 0.675 | 0.335 | 0.509 | 0.400 | 0.506 | 0.812 | | | |
| MP | 0.734 | 0.651 | 0.694 | 0.856 | 0.640 | 0.341 | 0.863 | | |
| OP | 0.758 | 0.775 | 0.721 | 0.901 | 0.581 | 0.391 | 0.636 | 0.918 | |
| OppO | 0.759 | 0.594 | 0.584 | 0.690 | 0.489 | 0.314 | 0.595 | 0.656 | 0.782 |

Note: Diagonals represent the square root of the average variance extracted.

4.3. Structural Model Testing

As per observation of Guinot, Latreille [114], the existence of superior-order latent variable occurs in a specific condition when all of the latent variables are also correlated. Table 4 shows correlations among all constructs related to opportunity orientation, agriculture entrepreneurship and entrepreneurial performance of farmers' (operational, market and economic).

From all the possible correlations among constructs, all of the correlations are significant ($p < 0.05$). Hence, this confirms that possible superior-order latent variables exist. Figure 3 represents the initially generated hierarchical structural model. Table 5 lists all the statistical quality and reliability indicators of the initially generated hierarchical structural model.

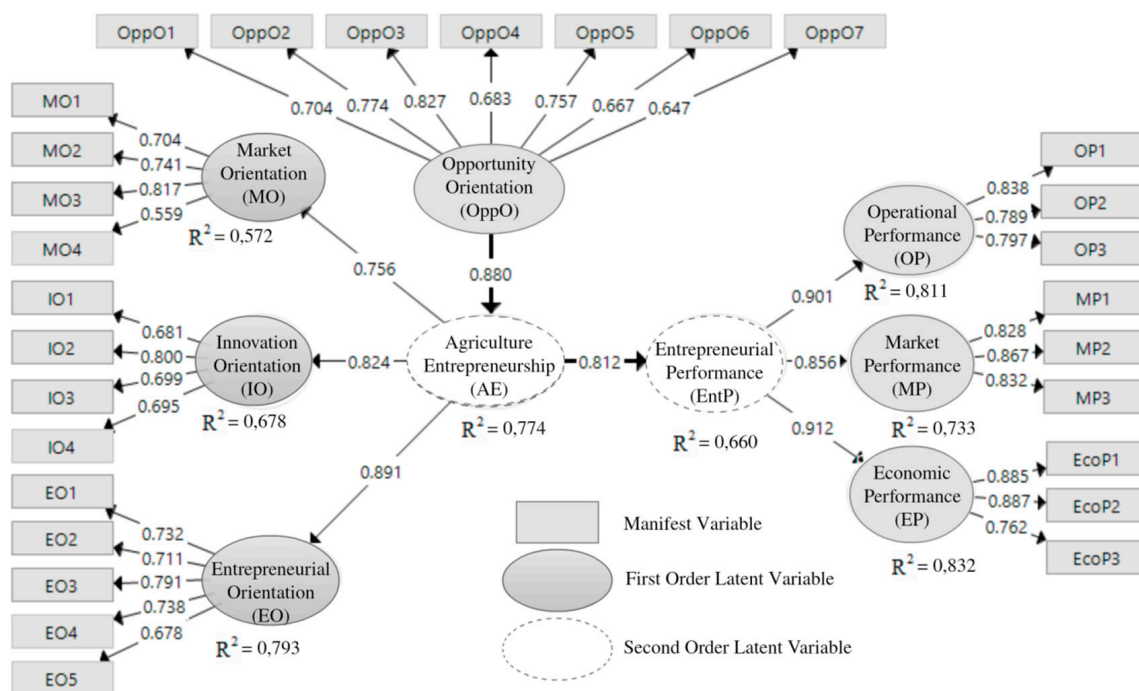


Figure 3. Hierarchical structural model.

Table 5. Statistical quality and reliability of constructs.

| Constructs | AVE | Composite Reliability | R Square | Cronbach's Alpha | Commonality | Loading |
|------------|--------------------|-----------------------|----------|--------------------|--------------------|--------------------|
| MO | 0.506 | 0.801 | 0.456 | 0.663 ^b | 0.506 | 0.675 ^b |
| IO | 0.518 | 0.811 | 0.687 | 0.694 ^b | 0.518 | 0.829 |
| EO | 0.535 | 0.852 | 0.795 | 0.782 | 0.535 | 0.892 |
| OppO | 0.525 | 0.885 | - | 0.848 | 0.525 | 0.759 |
| AE | 0.483 ^a | 0.921 | 0.576 | 0.909 | 0.483 ^a | 0.815 |
| OP | 0.653 | 0.85 | 0.811 | 0.735 | 0.653 | 0.901 |
| MP | 0.710 | 0.88 | 0.732 | 0.796 | 0.710 | 0.856 |
| EcoP | 0.717 | 0.883 | 0.832 | 0.801 | 0.717 | 0.912 |
| EntP | 0.549 | 0.916 | 0.664 | 0.897 | 0.549 | - |

^a loading lower than required level (0.5); ^b loading lower than required level (0.7).

Table 5 presents the statistical quality of second-order latent variables on agricultural entrepreneurship being the most central latent variable and directly linked with the study hypotheses. It is clear that it has an AVE value below 0.5. In order to better fit the model, it is possible to remove some manifest variables in first-order latent variables with factor loading below then required (>0.7). This way, among first-order latent variables, manifest variables with lower loadings were eliminated as: (1) concerning the latent variable MO, the indicator MO4, (2) latent variable IO, the indicator IO1, (3) latent variable EO, the indicator EO5, and in the latent variable OppO, the indicators OppO6 and

OppO7 were excluded. Thus, by doing so, we set-up a new structural model, as can be seen in Figure 4. Table 6 presents the results of the revised structural model, as per our study parameters that yielded satisfactory indexes. For the evaluation of model adjustments, we used discriminant validity which indicates the extent to which a construct truly varies from other constructs. Furthermore, it helps to figure out to what extent the newly settled construct relates with other constructs and also reveal the number of measures that show only a single construct. According to Hair, Sarstedt [106], among other methods to evaluate discriminant validity, the most robust one is to verify the variables if they have higher factor loadings in their original factors compared with other constructs.

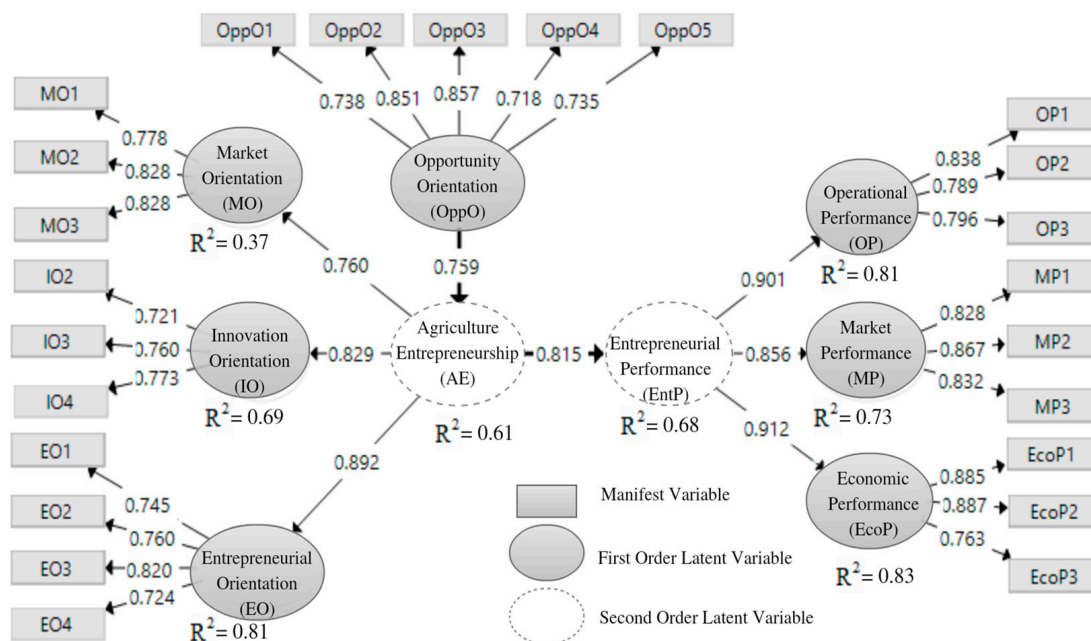


Figure 4. Restructured structural model.

Table 6. Statistical quality and reliability of construct for the revised structural model.

| Constructs | AVE | Composite Reliability | R Square | Cronbach's Alpha | Commonality | Loading |
|------------|-------|-----------------------|----------|------------------|-------------|---------|
| MO | 0.659 | 0.853 | 0.364 | 0.741 | 0.659 | 0.76 |
| IO | 0.565 | 0.796 | 0.693 | 0.722 | 0.565 | 0.829 |
| EO | 0.582 | 0.848 | 0.802 | 0.761 | 0.582 | 0.892 |
| OppO | 0.612 | 0.887 | - | 0.84 | 0.612 | 0.759 |
| AE | 0.504 | 0.904 | 0.604 | 0.885 | 0.504 | 0.815 |
| OP | 0.653 | 0.85 | 0.812 | 0.735 | 0.653 | 0.901 |
| MP | 0.71 | 0.88 | 0.789 | 0.796 | 0.71 | 0.856 |
| EcoP | 0.717 | 0.883 | 0.832 | 0.80 | 0.717 | 0.912 |
| EntP | 0.549 | 0.916 | 0.68 | 0.897 | 0.549 | - |

Table 7 shows the cross-loading analysis that yielded more accurate results for the discriminate validity.

Table 7. Cross loading analysis.

| Manifest Variable | EO | EcoP | IO | MO | MP | OP | OppO |
|-------------------|--------------------|--------------------|-------|-------|-------|-------|-------|
| EO1 | 0.745 ^a | 0.396 | 0.649 | 0.382 | 0.476 | 0.525 | 0.424 |
| EO2 | 0.760 ^a | 0.569 | 0.549 | 0.406 | 0.603 | 0.563 | 0.397 |
| EO3 | 0.820 ^a | 0.522 | 0.48 | 0.402 | 0.563 | 0.571 | 0.547 |
| EO4 | 0.724 ^a | 0.58 | 0.450 | 0.36 | 0.471 | 0.545 | 0.406 |
| EcoP1 | 0.623 | 0.885 ^a | 0.438 | 0.307 | 0.558 | 0.691 | 0.581 |
| EcoP2 | 0.575 | 0.887 ^a | 0.449 | 0.229 | 0.575 | 0.709 | 0.581 |
| EcoP3 | 0.503 | 0.763 ^a | 0.463 | 0.325 | 0.519 | 0.56 | 0.326 |

Table 7. Cont.

| Manifest Variable | EO | EcoP | IO | MO | MP | OP | OppO |
|-------------------|-------|-------|--------------------|--------------------|--------------------|--------------------|--------------------|
| IO1 | 0.399 | 0.221 | 0.721 ^a | 0.479 | 0.274 | 0.256 | 0.279 |
| IO2 | 0.543 | 0.257 | 0.760 ^a | 0.307 | 0.343 | 0.395 | 0.218 |
| IO3 | 0.612 | 0.624 | 0.773 ^a | 0.366 | 0.746 | 0.608 | 0.553 |
| MO1 | 0.407 | 0.273 | 0.483 | 0.778 ^a | 0.252 | 0.318 | 0.194 |
| MO2 | 0.384 | 0.18 | 0.383 | 0.828 ^a | 0.244 | 0.284 | 0.234 |
| MO3 | 0.445 | 0.357 | 0.367 | 0.828 ^a | 0.33 | 0.348 | 0.333 |
| MP1 | 0.612 | 0.487 | 0.536 | 0.384 | 0.828 ^a | 0.526 | 0.478 |
| MP2 | 0.597 | 0.554 | 0.549 | 0.237 | 0.867 ^a | 0.542 | 0.554 |
| MP3 | 0.548 | 0.601 | 0.533 | 0.247 | 0.832 ^a | 0.539 | 0.472 |
| OP1 | 0.529 | 0.644 | 0.452 | 0.254 | 0.553 | 0.838 ^a | 0.542 |
| OP2 | 0.682 | 0.578 | 0.512 | 0.444 | 0.496 | 0.789 ^a | 0.462 |
| OP3 | 0.546 | 0.656 | 0.449 | 0.258 | 0.492 | 0.796 ^a | 0.584 |
| OppO1 | 0.501 | 0.496 | 0.401 | 0.219 | 0.544 | 0.548 | 0.738 ^a |
| OppO2 | 0.455 | 0.511 | 0.352 | 0.211 | 0.52 | 0.579 | 0.851 ^a |
| OppO3 | 0.558 | 0.562 | 0.45 | 0.331 | 0.477 | 0.523 | 0.857 ^a |
| OppO4 | 0.327 | 0.299 | 0.261 | 0.139 | 0.33 | 0.424 | 0.718 ^a |
| OppO5 | 0.398 | 0.403 | 0.416 | 0.295 | 0.426 | 0.475 | 0.735 ^a |

^a Higher loadings in the original construct.

PLS avoids assumptions of data normality, meaning that parametric test for significance used in regression analysis is not applicable to test the significance of loadings, and therefore, it follows a bootstrap non-parametric procedure. Thus, we used a bootstrap process consisting of 5000 sub-samples to test model robustness and significance of the proposed relationships in the model as can be seen in Table 8, which shows both of the study hypotheses are statistically significant ($p < 0.01$).

Table 8. Structural model significance analysis.

| Relation | t-Value |
|----------------|---------|
| AE → EntP (H2) | 22.11 * |
| AE → OP | 3.26 * |
| AE → MP | 3.39 * |
| AE → EcoP | 3.60 * |
| OppO → AE (H1) | 15.41 * |
| OppO → MO | 9.18 * |
| OppO → IO | 6.73 * |
| OppO → EO | 4.71 * |
| AE → MO | 8.05 * |
| AE → IO | 30.97 * |
| AE → EO | 44.99 * |
| EntP → OP | 43.55 * |
| EntP → MP | 30.57 * |
| EntP → EcoP | 49.03 * |
| MO1 ← MO | 14.12 * |
| MO2 ← MO | 21.12 * |
| MO3 ← MO | 16.75 * |
| IO2 ← IO | 21.44 * |
| IO3 ← IO | 9.98 * |
| IO4 ← IO | 13.07 * |
| EO1 ← EO | 16.08 * |
| EO2 ← EO | 9.86 * |
| EO3 ← EO | 15.81 * |
| EO4 ← EO | 9.17 * |
| OppO1 ← OppO | 13.78 * |
| OppO2 ← OppO | 32.15 * |

Table 8. Cont.

| Relation | t-Value |
|--------------|---------|
| OppO3 ← OppO | 27.23 * |
| OppO4 ← OppO | 10.12 * |
| OP1 ← OP | 23.54 * |
| OP2 ← OP | 13.77 * |
| OP3 ← OP | 16.02 * |
| MP1 ← MP | 18.10 * |
| MP2 ← MP | 23.24 * |
| MP3 ← MP | 24.73 * |
| EcoP1 ← EcoP | 42.66 * |
| EcoP2 ← EcoP | 45.47 * |
| EcoP3 ← EcoP | 11.31 * |

* p value < 0.01 (t value > 2.57).

These results reveal that Hypotheses H1 can be accepted advocating that opportunity orientation is influencing farmers in the studied economic zones in Pakistan under the China-Pakistan Economic Corridor to pursue agriculture entrepreneurship. From the results, opportunity orientation and the pursue of agriculture entrepreneurship are positively related, as the loading between OppO and AE is 0.759 (see Figure 4) and also statistically significant (0.61 and $p < 0.01$).

Likewise, concerning the relationship between AE and entrepreneurial performance, the results indicate that Hypotheses H2 can also be accepted thereby implying that the adoption of agriculture entrepreneurship positively impacts farmer's operational, market and economic performance. Hence, a significant positive relationship is proved between AE and EntP.

As the CPEC is a promising venture to realize significant infrastructural developments in Pakistan, there is a vast room for the agriculture sector to seek the advantage through improved connectivity, access and mobility to the new global market via BRI [115].

5. Discussions

The special characteristics of this studied agriculture entrepreneurship, opportunity recognition, farmer's performance and ultimately improved food production and distribution have been taken into consideration while analyzing the results shown in Section 4. As discussed above, the agriculture sector has been a big contributor to the economy of Pakistan, this sector could potentially benefit directly or indirectly through the CPEC via assessing numerous explicit and implicit economic benefits [7]. In the coming couple of years, the CPEC will change the face of the infrastructural map of Pakistan's economy, the agriculture sector is destined to benefit the most by the establishment of several special economic zones, industrial estates, business parks, and export processing zones [7,116]. As shown above empirically, opportunity recognition by the farming community in the form of increased access to markets will pave a better way to offer their products, especially food products that are produced in surplus quantities. Regarding farmers' skills and opportunity recognition, this study provides substantial evidence that farmers are on the right track to boost their entrepreneurial skills while their alertness is aligned to seek, explore and exploit opportunities. From the results, improved entrepreneurial performance complements improved food production and distribution, whereby the CPEC can alleviate the bottlenecks and constraints in market identification, connectivity, and infrastructure. Additionally, following the CPEC route, food storage and processing facilities will broaden the opportunity canvas for farmers as well as other intermediaries and agents along the supply chain. The increased inclination to entrepreneurial uplift may end up in value addition and meet the challenges and requirements of newly-explored markets via the CPEC. Therefore, the CPEC has an important role in transforming farmers to agricultural entrepreneurs in the country.

From the study results, it is also evident that the adoption to market orientation, innovation orientation, and entrepreneurial orientation are the most effective measures implemented by the

farmers that transform their role to agriculture entrepreneurs. Within this context, market, innovation and entrepreneurship orientation provide farmers with sufficient capabilities to overcome borne menaces in agriculture sector, as many studies [36,117,118] explored that nascent agriculture entrepreneurs are aggressive to goals, flexible in decision making, adapting to technological developments, proactive to market signals and yield superior economic performance [119]. As noted by Ismail, Domil [37], there is vast room for nascent entrepreneurs to grow faster and gain sizable expansion and this is very true in the case of the present study settings. Although, the agriculture sector in the country has been unprivileged, underutilized and prone to lower farmers' entrepreneurial skills, with the emergence of the CPEC in the form of a new opportunity, farmers' role is aligned to reap benefits from such avenues complemented by increased performance at the farm and in the market. Results also speak of clear adoptions of additional entrepreneurial practices (MO, IO, EO and OppO) in the attempt to boost farmers' performance on multiple lines, as shown by significantly positive constructs for the latent variable on opportunity recognition. In essence, among the latent variable on opportunity orientation, the role of indicators OppO1, OppO2, OppO3, OppO4, and OppO5 has remained conspicuous and effectively related to agriculture entrepreneurship. Actually, the role of opportunity orientation is crucial to agriculture entrepreneurship [79]. Likewise, OppO is the basic tenet that has enormous potential to substantially add to understand how new business ideas emerge and how they are pursued [83]. Thus, this is one of the possible reasons to understand why farmers are aligning to MO, IO, and EO in the country.

However, among first-order latent variables, the following manifest variables were not in consideration of farmers: (1) concerning the latent variable MO, the indicator on the use of e-commerce (MO4), (2) for latent variable IO, the indicator on R&D (IO1), (3) latent variable EO, the indicator on autonomy in business activity (EO5), and in the latent variable OppO, the indicators on resource leveraging (OppO6), and active search (OppO7). Although the use of e-commerce has sparked entrepreneurship in agriculture across the world [120], such indication is not common among the study subjects. Contrary to our findings on Pakistan, emerging firms need more R&D to continue innovation orientation, whereas via R&D, farmers can excel their existing knowledge pool that leads to commercial gains by the introduction of new products (or new attributes among the existing ones) and services [75]. This type of behavior is best explained by the low level of knowledge about new research avenues among existing farming communities in Pakistan.

Among the other less conspicuous latent variables needing acute attention of farmers and policymakers for the country are (a) farmers' autonomy that plays a particular role in extending entrepreneurial activity by increased freedom in decisions, perceptions, reactions and performances [121], (b) resource leveraging refers to the process of seizing or creating an economic opportunity and pursuing it regardless of the resources currently controlled [122] and, (c) active search links present to future and enhances the chances of entrepreneurial success [123] while an individual entrepreneur comparatively spends more time on active search to uncover new opportunities [124].

The present study also reveals a significant positive impact of the agriculture entrepreneurship on the performance of farmers. The results of the study are consistent with the literature and are in line with the findings of several studies on market orientation [52,125], innovation orientation [71,75,126], entrepreneurial orientation [60,67,127] emphasizing a significantly positive impact on agriculture entrepreneurship. Likewise, many studies confirm that opportunity orientation leads to pursuing entrepreneurship [77,78]. Although farmers in Pakistan operate relatively small farm sizes, they are linked with central markets in every district of the country [128]. These markets are highly connected with each other through existing infrastructure which now is destined to benefit from the CPEC and BRI investments in the region [29]. With such an improved facility, already functional food producers, marketing agents and companies (including farmers, commission agents within fruits and vegetable markets and large food traders) have started seizing the upcoming opportunity through entrepreneurial orientation to access far-off potential markets in the country and abroad like China, Russia, Afghanistan, Iran, Uzbekistan, and Turkey [129,130]. This surge in market expansion has

stronger implications for sustainability in the country as well as the region. Such an outcome is best supported by the finding related to the main constructs on market orientation and profitability or improved skills in the form of entrepreneurial orientation given by a positive connection between the two, e.g., MO and EO, as given in Table 8. We further deduce a reinforcement in the face of expanding infrastructural provisions not only linked with enhanced communication facilities but also with the rapid accomplishment of many energy projects (including coal, hydel, solar and wind). The local companies see a promising future in terms of food trade via the establishment of several Special Economic Zones (SEZ) mainly targeting small-scale producers and wholesalers to newly-linked markets locally and regionally [102,130]. Therefore, one possible conclusion is that the studied agriculture entrepreneurship in the context of the CPEC has enormous potential to grow despite the fact that farmers are currently adopting entrepreneurial practices in agriculture. For the farmers, this is an important practical finding, although studied agriculture entrepreneurs are budding while achieving positive results in the context of this nascent opportunity calls for an increased pace to prepare for early harvesting of gains and privileges.

6. Conclusions, Outlook and Limitations

The CPEC of tomorrow belongs to agriculture entrepreneurs. The CPEC is broadening opportunity canvass of farmers through improved infrastructure, connectivity, access to new markets in China and beyond. This study aimed to investigate the farmers' entrepreneurial skills, opportunity orientation, and performance in pursuit of opportunities arising along the CEPC. This study attempted to bridge a key knowledge gap in agriculture entrepreneurship theory: the possible role of investigated contextual factors (in the case of the studied country) in the implementation of such entrepreneurial practices.

The proposed research hypotheses and respective empirical analyses developed herein confirmed that opportunity orientation is influencing farmers in the studied agriculture zones in Pakistan to pursue agriculture entrepreneurship. More importantly, this study revealed that the CPEC is transforming the agriculture sector through changing farmers' role to agriculture entrepreneurs and providing huge economic opportunities to the sector. The CPEC has improved the infrastructure, connectivity and linkage facilities for existing and nascent entrepreneurs, already functional food producers. Marketing agents and companies have started seizing the upcoming opportunities through market and entrepreneurial orientation to access far-off potential markets in the country and abroad, such as China, Russia, Afghanistan, Iran, Uzbekistan and Turkey. Further, it provides a profound connection between economic hubs or nodes, connects the economic agents along a defined geography and improves food distribution to overcome development issues, including poverty and hunger, and fostering sustainable food distribution among the local and regional markets. Concerning the relationship between agriculture entrepreneurship and farmers performance, the study reveals that a range of entrepreneurial practices (in terms of latent variables) positively impacts farmers' performance (operational, market and economic). The findings of this study contribute empirically to the existing literature, theory, and practices of entrepreneurship in agriculture along with many policy-level implications. The body of knowledge in operations, market and economic management can be importantly reinforced as the empirical evidence revealing the significant positive influence of opportunity orientation on the operational, market and economic performance of farmers. On the practical side, our study results provide a new dimension to the farmers and stakeholders in the agriculture sector that the agriculture entrepreneurship boosts the operational, market and economic performance, which could be a significant factor for gaining the confidence of farmers, stakeholders and the government to facilitate agriculture entrepreneurship in the country. As such, facilitating agriculture entrepreneurship is destined to reap significant benefits arising from an increase in per unit farm productivity, improved distribution locally, regionally and internationally.

Finally, this study shows some limitations which could be changed into opportunities from the perspective of future research studies. Initially, we assumed only one tier of the entrepreneurial practices in Pakistan' agriculture which transpired to be multitier. Additional studies could include

more tiers as internal and external entrepreneurial practices within the agriculture entrepreneurship and could be segregated into the latent variables to verify the internal and external practices among farmers. Furthermore, it is not merely possible to obtain such results for another kind of entrepreneurial practices. Further studies might disclose the same entrepreneurial aspects of agriculture entrepreneurship involving various farming segments (e.g., cooperative farming and peasants). Moreover, this study considered only three dimensions of farmers' entrepreneurial performance (operational, market and economic) while future research can focus the entrepreneurial growth and social dimensions to the context of the CPEC.

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