

Muhammad, Fiaz; Ikram, Amir; Jafri, Syed Khurram; Naveed, Kanwal

Article

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Article

Product Innovations through Ambidextrous Organizational Culture with Mediating Effect of Contextual Ambidexterity: An Empirical Study of IT and Telecom Firms

Fiaz Muhammad ¹, Amir Ikram ^{2,*}, Syed Khurram Jafri ³ and Kanwal Naveed ²

¹ Department of Management Sciences, Lahore College for Women University, Lahore 54000, Pakistan; mfiaz@lcwu.edu.pk

² Institute of Business & Management, University of Engineering & Technology, Lahore 54890, Pakistan; kanwal161@hotmail.com

³ Department of Management Sciences, Bahria University, Lahore 54000, Pakistan; skhurram.bulc@bahria.edu.pk

* Correspondence: amir.ikram@uet.edu.pk or amirikram12@hotmail.com

Abstract: Considering the universal competitive pressures, it is imperative for the organizations to be more dynamic and innovative. The viability of companies is dependent on innovation and organizational culture is regarded as an important component in realizing the objective of product innovation. The study examines the association between ambidextrous organizational culture and product innovation outcomes through mediation of contextual ambidexterity. By pursuing the snowball sampling technique, pre-established structural questionnaires were distributed among the top management of IT and Telecom sector, 125 valid questionnaires were considered for data analysis purpose. The collected data was analyzed using Smart PLS software and measurement model was assessed with respect to reliability and validity. Structural model was assessed for hypothesis testing using bootstrapping technique. Results indicated that organizational diversity significantly and positively affect new product innovation outcomes i.e., incremental, radical product innovation, and speed to market, whereas shared vision positively affect incremental product innovation. Indirect effects results indicated that significant positive partial mediation of contextual ambidexterity exists between organizational diversity and new product innovation outcomes, i.e., radical innovation and speed to market. Whereas full and significant positive mediation role of contextual ambidexterity exists between shared vision and new product innovation outcomes i.e., radical innovation outcomes and speed to market. At last, no significant mediation role of contextual ambidexterity exists between organizational diversity and incremental innovation outcomes.

Keywords: product innovation; organizational culture; contextual ambidexterity; radical innovation



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1. Introduction

The phenomenon of ambidexterity has been defined as an organizational ability to cope with its opposing ends and pressures. By solving these opposing tensions, the firm can build ambidexterity in the organization which ultimately results in higher performance of the organization [1,2]. The literature on ambidexterity debate that ambidextrous firms often comprises both structural and contextual elements, however, recent research proposes that contextual ambidexterity is imperative to business success rather than an option [3,4]. Contextual ambidexterity arises when organization leaders are capable enough to form a context with sufficient degrees of social support and performance management. Researchers state four groups of traits which act together to explain the context of the organization. These traits combine together to generate two extents of organizational context [5]. As a matter of fact, the contextual ambidexterity is stranded in the kind of organizational culture that encourages both creativeness and discipline in the organization [6]. Organizational learning literatures debate that diversity boosts creativeness can

be combined into set of standards that offer direction and discipline. Thus, institutional diversity and shared vision strengthen each other constituting ambidextrous organizational culture. This provides the understanding about the kind of culture needed for contextual ambidexterity, nonetheless it has not been theoretically incorporated or observed in the literature of product innovation and organizational ambidexterity [5]. In current dynamic world, ambidexterity emerges due to innovation, the capability to attain incremental and radical innovation in unison, an attractive thought to literature. Literature suggests that organizational culture is imperative for managing successful innovation [7]. Therefore, we take innovation as a dependent variable for this study.

New product innovation is a construct comprising incremental product innovation, speed to market and radical product innovation. The notion of incremental product innovation means ‘product enhancements and enlargement that are typically anticipated at satisfying the requirements of prevailing customers’, and this comprise minor variations in knowhow and prevailing product-market practices of the enterprise’. The phenomenon of radical product innovation contains central variations in expertise and skill base for the company, usually focus the requirements of evolving consumers that are fresh to the organization and offer them significant new benefits [8]. Speed to market is an important attainment factor for firms to exploit first mover advantage and increase effectiveness. Speed to market means launching products faster than their competitors [9]. Extensive research has been done on antecedents and outcomes of organizational ambidexterity, such as such innovation outcomes, contextual ambidexterity, exploration, exploitation and many others as discussed in literature. Still various theoretical connections have received limited attention by researchers except the study of Wang & Rafiq [5], which is significant contribution towards literature on ambidextrous institutional culture, contextual ambidexterity and product innovation outcomes. Hence, this study comprehensively examines the association between ambidextrous institutional culture (organizational diversity, shared vision) and new product innovation outcomes (incremental product innovation, radical product innovation, speed to market) through the mediation evidence of contextual ambidexterity (performance management, social support). Moreover, there is lack of literature on mediating effect of contextual ambidexterity in the context of developing economy of Pakistan.

The research article will also contribute to the present body of knowledge of the benchmarking practices that influence product innovation and organizational culture. The information will also act as a reference for scholars for further research on development of organization culture and product innovation. This paper begins with a literature review and development of hypotheses that looks into the current scenario of organizational ambidexterity, culture and product innovation. Then, structural equation modelling is deployed in order to validate the proposed model. The final sections of discussion and conclusion present the results, implications and recommendations for future study.

2. Literature Review and Hypotheses Formulation

2.1. Organizational Ambidexterity and Contextual Ambidexterity

Organizational ambidexterity is an emerging issue in current era. Several studies have directed on this topic in the literature. Based on the perspective of configurational theory, Park et al. [10] examines the role of digitization in attaining organizational structural ambidexterity by simultaneous pursuance of both exploitation and exploration, and proposed that intrafirm collaboration is imperative to both the intrafirm and interfirm solutions for achieving ambidexterity. Organizational ambidexterity means how to materialize the balance and simultaneousness between exploration-based and exploitation-based culture [11]. Organizational culture is defined as core beliefs, standards, and values that provide foundation for the management scheme of the organization, its policies that illustrate, strengthen and support those preliminary values. Shin and Park [12] conducted a survey of 100 social entrepreneurs and suggested that a stable culture nurtures high-level socioeconomic performance. The concept of organizational culture formulates the casual,

interactive part of organizational context that helps to complementing in organizational systems and processes. Organizational culture made firm capable to handle its twofold problems of direction and flexibility and also help in its external adaptation and internal integration [13].

Current theoretical developments in the literatures of organizational learning contend that different specific understanding, abilities and skills that stimulate creativeness refer to organizational diversity. These differences required shared opportunities. These opportunities are stated as shared vision. Organizational diversity tolerates the individual differences, skill and abilities in organization while shared vision encourages the involvement of employees in the organizational goals [14]. Organizational diversity and shared vision strengthen each other, and thus creates an ambidextrous organizational culture. This provides the understanding about the kind of organizational culture essential for contextual ambidexterity, nevertheless it has not been theoretically observed in the literature [5]. Current research proposes that contextual ambidexterity is necessary for the firm's survival and success because they have to exploit their current proficiencies for their success in short-term to avail commercial benefits and at the same time search new capabilities for their success in long run [6,15]. Contextual ambidexterity arises once organizational leaders are capable to form a firm context with right amounts of social sustenance and performance management. Authors highlight that existence of performance management context and social support will generate organizational context with increase performance that give rise to a contextual ambidextrous firm [5,15,16]. Hence, we hypothesize as follows:

Hypothesis 1a (H1a): *Organizational diversity has a significant impact on performance management and social context of the employees.*

Hypothesis 1b (H1b): *There is significant effect of shared vision on performance management and social context of the employees.*

2.2. Contextual Ambidexterity and New Product Innovation Outcomes

Recent studies [17,18] suggested that key ingredients for contextual ambidexterity are pursuance of decentralization and continual innovation. The organizational ambidexterity is the capability on part of the firm to perform not only on incremental quality progresses but also radical innovative developments that explore new avenues and opportunities. Van Assen [19] proposed managerial implication with respect to contextual ambidexterity and suggested that organizations should go for empowerment of their employees so that they will enable them to make autonomous decisions when they conduct exploratory and exploitative activities. Minatogawa et al. [20] explained business model innovation in SMEs through the spectrum of operationalized contextual ambidexterity, and proposed practical implications that allows organization to go for sustainable development and open innovation. Wu et al. [21] examines the ambidexterity-innovation effect of high-tech enterprises of China and suggested the negative influence of ambidexterity on the innovation outcomes of native enterprises.

The sustainable accomplishment of enterprises asks for a vigorous harmonizing of organizational ambidexterity and product innovation [22]. In order to enhance process and product innovation, Ali et al. [23] suggests that manufacturing firms need to rely on executing efficient human resource management practices by providing conversant training to their staff, refining work skills and commitment by the suitable compensation system and furthering organizational culture. Considerable research efforts by different researchers have been dedicated to recognize and elaborate the factors that results in organizational ambidexterity. In literature, researchers have discussed that employees need to be explorative and exploitative simultaneously in order to be ambidextrous [17,24]. When managers are capable to form a context of organization with appropriate stages of performance management and social sustenance, contextual ambidexterity arises. Authors underline that existence of performance management context and social support will generate organizational context with increase performance in firm. This high-performance

context will help to enable people to show creativity, team work, brokering abilities, and multitasking abilities [15,16]. After reviewing recent literature, Martínez-Climent et al. [18] concluded that the combination of exploration and exploitation enriches innovation, and it is further suggested that ambidextrous leadership practices promote innovation and exploration by employees.

Contextual ambidexterity has made business units proficient of incorporating new practices or system for radical innovation and the competence and invention essential for incremental innovation. Ali et al. [23] inspected the degree to which illustrative policies are implemented by manufacturing enterprises and their influence on the extents of product innovation. It is suggested that management should get themselves acquainted with the novel strategies that augment operational performance and enable effective decision-making. The final is linked to speed to market in new product outcomes. Speed to market means launching new products in market more rapidly; it is regarded as a central factor to gain first mover advantage and competitiveness in the marketplace [9]. Based on investigation of literature related to contextual ambidexterity and new product innovation outcomes, it has been extracted that there exists a relationship between these two constructs and in order to develop hypotheses of this study our logical reasoning based upon following studies as elaborated in detail in literature review chapter, which forms the basis for our research hypotheses as follow:

Hypothesis 2a (H2a): *Performance management significantly influence incremental product innovation, radical product innovation, and speed to market.*

Hypothesis 2b (H2b): *Social support has a significant impact on incremental product innovation, radical product innovation, and speed to market.*

2.3. New Product Innovation Outcomes and Ambidextrous Organizational Culture

Literature suggests substantial association between organizational culture's ambidexterity and innovation consequence [17,25]. Researchers found that culture in which knowledge is highly share has significantly impacted ambidexterity and strategic leadership helped in achieving this culture. It is also revealed that to enable innovation in organization, culture is more essential than leadership, put emphasis on the significance of organizational culture for innovation [26]. The pursuance of open innovation improves the of the economic worth of patents and the prospects of technology transfers [27]. Peng et al. [28] conducted an empirical study of high-tech industry of Taiwan, and suggested that ambidexterity has a positive effect on organizational performance. They further advocated that simultaneous pursuance of exploration and exploitation is imperative for organizational performance, and thus nurturing the two capabilities simultaneously go in harmony with the notion of ambidexterity.

Khan and Mir [17] conducted empirical investigation of 414 respondents and suggested that environmental kindness reinforce the associations between ambidextrous organizational culture and contextual ambidexterity. Moreover, researchers found that culture and innovation is mediates by ambidexterity. Organizational diversity and shared vision go hand in hand in instituting a higher-order concept of ambidextrous organizational culture, and thus leads to the incorporation of contextual ambidexterity in a business unit [5]. It is crucial that a vision that illustrates the need and reason of ambidexterity is expressed and undoubtedly transferred between participants to make sure that the distinguished efforts of incremental and radical innovation do not constrain the business unit's capability to flourish at any activity [6,29].

Hypothesis 3a (H3a): *Organizational diversity has a significant impact on incremental product innovation, radical product innovation and speed to market of firm.*

Hypothesis 3b (H3b): *Shared vision has a significant impact on incremental product innovation outcomes, radical product innovation outcomes, and speed to market of firm.*

The pursuance of innovation helps in attaining competitive advantages and realizing superior performance in competitive market environments, nonetheless efficacious innovations remain challenging task for enterprises. Recent studies reveal the importance of both technology-related innovations, which refers to the adoption of disruptive technologies in new product development processes [23,25]. Innovation also depends on exploration and exploitation processes, and balancing exploration and exploitation offers another difficult dilemma. In order to analyze effects of eco-innovation on dynamic ambidexterity, Alos-Simo et al. [30] constituted a research framework by deploying panel data over the period of 5 years from the telecommunication sector and verified the model using SEM and PLS; it is suggested that dynamic ambidexterity leads to innovation. The pursuance of ambidexterity within a specific domain is suggested in order to address these challenges [29]. Organizational culture made business unit capable to enhance its distinctive capability to incorporate radical exploration and exploitation or incremental. Organizational culture produces performance outcomes through contextual ambidexterity that is match with the organization resource-based view discussing that it is organizations' unique competencies of reconfiguring, bundling and organizing resources that generate differential outcomes [13,17]. The proposed research model is shown in Figure 1, and hypotheses are also being depicted. On the basis of abovementioned literature support, we hypothesized as follows:

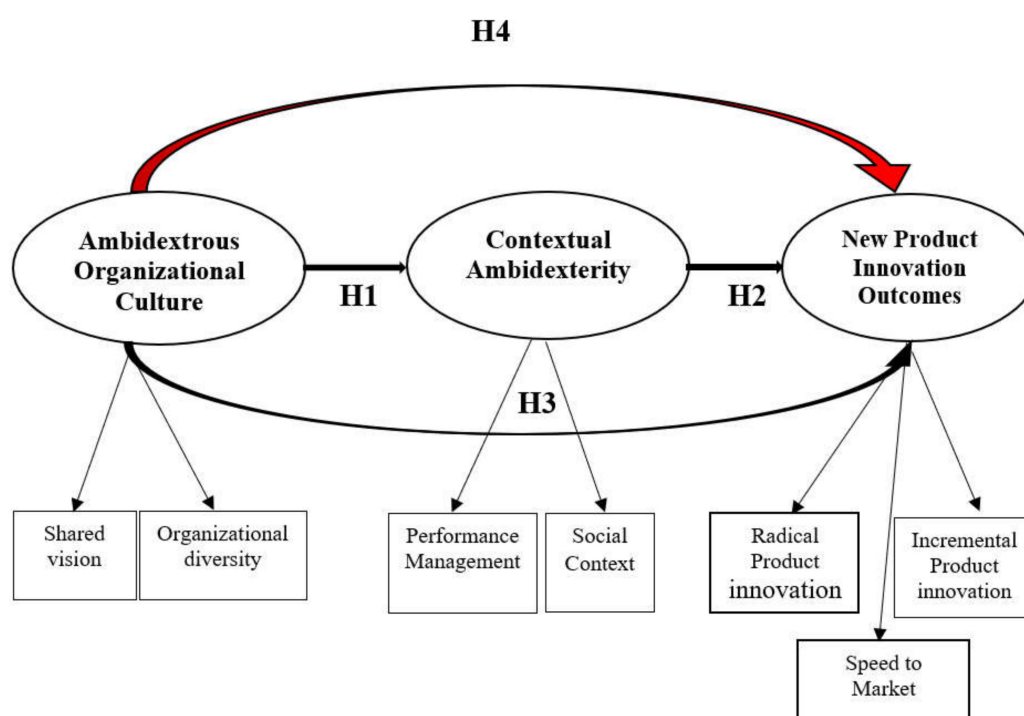


Figure 1. Proposed research model.

Hypothesis 4a (H4a): Contextual ambidexterity mediates the relationship between organizational diversity and incremental product innovation.

Hypothesis 4b (H4b): Contextual ambidexterity mediates the association between organizational diversity and radical product innovation.

Hypothesis 4c (H4c): Contextual ambidexterity mediates the relationship between organizational diversity and speed to market.

Hypothesis 4d (H4d): *Cotextual ambidexterity mediates the association between shared vision and incremental product innovation.*

Hypothesis 4e (H4e): *Contextual ambidexterity mediates the relationship between shared vision and radical product innovation.*

Hypothesis 4f (H4f): *Contextual ambidexterity mediates the association between shared vision and speed to market.*

3. Research Methods

This study draws samples from the top management of IT and Telecom sector of Pakistan. Since the research requires data collection from the top-level management of IT firms, snowball sampling technique was deployed. Total 140 questionnaires were distributed out of which 125 usable questionnaires at the response rate of 89.28 % were kept for analysis. In order to determination of minimum sample, minimum R-square method was used [31] and usable questionnaires were above the threshold hold values as required by this method. For current study it is not viable to implement probability sampling technique as it is not feasible to approach to all the CEO working in IT and Telecom sector of Pakistan, therefore this study use snowball non-probability sampling technique. Further, our target population is based on the criteria of small and medium high-tech firms operating in Pakistan for more than 3 years. The geographical jurisdiction of area under study included the IT and Telecom companies of district Lahore and Islamabad.

For the purpose of data collection, cross sectional survey design was adopted and self-administrated survey is carried out through personal visits to respondents and through mail courier or email. Prior established instruments are used to collect data on organizational diversity, shared vision, incremental product innovation, radical product innovation, and speed to market, performance management and social support. Organizational diversity (OD) measured by instrument consisting of three items. Shared vision (SV) was measured using 4 items instrument Social support and performance management were measured by instrument consisting of four item and three items respectively. The incremental and radical product innovation were evaluated using scale of two items, while speed to market was evaluated by deploying four items scale. Top management i.e., CEO or top managers in R&D and marketing, of selected IT and Telecom firms were requested to respond on constructs. The 5-point Likert scale was deployed to for the measurement of constructs e.g., organizational diversity, incremental product innovation, shared vision, radical product innovation, performance management, social support and speed to market.

4. Results and Analysis

Structural equation modeling is deployed to investigate the purposed model and relationships between latent and observed variables. For this research, reliability was assessed through composite reliability for all constructs as organizational diversity, shared vision, performance management, social support, radical product innovation, incremental product innovation and speed to market and found to be at par or above the threshold values. In initial stages of research, an internal consistency reliability value of more than 0.7 and values greater than 0.8 or 0.9 in lateral stages of research are regarded as satisfactory, whereas a value below 0.6 depicts deficiency of reliability [32]. Validity can be assessed by the way of convergent validity and discriminant validity. Discriminant validity can be gauged by probing the cross loadings of the indicators; it is proposed that outer loading of an indicator with its own construct needs to be in excess of all of its loadings with other constructs [33]. Table 1 depicts the result summary of reflective measurement model.

Table 1. Results summary of reflective measurement model.

Latent Variable Name Total Indicators & Indicators Deleted Due to Poor Loadings	Indicators	Loadings	Composite Reliability	AVE	Discernment Validity
Incremental Product Innovation (IPI) Total 2 Indicators None is Deleted	IPI1 IPI2	0.865	0.851	0.741	YES
Organizational Diversity (OD) Total 3 Indicators None is Deleted	OD1 OD2 OD3	0.802 0.818 0.842	0.861	0.673	YES
Performance management (PM) Total 3 Indicators None is Deleted	PM1 PM2 PM3	0.984 0.994 0.974	0.989	0.968	YES
Radical Product Innovation (RPI) Total 2 Indicators None is Deleted	RPI1 RPI2	0.975 0.976	0.975	0.952	YES
Social Support (SS) Total 4 Indicators SS4 is Deleted	SS1 SS2 SS3	0.804 0.762 0.782	0.826	0.613	YES
Speed to Market Total 4 Indicators STM1 is Deleted	STM2 STM3 STM4	0.960 0.956 0.929	0.964	0.900	YES
Shared Vision Total 4 Indicators SV1 is Deleted	SV2 SV3 SV4	0.794 0.840 0.802	0.853	0.660	YES

In second step, the bootstrapping was executed to check the structural model and relationship between latent variables. In this step, the relationship between variables was analyzed and path coefficient values is taken for direct model estimation and total effects values are taken for mediating results. The structural model for this study consists of two independent variables namely organizational diversity, shared vision and three dependent variables, namely, incremental product innovation, radical product innovation and speed to market for direct model estimation and taking performance management and social support as mediator for mediation analysis. In order to assess the implication of path coefficients, the bootstrapping procedure is run, as significance of relationships depends on standard error. For the purpose of this study, values of path coefficients have taken into account for testing relationships and for significance of relationships t-values > 1.96 at significance level 5% (<0.05) have been considered and the results of path coefficients of direct relationships as hypothesized are depicted in Table 2.

Table 2. Indirect effects and mediation testing.

Hypothesis	Path Coefficients			Indirect Effects		
	T-Values Path Coefficients	p-Values Path Coefficients	Supported/Not- Supported	T-Values Indirect Effects	p-Values Indirect Effects	Mediation
OD -> IPI	5.319	0.000	Supported	1.534	0.126	No Mediation
OD -> RPI	2.727	0.007	Supported	2.409	0.016	Partial Mediation

Table 2. Cont.

Hypothesis	Path Coefficients			Indirect Effects		
	T-Values Path Coefficients	p-Values Path Coefficients	Supported/Not- Supported	T-Values Indirect Effects	p-Values Indirect Effects	Mediation
OD -> STM	5.134	0.000	Supported	3.195	0.001	Partial Mediation
SV -> IPI	3.025	0.003	Supported	1.616	0.107	No Mediation
SV -> RPI	1.458	0.146	Not Supported	2.556	0.011	Full Mediation
SV -> STM	0.100	0.920	Not Supported	4.731	0.000	Full Mediation

4.1. Mediation Analysis

This study includes mediators named as performance management and social support, this plays a mediator role between ambidextrous organizational culture' dimensions i.e., organizational diversity, shared vision and new product innovation outcomes, i.e., incremental product innovation, radical product innovation and speed to market. For the purpose of assessing mediation effect of contextual ambidexterity, the procedure of mediation analysis in the case of partial least squares path modeling as given by Nitzl Christian et al. [34] was adopted.

4.2. Coefficient of Determination (R^2)

The coefficient of determination is one most essential criterion for assessment of structural model, i.e., R^2 of the dependent variables. The R^2 values of 0.75, 0.50 and 0.25 for dependent variables can describe the cases of substantial, moderated and weak linkages respectively. R^2 is used to measure predictive accuracy of the structural model. Table 3 displays the 5 endogenous latent variables, such as performance management has R^2 value of 0.236 (weak), social support has R^2 value of 0.359 (weak), incremental product innovation has R^2 values of 0.442 (moderate), radical product innovation has R^2 values of 0.337 (weak) and speed to market has R^2 values of 0.502 (moderate).

Table 3. R^2 and R^2 Adjusted.

	R Square	R Square Adjusted
Incremental Product Innovation (IPI)	0.442	0.430
Performance Management (PM)	0.236	0.228
Radical Product Innovation (RPI)	0.337	0.323
Social Support (SS)	0.359	0.352
Speed to market (STM)	0.502	0.492

4.3. Blind Folding and Predictive Relevance Q^2

An additional assessment of the structural model comprises its ability to forecast and predict. In this case, the main measure of predictive significance is Stone-Geisser's Q^2 which can be evaluated through deploying blindfolding procedures. Values of 0.02, 0.15 and 0.35 have small, medium and large predictive relevance of a specific dependent variable. Table 4 illustrates the values of Q^2 for dependent variables i.e., incremental product innovation has 0.283 (Medium Predictive Relevance), radical product innovation has 0.281 (medium predictive relevance), speed to market has 0.41 (large predictive relevance), performance management has 0.20 (medium predictive relevance) and social support has 0.19 (low predictive relevance).

Table 4. Construct cross validated redundancy.

	SSO	SSE	Q ² (=1 – SSE/SSO)
Incremental Product Innovation (IPI)	392.000	281.152	0.283
Performance Management (PM)	588.000	465.149	0.209
Radical Product Innovation (RPI)	392.000	281.725	0.281
Social Support (SS)	588.000	471.784	0.198
Speed to market (STM)	588.000	345.043	0.413

5. Discussion

The research model of our study confirms and extends the previous investigations that interlink product innovations, ambidextrous organizational and contextual ambidexterity. The results reveal that shared vision have significant relationship with incremental product outcomes but this relationship doesn't mediate with the contextual ambidexterity. The study performed by Khan and Mir [16] is consistent with our results which strengthened a robust positive connection between shared vision and incremental product innovation. Moreover, the intermediating role of contextual ambidexterity is a contribution of this empirical investigation in this regard. No significant relationship is found between the shared vision and radical product innovation and speed to market, and this is in line with the findings of Slater, Mohr, and Sengupta [8] and Wu et al. [21]. However, empirical investigation suggests significant positive relationship between shared vision and radical innovation and speed to market with mediation of contextual ambidexterity. This is constant with the findings of Müller et al. [35], as they recommended that the enterprises who acquire and exploit external knowledge are in a better position to participate in both exploitative and exploratory innovation strategies. Thus, our study also validates the findings of previous researchers on the constructs of organizational culture and radical innovation [4,5,7,12].

The observed results of mediation analysis depict that contextual ambidexterity wholly mediates the association between shared vision and radical product innovation; shared vision and speed to market. Further partial mediation of contextual ambidexterity has been proved between organizational diversity and radical product innovation as well as organizational diversity and speed to market. Our findings also endorse the study by Park et al. [10], in which the researchers investigated Canadian firms, who are investing in the implementation of information technology system, and suggested that digitization plays a multifaceted role in achieving ambidexterity. Accordingly, the study implies that contextual ambidexterity does not play any mediation role between organizational diversity and incremental product innovation and shared vision and incremental product innovation. The findings advocate that the effect of organizational culture and contextual ambidexterity cannot be offset in enhancing the aspects of product innovation and thus organizations should take concrete steps that foster contextual ambidexterity.

6. Conclusions

The study act as a reference for policy makers and scholars on development of organization culture and pragmatic approach of product innovation. The results infer that organization diversity significantly affects incremental product innovation outcomes in organization, ensuring a positive role of organizational diversity on incremental product innovation outcomes. Further this study extends the research and found that the organizational diversity also positively affects radical product innovation outcomes in organization and this relationship is also mediates by the contextual ambidexterity. Organizational diversity also has significant positive relationship with speed to market and their relationship also mediates by the contextual ambidexterity.

Two dimensions of ambidextrous organizational culture are considered in this study, namely organizational diversity and shared vision. Both dimensions are positively and significantly correlating with the dimensions of contextual ambidexterity that is performance management and social support, the better organization in diversity and vision, the

better employees are in their performance and adaptability, performing well and satisfied at work. Dimensions of contextual ambidexterity used in this model are performance management and social support. Performance management has significant positive connection with radical product innovation and speed to market whereas no significant relationship is found performance management and incremental product innovation, which implies that firms should deploy strategies for the active development of organizational culture and ambidexterity in order to improve product innovation. Social support dimension significantly affects speed to market of firm, whereas no significant relationship is found between social support and incremental and radical product innovation outcomes.

The results of the study offers practical suggestions for management of IT and telecom sector, as results implicate that in order to increase innovation in the organization, whether it is towards the incremental or radical or the balanced of both, organizations need to take on a bottom-up learning style for organizational culture that would permit organizational diversity and shared vision to interact at the same time, enabling the incorporation of performance management and social support activities in organization for the superior performance. Our findings suggest that policymakers and managers are required to decide on the tradeoff between radical and incremental innovation through generating the accurate context to encourage people to resolve problems and to be responsible for their actions. The results represent strong indication that the attainment of competences for performance management that create alignment in activities and social support that increase the flexible behavior, facilitates the association between features of the organizational context that boost these actions and performance parameters. Our findings are imperative for those organization that function in enormously stormy settings. Inevitably, this ensures survival of the firms in unfavorable business settings, and enable them to endure the current economic slump arising out of recent pandemic of COVID19. The contribution of this empirical investigation is original in the sense that it offers thorough intuitions into the nature of the scrutinized interdependences.

7. Limitations and Future Research Directions

The relations of contextual ambidexterity, ambidextrous organizational culture and radical innovation can be used as a theoretic foundation for future deliberations. Findings of this study implies certain prolific managerial implications, still there are certain limitations of this study. First, the survey items of innovation construct are limited to product innovation. Therefore, the outcomes might not be generalizable to other types of innovations. Secondly, the empirical authentication of the framework was constructed through research data collected from IT professionals of the Telecom sector of limited geographical area such as Lahore and Islamabad cities of Pakistan, which resulted in hindrance of generalizability of the findings across other sectors. Moreover, the survey instrument of the questionnaire had no qualitative data. Nevertheless, an improved comprehension of the causal relationship between the supposed variables and product innovation is the anticipated interviews with associates from the IT organization that are involved in the sample.

The study also open avenue for further study as future researchers may apply same conceptual model to other tech firms like electronics and mobile manufacturing companies to cross validate and generalize the results across the sectors, as depicted by the empirical investigation of top three sectors of Korea, namely automobile, robotics and aviation [36]. In order to enhance the implications of this study, the development of supplementary policy to augment the moderating effect of R&D on open innovation [27] should be investigated in the context of emerging economy of Pakistan. Future researchers are also advised to conduct study from the context of macroeconomic environment, wherein the notion of product innovation and open innovation should be analyzed from the perspective of triple helix model [37,38]. It is also advised to include other contextual ambidexterity dimensions i.e., sense making and cognition to investigate its mediation between ambidextrous organizational culture and innovation.

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