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EXAMINING THE IMPLICATIONS OF INNOVATION FAILURE: A PERSPECTIVE FROM PAKISTAN'S INNOVATION CAPABILITY AND DYNAMIC CAPABILITIES

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A B S T R A C T

By utilizing their creative and adaptive roles, firms interact with technology. Taking into consideration situations where development initiatives fail to produce positive results for companies, we looked at how business creativity characteristics and flexible abilities can affect company success in this research. We created a hypothetical model, based on the adaptive capability perspective and the idea of creative skills, and then we tested it by surveying a sample of Pakistani-based companies in various manufacturing and commercial sectors. Through the use of PLS-SEM, we were able to determine that a variety of situational elements, such as technological soundness and economic survival, are crucial in determining the success or failure of innovations. Technological failure, in turn, has a detrimental effect on company growth.

A R T I C L E I N F O

Keywords:
Risk assessment
Innovation failure
Skill development
Innovation capability Commercial viability
Market demand
Organizational resilience
Innovation Performance

1. Introduction

It is widely acknowledged that innovation is critical to any company's potential to develop and exist in the future. Innovation is defined as a vital component of organizational success and a company's ability to survive in a cutthroat market (Tohidi and Jabbari, 2012). While innovation-related operations and procedures don't always provide the intended results, and firms that attempt to be creative encounter a number of difficulties that ultimately result in advancement collapse

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(Walker, Damanpour and Devece, 2011). The notion that ineffective innovation endeavors might yield advantages for the firm is not well explored. According to a recent research, for example, depending on the type of innovation, 55–85% of initiatives ultimately failed completely or in part (Townsend, 2010). It's important to note that despite the significant failure rate of innovation, much research on innovation controlling manages to concentrate more on the positive effects of innovation than on its failure. As a result, there are not only few research on innovation collapse (Hadi Razavi and Attarnezhad, 2013), but there is also a lack of detail in the debate of how innovation failure might be properly characterized, conceived, and implemented (Hartley and Knell, 2022). (Leoncini, 2016) demonstrated that failure is not always a negative thing, and that failure in invention occurs more frequently than success. Failure in innovation may be viewed as a bad thing, but in the long run, it may be beneficial.

Scholars have contended that failures in innovation need not to be interpreted negatively, as they might sometimes give rise to favorable prospects (Sawng, Shin and Kim, 2019). For example, some academics contend that "exploration may increase the company's vulnerability to failure, but it may also present learning options to decrease failure (Chatterjee *et al.*, 2023). In fact, businesses may learn from failure, and this knowledge can lead them to change and alter the underlying creative concepts, or to stop or reduce certain innovation efforts (Gerben, Cees and Alfred, 2003).

According to the principles of the resource-based view (RBV) (Barney, 1991), companies must correctly harness skills that are precious, uncommon, unique, and non-substitutable (PUUN) in order to innovate. But some businesses manage innovation better than others, and they have a stronger track record of profitably utilizing novel concepts. Some of these businesses may be considered to have a better 'innovation capability,' at least momentarily. Developing such a skill is a crucial strategic challenge because innovation is required for a company's survival and growth (Van der Panne, 2003). Nevertheless, several development programs have failed, sometimes with tragic outcomes. An innovation competency is consequently crucial since it enables the performance of strategic evaluations of innovation endeavors (Tucker and Stanny, 2021).

It follows that having dynamic capacities is essential for businesses operating in uncertain and turbulent economic settings (Tikkanen and Tuominen, 2000; Gençer, 2019). With the help of these talents, businesses can recognize possibilities and reorganize them via the allocation of resources and innovative projects. They will, therefore, also require an innovation competency that enables them to strategically analyze their own innovation efforts and evaluate the achievements and failures of both past and present innovation (Salas-Fumás and Ortiz, 2019). The research currently in publication has not evaluated whether and to what degree organizational capabilities—specifically, innovation capabilities—can impact the success or failure of innovation and how that influences organizational product performance. This study consistently seeks to determine the

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subsequent research question:
RQ: How and to what extent do organizational innovation capabilities influence innovation failure and organizational performance in Pakistan?

A comprehensive theoretically motivated unified conceptual model encompassing institutional innovation skills, innovation failure, and organizational effectiveness has been developed and tested to answer the research question. Employing a item-based PLS-SEM approach, the conceptual model—which is based on the resource-based view (RBV) (Cabrera-Moya and Reyes, 2018) and dynamic capability view (DCV) (Ali and Selvachandran, 2017)—was assessed on a sample of 299 participants.

Thus, this study represents a lot of noteworthy breakthroughs. First, by defining financial viability and technological viability as critical components, it defines and operationalizes the primary factors influencing innovation failure or success. Second, it indicates that an organization's ability to innovate may influence the success of new ideas by affecting criteria such as scientific and commercial sustainability. Third, it argues that organizational performance may be influenced by a combination of inventive successes and failures. In this study, we expand previous research done in India (Chatterjee *et al.*, 2023) to the setting of Pakistan, with the goal of investigating the impact of organizational innovation skills and dynamic capabilities on organizational performance. Using the paradigm developed in the previous study, we investigate how contextual elements like economic viability and technological feasibility impact the results of innovation initiatives in Pakistani firms. We are exploring and expanding research of (Chatterjee *et al.*, 2023) to Pakistan because both Pakistan and India have followed a similar developmental pattern, which gives new insights and adds significance to the most recent findings of (Chatterjee *et al.*, 2023).

To fulfill its aims, the paper is constructed as follows: The second section goes into relevant literature, and in section three, we establish our hypothesis using the flexible abilities approach and the idea of innovation capability. Section 4 discusses the research approaches used. The following part (part 5) discusses the analysis and findings. The fifth part discusses and presents the theoretical contributions and managerial implications drawn from this work, as well as a summary of limitations and prospective future research areas.

2. Literature review

2.1. *Innovation*

The innovative approach integrates creativity and invention with the goal of creating something valuable that may be traded, developed, or sold (Taylor, 2017). Innovation has significantly enhanced customers' lives by improving product quality and cutting pricing for services (Gustavsen, 2005). Innovation can be planned, purposeful, or unplanned, resulting from an interactive learning process undertaken by all parties involved (Veugelers, 2014).

2.2. *Innovation Failure*

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According to (Hartley and Knell, 2022) innovation failure might lead to future project success. Failure can provide valuable learning opportunities for identifying and avoiding faults in future innovation endeavors. Changing organizational strategy, rules, and goals can increase efficiency (Kärnä, Anders; Karlsson, Johan; Engberg, 2020). Innovation failure occurs when businesses fail to learn from their mistakes (Kirschner *et al.*, 2004). The most catastrophic scenario sees organizations fail two times: in their innovation efforts and in their capacity to learn from their mistakes. In the opinion of (Klein Woolthuis, Lankhuizen and Gilsing, 2005), gaining from failure is more beneficial than learning from success in the setting of innovation leadership. Learning is inadequate if a company lacks the requisite resources and resources (Maidique and Zirger, 1984).

2.3. *Innovation, the resource-based view (RBV)*

(Barney, 1991) laid the groundwork for the resource-based view (RBV) regarding the business by combining academic work in conservative economics, adaptive economics, and company resource variation, as well as the structure-conduct-performance (SCP) paradigm. This theoretical framework demonstrates how businesses create profit and value by concentrating on administrative assets, which include all resources, skills, operational procedures, firm features, details, expertise, and so on. Controlled by a company, allowing the firm to devise and implement methods that increase its economy and profitability (Hadi Razavi and Attarnezhad, 2013). To produce worth and earnings, businesses must have recourse to commodities that are precious, limited, unique or, more pragmatically, non-perfectly comparable to rivals. These resources whose above attributes are acronymized as VRIN are crucial to supporting and enabling creative efforts, methods, and undertakings (Cabrera-Moya and Reyes, 2018).

2.4. *Innovation, the dynamic capability view (DCV)*

Dynamic capabilities concept arose as a supplement to the resource-based theory, which has been criticized for stressing achieving and maintaining competitive edge in a static context only. But (Ali and Selvachandran, 2017) contends that the RBV has missed the dynamics of capability development and does not effectively address the abilities necessary for enterprises to become competitive. The DCV has solved this problem (Alves *et al.*, 2017). In fact, flexible abilities (and the related DCV) can be understood as a high-level habit (or gathering of schedules) that, collectively with it carrying out input circulates, provides upon an organization's leadership a set of choices alternatives to generate essential results of a specific type (Najib, Saefuloh and Mulyawan, 2020).

2.5. *Innovation capabilities*

Frequently assets are insufficient on their own; they must be coordinated by administrative capabilities, which are the ability of an organization to combine, assemble, incorporate, and utilize assets to gain a commercial border. Institutional abilities are part of a larger set of company competitive advantages, which are described as an organization's ability to allocate and combine

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resources through organizational operations to accomplish a desired outcome. These skills have been defined as fluid if they can respond quickly to rapid-fire, highly erratic, and variable workplaces, as well as change combine, and reconfigure capabilities (Alves *et al.*, 2017).

According to the Dynamic Capabilities (DC) idea, flexible abilities enable organizations to identify, grab, and adapt possibilities through creative projects. But certain companies outperform others in communicating with VRIN assets that support creativity because they can handle creation more effectively than their competitors and thus indicate a superior track record of effectively utilizing new ideas (McGguinness, 2008). These firms "can be said to have, at least for a time, a superior 'innovation capability'." Building such competence is an essential economic problem because innovation is critical to an enterprise's sustainability and development (McGguinness, 2008; Gao and Zhu, 2015). Development skills are extremely important since they may impact the practicality, technological viability, and commercial viability of new activities, eventually deciding the success or failure of innovation. When combined, the DCV method of theory (McGguinness, 2008; Gao and Zhu, 2015; Alves *et al.*, 2017; Najib, Saefuloh and Mulyawan, 2020) and argument of creative capacity (Francis and Bessant, 2005) demonstrate that investing on innovation tools does not always result in effective innovation. Instead, they seek to emphasize that assets must be paired with fluid and imaginative abilities to produce innovative results. We do not, nevertheless, know if and to what extent innovation skills may assist businesses in leveraging development failures to enhance organizational efficiency, or if distinct organizational performance characteristics may be impacted by innovation triumphs and losses. By creating and evaluating an abstract version that expands on the DCV theoretical viewpoint (McGguinness, 2008; Gao and Zhu, 2015; Alves *et al.*, 2017) and the idea of innovation ability (Francis and Bessant, 2005) this work aims to close this research variance by determining whether and how innovation failures affect organizational performance, possibly because of learning from unsuccessful innovations (Ali and Selvachandran, 2017).

3. Formulating Hypotheses

3.1. *Innovation capabilities*

It is often acknowledged that innovation is one of the most important elements in enhancing and maintaining organizational success (Tohidi and Jabbari, 2012). Prosperity and employment growth are higher in innovative businesses (Hsiao, Chang and Chen, 2014). But several variables, such as manufacturing and technological resources as well as economic viability, affect how feasible any innovation endeavor or project is (Rowe, Boise and Rowe, 1974). These resources might be regarded as valuable, uncommon, unique, and non-substitutable (VRIN) resources in accordance with the Resource Based View (RBV) (Cabrera-Moya and Reyes, 2018) which may promote increased creativity and organizational success.

Organizations may reap several advantages from organizational innovation skills, such as enhanced employee engagement and retention, market leadership, competitive advantage, adaptability, and increased efficiency and productivity (Gayrard, Orhhek and Charpin, 1972).

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Establishing robust innovation capacities enables enterprises to set themselves apart from rivals by producing one-of-a-kind goods, services, or procedures that satisfy changing consumer needs (Tohidi and Jabbari, 2012; Hartley and Knell, 2022). In addition, creative capacities foster prospects for individual-based growth by augmenting personal competencies and expertise, which can result in increased human capital and improved competitiveness (Maidique and Zirger, 1984). Capabilities for organizational innovation are critical for maintaining competitiveness, fostering development, and adding value for all parties in Pakistan. We postulate the following hypotheses:

H1a: In the context of Pakistan, there exists a positive correlation between organizational innovation capability (INC) and the Economic viability (ECV) of a recently developed item.
H1b: In the context of Pakistan, organizational innovation capability (INC) exerts a positive influence on organizational performance (OUT).
H1c: In the context of Pakistan, there is a positive correlation between organizational innovation capability (INC) and the technological feasibility (TEC) required to build a fresh product.

3.2. *Commercial viability*

To assess if new items will be commercially viable, innovation activities are crucial (Upadhayay and Alqassimi, 2020). Organizations endeavor to generate innovative solutions that satisfy market demands and customer expectations through strategic innovation initiatives. A product's economic viability is determined by a number of characteristics that include both its intrinsic value and the whole customer experience (Argus *et al.*, 2020). The product's comparable pricing is one of the most important of these characteristics since it directly affects customer purchasing preferences and market viability (Cant, Wiid and Sephapo, 2016). Most people consider a product's early market entry to be a competitive advantage. According to (Cant, Wiid and Sephapo, 2016; Alves *et al.*, 2017)s Dynamic Capabilities View (DCV), launching a product early on requires organizational capacities designed to quickly evaluate market potential in a dynamic and quickly changing environment. Companies can successfully support plans for product introduction and launch thanks to his proactive attitude. Companies may benefit from being first to market(Padmanabhan and Bass, 1993; De Toni *et al.*, 2017). By making use of their capacity to foresee market trends, adjust to shifting customer tastes, and innovate quickly (Cant, Wiid and Sephapo, 2016).

Several studies have demonstrated that to support innovation projects' economic viability, companies need to commit enough resources to them. Investing in resources involves several different aspects, including infrastructure, technology, financial capital, and human capital (Zheng and Wang, 2018). For R&D projects, prototypes, testing, and the commercialization of novel goods and services, financial resources are essential (Owusu *et al.*, 2021). From conception to execution, human capital—including trained employees with a wide range of experience and knowledge—is essential to advancing the innovation process (Perez-Alaniz *et al.*, 2023). Investing in state-of-the-art infrastructure and cutting-edge technology makes it easier to create and implement innovative solutions quickly, which increases their competitiveness and market attractiveness. Organizations may increase the chance of commercial success for their innovation initiatives by leveraging

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opportunities, overcoming obstacles, and reducing risks via the effective deployment of resources (Aranda-Usón *et al.*, 2019; Odide, 2021). An investment in assets like this can enhance the innovation capacity of a business. Conversely, neglecting to provide resources and competencies that facilitate creativity might result in dire outcomes (García-Quevedo, Segarra-Blasco and Teruel, 2018). Businesses are therefore likely to invest their time and energy into thoroughly preparing each innovation project to get a high-performance rate in innovation initiatives. According to this research, improving a product's commercial viability makes innovation endeavors more successful, but a drop in commercial viability results in innovation failure. As a result, we put up the following theories:

H2a: In the context of Pakistan, the success of the product innovation (SPI) is favorably correlated with a product's robust economic viability (ECV).

H2b: In the context of Pakistan, the failure of an organization's innovations (FAL) is strongly correlated with a product's decreased economic viability (ECV).

3.3. *Technological Viability Assessment*

Several important elements determine whether an innovative concept is technologically feasible. Technical Proficiency: The accessibility of knowledgeable individuals possessing the requisite technological know-how and proficiency to create and execute the suggested innovation(Ra *et al.*, 2019; Dias *et al.*, 2020). Accessibility of Resources: Enough material, technological, and human resources to aid in the creation and application of the invention (Bakker *et al.*, 2019). Research and Development: The quantity of research and development needed to get over the innovation's technological difficulties and unknowns (Vacchi *et al.*, 2021). Compatibility: How well the suggested technology works with the infrastructure, processes, and standards already in place (De Toni *et al.*, 2017). Risk assessment is the route of detecting and reducing technological risks and obstacles that can prevent the invention from being implemented successfully (Hartley and Knell, 2022). Innovation Ecosystem: The availability of financing sources, industrial alliances, and research facilities as well as other supportive innovation ecosystems to promote the advancement and uptake of new technologies. Organizations must deliberately create innovation projects by focusing on the right markets and utilizing innovations that have been proven via previous experience (Najib, Saefuloh and Mulyawan, 2020).

As a result, we formulate the following hypotheses:

H3a: In the context of Pakistan, the success of product innovations (SPI) created by the organization is favorably connected with a product's strong technological feasibility (TEC).

H3b: In the context of Pakistan, the failure of innovations (FAL) created by the organizations in Pakistan is positively connected with a product's low technological feasibility (TEC).

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3.4. *Organizational performance*

Performance in innovation has a big impact on organizational performance (Xuezhou et al., 2020; Hassan *et al.*, 2013). Businesses that are very innovative frequently launch innovative goods, services, or procedures that set them apart from rivals (SÖZBİLİR, 2018; Bach *et al.*, 2019). Increased market share, client loyalty, and general competitiveness may result from this. Effective innovation initiatives may broaden the market, create new income sources, and boost sales of already-available goods and services (Robertson, Caruana and Ferreira, 2023). This has a direct impact on the organization's sustainability and financial success (Agustia *et al.*, 2022). Streamlining operations, streamlining procedures, or using fewer resources can all lead to cost savings and increased productivity. This improves the bottom line and resource usage of the company (Wang et al., 2023; Atalay, Anafarta and Sarvan, 2013). Innovation-focused cultures encourage employees' creativity, teamwork, and feeling of purpose (Khaskheli et al., 2023; Aboramadan *et al.*, 2020). Teams that are motivated and engaged are more likely to take creative initiative and provide novel ideas, which improves organizational performance (Shahzad, Xiu and Shahbaz, 2017).

Several studies have looked at technological and commercial viability as key factors that determine whether innovation projects and efforts succeed or fail. A key component of innovation success is commercial viability, which includes elements like price strategies, market acceptability, and overall economic feasibility (Chatterjee *et al.*, 2023). Similarly, a key factor in the success of innovation is technological feasibility, or the capacity of a suggested technology to be created and applied (Odide, 2021). When quality and price are appropriately and equally matched, an item is more likely to be economically successful and increase organizational performance (Perez-Alaniz *et al.*, 2023). On the other hand, a lack of commercial viability can result in failure and a decrease in an organization's performance. Similarly, organizational performance is expected to increase if innovation projects are technically possible (Wijethunga, Rahman and Sarker, 2023). The above argument yields the following hypotheses within the context of Pakistan:

H4. In the context of Pakistan, the success of product innovation (SPI) improves organizational performance (OUT).

H5. In the context of Pakistan, failure to innovate (FAL) has a negative impact on organizational performance (OUT).

Table 1 displays a statistical representation of the explanation of each construct employed in this research, along with their associated sources. **Figure** 1 illustrates the conceptual structure, which includes all the postulated linkages. The conceptual model used in this study is adopted from (Chatterjee *et al.*, 2023).

4. Research Methodology

4.1. *Research Design*

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The investigation will use a quantitative method to identify the link between economic viability, technological feasibility, and the success or failure of inventive activities. A cross-sectional study will be used to collect data at a single moment in time from a broad sample of organizations.

4.2. *Sampling Strategy*

The sample frame will include businesses from a variety of industries, including industrial and service sectors, to ensure a thorough knowledge of innovation dynamics. A purposive sample approach will be utilized to pick firms that have recently participated in innovation programs. The sample size will be set by considering statistical power and representativeness. To test our study hypotheses, we performed a survey utilizing a questionnaire, which is detailed in the following section

4.3. *Preparation of questionnaire*

A questionnaire was developed using prior research and concepts. The questions are on a 5-point Likert scale, with 1 representing Strongly Disagree (SD) and 5 representing Strongly Agree (SA). A 5-point Likert scale was used, as in many previous survey-based empirical investigations since it is simple to use and allows respondents to express a neutral position by selecting "neither disagree nor agree". To improve the clarity of the questions, eleven experts' perspectives were assessed as a preliminary test. Five of the eleven specialists are from academia and have over eight years of research background in innovation leadership and project leadership. The remaining six specialists were from a variety of professions, including mechanical healthcare, fabrics, computer networking, telecommunications, and sales, and had at least ten years of pro knowledge. The experts' views helped to fine-tune and improve the questionnaire's legibility. Given the extent of the study and the complexity of the structures under consideration, a questionnaire with 26 items is extremely comprehensive. Items statements and their sources are given in Chatterjee *et al.* (2023) appendix section. To assure the questionnaire's efficacy and the validity of the acquired data, pilot testing was carried out to evaluate the items' clarity, comprehensibility, and relevance. A pilot test was conducted with 28 convenience-selected respondents. The 28 respondents were not included in the main poll.

4.4. *Data Collection*

Data gathering for this study took place in Pakistan as an extension of prior research in India (Chatterjee et al., 2023). Collaborating with numerous Pakistani business groups, including Lahore Chamber of Commerce & Industry (LCCI) were instrumental in providing access to relevant stakeholders and organizational representatives. Furthermore, participation in industry-specific groups such as the Pakistan Software Houses Association (P@SHA) and the All-Pakistan Textile Mills Association (APTMA) enhanced the study by obtaining opinions from many sectors of the Pakistani economy.

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Several factors contributed to the choice to focus on Pakistan. First and foremost, Pakistan is a growing economy with enormous development potential and a broad corporate landscape. Pakistan's unique location at the crossroads of South Asia, Central Asia, and the Middle East makes it an important player in regional economic cooperation efforts. Its participation in projects such as the China-Pakistan Economic Corridor (CPEC) and membership in organizations such as the "South Asian Association for Regional Cooperation" (SAARC) demonstrate its strategic relevance. Pakistan's vast and expanding population, along with increased urbanization and a booming middle class, provide considerable opportunity for enterprises and innovative projects. Studying innovation dynamics in Pakistan provides insights on capitalizing on this massive market potential. Pakistan's status as an emerging market creates distinct difficulties and possibilities for businesses and innovation ecosystems. Understanding how firms negotiate these dynamics and use their innovative capabilities may give significant insights for both domestic and international stakeholders. Focusing on Pakistan enables comparative examination of surrounding nations and regions, revealing regional differences in innovation ecosystems, regulatory frameworks, and market dynamics. This comparative viewpoint helps to better appreciate the role of innovation in promoting economic development and competitiveness in South Asia.

Using the provided links, we were able to compile a list of 349 organizations, including contact information. Out of the 349 organizations, 294 were determined to have invested in innovation initiatives in the previous three years. Because the survey's unit of analysis is the organization, senior executives from these 294 organizations were invited to participate. They were advised that the project's purpose was academic, and they were guaranteed that their identities and confidentiality would be protected. Participants were given instructions on how to complete response papers. All 294 top managers were asked to answer within 3-months (November 2023-January 2024). By the deadline, 281 executives had responded. Twenty-one out of 281 responses were incomplete. These weren't maintained. So, 260 responses were then analyzed using PLS-SEM. Table 1 includes detailed descriptive information for the 260 companies.

5. Analysis and Findings

We employed PLS-SEM to test our study hypothesis. Our goal was to look at how contextual factors like economic viability and technological feasibility influence the success of innovation projects in Pakistani firms. The partial least squares structural equation modeling (PLS-SEM) approach was chosen for its ability to handle complicated models successfully. Furthermore, PLS-SEM does not impose strict sample size constraints. (Kock and Hadaya, 2018) demonstrate that PLS-SEM's power is consistent with that of regular least squares regression and, most likely, other approaches with comparable mathematical bases.

5.1. *Factor Analysis*

To assess the validity and accuracy of a measuring scale, to validate discriminant validity, consistency, and convergent validity, we employed Confirmatory Factor Analysis (Akter, D'Ambra

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and Ray, 2010). The findings in Table 2 illustrate the validity of the measuring scale by having items loading larger than the minimal criterion of 0.5 is acceptable (Hair *et al.*, 2010; Memon and Rahman, 2014). We also investigated the constructs' validity and stability by computing the average variance extracted (AVE) and combined reliability (CR). Cronbach's alpha was used to assess inner coherence across all components. Our findings showed that all loading factors surpassed the suggested threshold of 0.7 (Fornell and Larcker, 1981; Akter, D'Ambra and Ray, 2010), while the calculated AVE values exceeded 0.5 (Hair *et al.*, 2010). The findings of Construct Reliability and Convergent Validity are described in Table 3. The discriminant validity was assessed using the "Fornell and Larcker criteria" (Fornell and Larcker, 1981). We discovered that the square roots of all AVEs were bigger than their bifactor association factors. Table 4 presents detailed results.

Table 1: Characteristics of Participating Enterprises (N = 260)

Category	Description	Frequency (n)	Percentage (%)
Company Tenure	Established Over Two Decades	95	36.54
	Operational for 5–20 Years	50	19.23
	Startups Launched Within Five Years	115	44.23
Company Size	Employing Over 5000 Personnel	90	34.62
	Midsize Enterprises (1000–5000 Employees)	60	23.08
	Small to Micro Businesses (<1000 Employees)	110	42.31
Business Type	Service-Oriented Firms	140	53.85
	Manufacturing Enterprises	120	46.15
Industry Sector	Textile Manufacturing	70	26.92
	Retail	40	15.38
	Automotive	35	13.46
	Information Technology	40	15.38
	Telecommunications	45	17.31
	Pharmaceuticals	30	11.54

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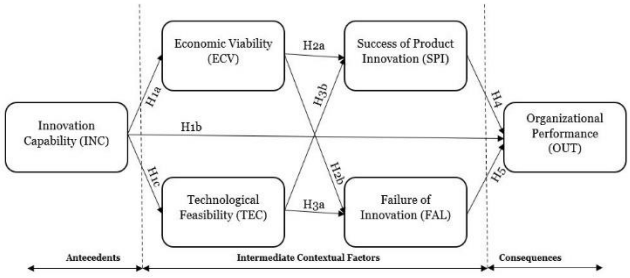

Figure 1: Conceptual Model, Source: (Chatterjee *et al.*, 2023)

Table 2: Factor Analysis

	INC	ECV	TEC	SPI	FAL	OUT
INC1	0.86					
INC2	0.72					
INC3	0.85					
INC4	0.87					
INC5	0.90					
ECV1		0.77				
EC		0.				

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V2		81				
ECV3		0.72				
ECV4		0.88				
TEC1			0.82			
TEC2			0.85			
TEC3			0.73			
TEC4			0.91			
SPI1				0.85		
SPI2				0.85		
SPI3				0.83		

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SPI4				0.82		
FAL1					0.88	
FAL2					0.93	
FAL3					0.83	
FAL4					0.78	
OUT1						0.88
OUT2						0.76
OUT3						0.82
OUT4						0.89
OUT5						0.85

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Table 3: Construct Reliability and Convergent Validity

Construct	Cronbach's Alpha	ρ_A	Composite Reliability	Average Variance Extracted (AVE)
INC	0.85	0.88	0.89	0.82
ECV	0.78	0.81	0.83	0.76
TEC	0.82	0.85	0.87	0.79
SPI	0.79	0.82	0.84	0.77
FAL	0.75	0.79	0.82	0.74
OUT	0.81	0.84	0.86	0.80

Table 4: Discriminant Validity

Constructs	INC	ECV	TEC	SPI	FAL	OUT
INC	0.82					
ECV	0.28	0.81				
TEC	0.31	0.22	0.85			

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SPI	0.35	0.39	0.28	0.88		
FAL	0.23	0.27	0.21	0.25	0.87	
OUT	0.26	0.36	0.32	0.28	0.29	0.86

5.2. *Heterotrait-Monotrait Ratio (HTMT)*

The HTMT ratio criteria were devised to establish the equivalence between the Fornell and Larker criteria, as well as the cross-loading condition. With the HTMT ratio approaching one, it suggests that the path assessment lacks discrimination (Fornell and Larcker, 1981). HTMT is an examination of component correlation (specifically, the upper border). To detect and grasp two components, HTMT will be less than one. The HTMT ratio is shown in Table 5 and is less than 1, indicating high discriminant validity between the components.

5.3. *F Square Test*

The F-square test determines the predictive potential of each predictor factor in explaining endogenous variables. An important independent variable, F-square values of 0.02 indicate a modest influence, 0.15 a moderate effect, and 0.35 a significant effect. It demonstrates that the higher the value, the greater the level of relevance (Cohen, 1988; Shiau, Sarstedt and Hair, 2019). Table 6 displays the outcomes of the present investigation.

Table 5: HTMT

	INC	ECV	TEC	SPI	FAL	OUT
INC						
ECV	0.4					

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	9 1					
T E C	0 . 3 6 0	0 . 6 2 0				
S P I	0 . 2 9 5	0 . 5 0 7	0 . 7 0 6			
F A L	0 . 2 3 7	0 . 3 9 1	0 . 6 0 1	0 . 7 7 1		
O U T	0 . 1 7 9	0 . 3 3 9	0 . 4 8 3	0 . 6 4 7	0 . 8 3 1	

Table 6: F Square

Variables	F Square Value
INC	0.429
ECV	0.667
TEC	1.000
SPI	0.538
FAL	1.000
OUT	1.222

5.4. *Hypothesis Testing*

To examine the hypotheses, a bootstrapping method was utilized. especially utilize the bootstrap PLS approach to produce data ranging from 100 to 5000. The

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significance of the structural model connection should be determined by assessing the variance levels given by the predictor parameters, the amount of the effect size, and the predictor variable. Additionally, the associated t-values for the route coefficients must be computed using bootstrapping with 5000 resamples. Each bootstrap has 260 instances because the original sample included 260 occurrences. We utilized SmartPLS and 5000 bootstrap subsamples to automate the development of this variable. Furthermore, (Sullivan and Feinn, 2012) believe that it is critical to evaluate the impact sizes of links. In this sense, the "p-value" reveals if an impact exists but does not reveal the size of the effect. SEM analysis was used to calculate path coefficients, p-values, and coefficients of determination for each connection and construct. Therefore, the legitimate and validated model is illustrated in Figure 2. The SEM model used in this study is adopted from (Chatterjee *et al.*, 2023).

Table 7: Structural Equation Model

Linkage	Hypothesis	Path Coefficients	p-values	Remarks
INC -> ECV	H1a	0.25	< 0.01	Accepted
INC -> OUT	H1b	0.18	< 0.05	Accepted
INC -> TEC	H1c	0.12	< 0.05	Accepted
ECV -> SPI	H2a	0.15	< 0.01	Accepted
ECV -> FAL	H2b	0.20	< 0.01	Accepted
TEC -> SPI	H3a	0.30	< 0.001	Accepted
TEC -> FAL	H3b	-0.25	< 0.01	Rejected
SPI -> OUT	H4	0.28	< 0.001	Accepted

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FAL -> OUT	H5	-0.22	< 0.05	Accepted

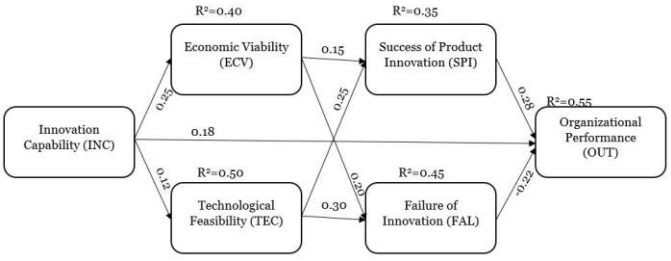

Figure 2: SEM Model, Source: (Chatterjee *et al.*, 2023)

6. Discussion and Conclusion

We formulated and assessed nine hypotheses drawing from diverse research domains such as innovation management literature, dynamic capabilities view (DCV), and innovation skills. Our analysis revealed significant positive effects of INC on ECV, OUT, and TEC, yielding notable path coefficients of 0.25, 0.18, and 0.12 ($p < 0.01$, $p < 0.05$, respectively). Moreover, the findings demonstrate the substantial influence of ECV on SPI and FAL, as evidenced by path coefficients of 0.15 and 0.20, respectively, with p-values < 0.01. TEC exhibited a significant influence on SPI manifesting focal path coefficients of 0.30. While TEC shows negative effect on FAL, manifesting focal path coefficients -0.25 ($p < 0.01$). Hypothesis (H3b) is rejected in our research. While (Chatterjee *et al.*, 2023) found a significant positive relationship between technological feasibility (TEC) and innovation failure (FAL) in India. The same relationship may not hold true in Pakistan due to variations in technological infrastructure, resources, and industry dynamics. Notably, SPI demonstrated a substantial positive effect on OUT, with a focused path coefficient of 0.28 ($p < 0.001$). Additionally, our study revealed that FAL exerted a notable negative impact on OUT, with a focal path coefficient of -0.22 and a p-value less than 0.05. Furthermore, the findings indicate that INC could predict ECV and TEC with 40% and 50% explained variance, respectively. The research revealed that ECV and TEC could explain 35% of the variation in SPI, and 45% of the variation in FAL. Moreover, the proposed conceptual framework effectively predicts OUT through SPI, INC, and FAL, accounting for 55% of the explained variance. The coefficient of determination, ranging from 0 to 1 (100%), signifies the degree to which a statistical model, including independent variables or predictors, predicts the outcome variable. The findings of this study indicate that INC exerts a notable positive influence on ECV, OUT, and TEC. This corroborates with (Van der Panne, 2003) research, which suggested that innovation can

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significantly impact both the technological and commercial viability of a project, consequently affecting organizational performance. Furthermore, our results support the findings of (García-Quevedo, Segarra-Blasco and Teruel, 2018; Chatterjee *et al.*, 2023) underscoring the crucial role of commercial viability and technological feasibility in determining the success or failure of product innovation initiatives. Additionally, the study reveals that ECV and TEC play a significant role in innovation failure. Such failures offer valuable learning opportunities for firms to refine their business practices, thereby enhancing overall performance.

6.1. *Contribution of the study*

This study's contribution is to investigate the dynamics of organizational innovation skills and their influence on performance in the setting of Pakistan, echoing the pioneering work of Chatterjee and colleagues in India (Chatterjee *et al.*, 2023). Our research adds to the current literature in numerous major ways. For starters, it combines the resource-based view (RBV) (Cabrera-Moya and Reyes, 2018), dynamic capabilities view (DCV) (Zhang et al., 2022; Alves *et al.*, 2017), and innovation capabilities idea to create a new conceptual model that defines innovation failure and its consequences for corporate performance. By incorporating these theoretical viewpoints, our methodology goes beyond the standard RBV and DCV paradigms, highlighting the need of connecting innovative talents with organizational resources to produce both successful and poor innovation results (Francis and Bessant, 2005). This new method addresses a vacuum in the literature by directly connecting RBV, DCV, and innovation skills, stressing the essential importance of innovation capabilities in improving organizational performance.

Second, our research emphasizes the need of combining DCV and innovation skills to better understand how businesses find, seize, and respond to innovation opportunities in changing business environments. By highlighting specific elements that contribute to innovation failure, we supplement the DCV approach (McGguinness, 2008) and highlight the need of assuring the commercial and technological viability of innovation initiatives to improve overall organizational performance. This expansion of the DCV paradigm fills a significant vacuum in the literature, as previous research has not clearly linked dynamic capabilities to the problem of innovation failure.

Third, our research contributes to current knowledge by providing a broad view on the causes of innovation failure (Gerben, Cees and Alfred, 2003). Unlike previous studies (Gerben, Cees and Alfred, 2003; García-Quevedo, Segarra-Blasco and Teruel, 2018) that looked at budgetary constraints or strategic issues as causes of innovation failure in isolation, our study emphasizes the overall nature of the challenge, highlighting the critical roles of management support, budget allocation, employee skill development, and innovation strategy in mitigating the risk of failure in innovation initiatives. Furthermore, we underline the necessity of perceiving innovation failure as a useful learning opportunity for firms to use in future innovation efforts.

Finally, we provide a logically oriented framework that explains how administrative innovation skills (Shahzad, Xiu and Shahbaz, 2017), particularly in terms of technological and economic feasibility, might improve organizational performance in the face of innovation failure. By integrating existing research (Chatterjee *et al.*, 2023) into a unified conceptual model, we add to the

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literature on innovation failure by offering a brief yet comprehensive framework for linking the causes and effects of innovation failure in the context of our study in Pakistan.

6.2. *Implications of the study*

Our findings have various implications for managers and practitioners working in innovation management. Managers may use the findings of our study to strategically match organizational resources with innovation skills. Managers may better deploy resources to improve innovation results if they recognize the crucial role of innovation skills in driving organizational performance. Understanding the elements that contribute to innovation failure, as shown in our study, enables managers to proactively identify and reduce risks associated with innovation initiatives. Managers may reduce the risk of innovation failure and its negative impact on organizational performance by addressing concerns such as commercial viability and technological feasibility. Our findings highlight the significance of seeing innovation failure as a learning opportunity. Managers may foster a culture of experimenting and learning in their firms, analyzing failures, extracting lessons, and using insights to influence future innovation efforts. Managers may utilize this data to prioritize investments in innovation skills, ensuring that adequate resources are available to support the creation and execution of new ideas.

6.3. *Limitations and Future Research*

While our research provides useful insights into the topic of innovation management, it is not without limits. To begin, the research uses cross-sectional data obtained at a particular instant in time, which limits our ability to establish causal relationships. Longitudinal research may give a more complete picture of the interactions between innovation capabilities, organizational performance, and innovation outcomes over time. Second, the study only examines organizations in Pakistan, which may restrict the findings' applicability to other situations. Future study might investigate how cultural, institutional, and contextual variables affect the links between innovation capacities and performance across countries and sectors. Furthermore, our study is mostly based on survey data, which may be susceptible to common technique bias and social desirability bias. To validate our findings, future study might use different approaches, such as case studies or experiments. Finally, while our research focuses on innovation skills and performance results, there may be additional elements that drive innovation success or failure. Future study might look at the function of leadership, organizational culture, and external environmental factors in influencing innovation results.

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Data availability: The data used in this paper is accessible upon request from the corresponding author.

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