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The Role of Firm's Open-Innovation Performance in Firm's Financial Performance: A Solution to Open-Innovation Challenges Evidence from Textile Industry of Pakistan

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ABSTRACT

This study purpose is to test the relationships between licensing & copy rights, relation with external stakeholders, intellectual property management and external knowledge incorporation, firms open innovation performance and firm financial performance, which suggests solution to open innovation challenges in the textile industry of Pakistan. A study was conducted on a sample of 250 managerial staff in the textile sector of Pakistan, using a simple random sampling method. The research model was tested using structural equation modeling (SEM). The results indicate that intellectual property management and external knowledge incorporation has a positive impact on firm open innovation performance and firm financial performance. Furthermore, result also reveal that licensing & copy rights, relation with external stakeholders have positive impact on intellectual property management and external knowledge incorporation, and that further positively link to on firm open innovation performance and firm financial performance. This study provides help to the management of the organizations to enhance firm financial performance while utilizing the open innovation performance of adopting enterprises as a strategic instrument.

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Introduction

Global financial crises have minimized the business opportunities for the corporates (Abdu & Jibir, 2018; Archibugi, Filippetti, & Frenz, 2013; Cincera, Cozza, Tübke, & Voigt, 2012; Colombo, Piva, Quas, &

Rossi-Lamastra, 2016; Filippetti & Archibugi, 2011; Paunov, 2012). Corporations must develop new methods to thrive in this competitive marketplace (Colombo et al., 2016). Corporations become more competitive by developing creative tactics, fast economic globalization, industrial integration, and rapid technology development encourage corporations to seek external novel ideas to generate new and inventive products (Cassiman & Valentini, 2016; Lin, Zeng, Liu, & Li, 2020). To meet such market challenges, innovative strategies are critical to success because they address the requirements of customers while also helping to improve financial performance (Srisathan, Ketkaew, & Naruetharadhol, 2020).

Innovations are only possible to implement within the internal structure of the companies with clearly defined structured boundaries (Mutlu, 2013). Firstly, corporations tend to allocate substantial resources towards internal research and development (R&D) endeavors, aiming to establish a robust knowledge hub. Secondly, the R&D departments provide specified technological inventions that produce innovative products and services. Thirdly, due to the above-discussed ways, the innovative processes are defined by a closed system with fixed boundaries alongside the R&D activities (von Hippel, 2005). Several aspects must be attended to in successfully implementing a close innovation processes company. A closed, innovative process requires employees to have intense hard work and commitment (Zapfl, 2018). Close innovation perspective comes with its advantages and disadvantages (Rodríguez & Lorenzo, 2011; West, Salter, Vanhaverbeke, & Chesbrough, 2014; West, Vanhaverbeke, & Chesbrough, 2006). The most certain advantage of close innovation is the speed with which a firm can utilize its technology while producing a product (Lerner, 2009).

Alongside the advantage, the major setback of close innovation is the requirement of R&D efforts so that the focus would be on the need for the specified technologies (Marques, 2014). In light of such disadvantage, it is undoubtedly clear that the unavailability of sufficient resources and the inability to manage pet projects (Grama-Vigouroux, Saidi, Berthinier-Poncet, Vanhaverbeke, & Madanamoothoo, 2020), a close innovative initiative may produce a valuable but unnecessary and unwanted product which does not hold any value and fails to fit inside the firm's business structure (Chiaroni, Chiesa, & Frattini, 2010).

Globally, the textile trade is vital to the country's economic development (Mehar, 2022). The total export value in the world clothing trade was US \$626 billion in 2017, with 67% shared by the top 10 exporting countries. China was the world leader, with 31% global export market share, followed by Bangladesh, Vietnam, India, Italy, Turkey, Germany, USA, Indonesia and Pakistan (Mehar, 2022). Competing with developed countries in trade became a challenge for developing countries. As a developing country, Pakistan is the ninth largest exporter of textiles, with a share of 2.2% in the world textile market. It has been mentioned that more than 60% of the country's exports belong to the textile sector, while its share of the GDP is 8.5%. It employs over 40% of the manufacturing sector labor force, almost 11% of the national employment, and 60% of the national export.

In the fiscal year 2022-2023, as reported by the Pakistan Board of Investment and Trade, the textile industry contributed \$1.35 billion to Pakistan's exports, slightly lower than the \$1.53 billion recorded in the corresponding month of the preceding year. Notwithstanding this, the textile sector is experiencing a decline in its growth rate. According to the World Trade Organization's report in 2019, there was a significant decline of 11 percent in the yearly export of textiles. Notably, Pakistan did not rank among the top ten nations regarding textile exports. The Pakistan Bureau of Statistics has just published data indicating an 18 percent decline in the textile industry during June 2022 compared to the corresponding period in June 2023. The growth rate of Pakistan's textile and clothing exports is comparatively lower than that of other developing nations, such as Bangladesh and Vietnam. The textile sector export of Pakistan is currently experiencing a significant disparity, contributing merely 1.10% to the world export market, in contrast to Bangladesh's substantial contribution of 7.66% (Memon, Aziz, & Qayyum, 2020). However, in the past ten years, the overall performance of the textile industry has shown negative growth. The main reason for such negative growth is the need to adopt open innovation.

Currently, technology is becoming more advanced to meet customers' new demands. Corporations also tend to search for crucial information from the market and communicate with their stakeholders. The relevant knowledge flows in and out of organizational borders throughout the open innovation process, resulting in market expansion (Amer, Jun, & Ayaz, 2016). Several researchers (J.-S. Chen, Kerr, Chou, & Ang, 2017; Chesbrough, 2010; Gimenez-Fernandez, Bogers, & Sandulli, 2019; Grisseemann, Plank, & Brunner-Sperdin, 2013) forced that open innovation positively influence the firm financial performance. At the same time, adoption by FOI (Firm Open Innovation) is a significant challenge in Pakistan's textile industry. Therefore, it is essential to identify key drivers that will help adopt open innovation, improve FOIP (Firm Open innovation Performance), and implement such performance policies in textiles. Previous studies have examined the firm's open innovation performance in several ways, such as service innovation, product innovation, and technology innovation in the corporates (F. H. Ali, Ali, Malik, Hamza, & Ali, 2020; Bianchi, Croce, Dell'Era, Di Benedetto, & Frattini, 2016; Brunswicker & Chesbrough, 2018; Manville, Karakas, Polkinghorne, & Petford, 2019; Saebi & Foss, 2015).

However, more research has been needed to solve the issues associated with adopting open innovation in the textile industry. The role of FOIP must be addressed by prior research, particularly in the textile industry. Generally, FOIP relies on two primary sources, external knowledge and intellectual property management, that play a significant role in firm performance (Chesbrough, 2012). External knowledge refers to acquiring information from sources beyond the confines of the firm. This includes data obtained from suppliers, customers, stakeholders, partners, competitors within the industry, and other investors (Lioukas & Pateli, 2019). This paper aims to underscore the importance of external knowledge in augmenting the open innovation performance of businesses. In line with such evidence, organization managers need to collect new information from the external environment and then mix it with the organization's present knowledge, resulting in new idea generation and innovative products. Therefore, properly utilizing extern knowledge improves firms' open innovation performance (McKelvie, Wiklund, & Brattström, 2018). External innovation and intellectual property management are essential for adopting open innovation (Rastrollo-Horrillo & Rivero Diaz, 2019). Research urges to investigate external innovation and intellectual property management to attain corporate success through open innovation strategies.

Previous research has extensively investigated the implementation of open innovation in the textile industry but overlooked examining the correlation between the success of firms in terms of open innovation. Therefore, the current study aims to investigate further by examining how organizations adopt open innovation and how it impacts their financial performance, notably in Pakistan's textile industry. A few studies have examined the connection between textile sector enterprises' open innovation success and firms' financial performance. Furthermore, a lack of proper research framework examines the interplay between intellectual property management, external information, organizations' embrace of open innovation, and the financial performance of firms, specifically within the textile industry. This study is the inaugural investigation of FOIP as a mechanism for augmenting innovation in Pakistan's textile sector. Numerous studies concentrated on the importance of innovation, but FOIP's importance in the textile industry should have been noticed. Hence, the primary objective of the present study is to investigate the interrelationships among EK (Extern Knowledge), IPM (Intellectual Property Management), FOIP (Firm Open Innovation Performance), and FFP (Firm Financial Performance).

Literature Review

According to the resource-based view, the success and performance of the organization are based on external knowledge and internal resources. These resources are tangible and intangible assets (e.g., employees' knowledge and skills) and organizational performance capability (Teece, Pisano, & Shuen, 1997). By following the resource-based view (RBV), an organization can also benefit from its external environment and enhance its performance, resulting in enhanced firm financial performance. RBV suggests that a firm's innovation is based on the internal capabilities of the organization as well as external knowledge from the external environment, such as information about rivals, external markets, and customers (ALKHAWLANI, 2020). The firm can also get information about its competitors, market opportunities,

and customer demands from the external environment to gain a competitive edge (Barney, 1991). Intellectual property (IP) is also crucial in the open innovation process, as organizations tend to offer resources and share knowledge from outside and inside the firm. The organizations can also lease out their license and get financial benefits from it. Conversely, it is also a challenging task for the organization. If managed properly, it can create good word of mouth for the company, resulting in positive financial performance. So, the organization should manage it wisely. Organizations should use proper managing tools.

Theoretical Framework

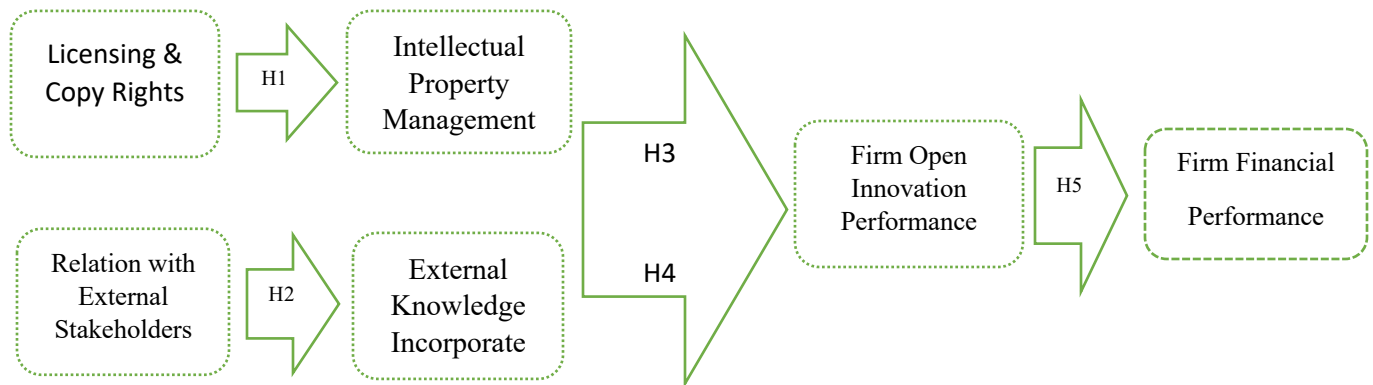


Figure 3: A Conceptual Research Model.

Note: L&CR= licensing & Copyrights, RES=Relation with external stakeholders, EK=External Knowledge, IPM=Intellectual property Management, FOIP=Firm open innovation performance, FFP=Firm financial performance

Licensing, Copyrights & Patent

Open innovation entails research, cooperation, and resource sharing; corporations confront several hurdles. One of the challenges associated with implementing open innovation is to pertain to intellectual property management. Numerous researchers are currently examining the influence of intellectual property management on the occurrence of open innovation. Sales suffer if intellectual property is not handled effectively (Alexy, Criscuolo, & Salter, 2009). Copyrights, trademarks, licenses, patents, and other IP management tools are available for corporations (Bogers, Chesbrough, Heaton, & Teece, 2019), and corporations employ these technologies to adopt open innovation and enhance financial performance. This study empirically examines this solution's impact on businesses' financial performance.

Intellectual property rights are protected by copyrights, licensing, patents, or trademarks that a company buys to protect its company from fraudulent activities (Ostrytska, 2020). Corporations use patents and trademarks to protect their copyrights and avoid any potential violation. The criteria for protecting copyright are commonly less critical than the conditions for patents and trademarks (Ostrytska, 2020). Moreover, suppose one organization acquires a portfolio of patents, trademarks & copyrights from another. In that case, it should know the strength of the patent organization portfolio, keeping in mind other important factors, i.e., the remaining patent terms & conditions and copyright protection, in addition to the capacity of every application designed for a patent (Ostrytska, 2020).

Furthermore, the problems faced in intellectual property law relevant to the obligation or acquisition of Intellectual Property licensing can be a problem with the intellectual property of the organization involved in this activity. For example, when companies transfer their trademark to another entity, they must ensure the licensee utilizes the trademark in conjunction with goods and services of equivalent quality to those associated with the trademarks and frequently linked with. Alternatively, if the trademark fails to maintain

its distinctive character, it risks losing its legal protection and may be invalidated (Judge & Al-Sharieh, 2011; Kauffman, 2012).

Intellectual Property Management

Intellectual property is defined as the right to use the property for a specific period by the trade organization. Intellectual property (IP) refers to organizational technology, knowledge, customer relationships, experience, and professional abilities that provide a competitive advantage in the market. One method of ensuring an innovation's marketability is through intellectual property (Von Zedtwitz, 2004). Corporate strategists are always concerned about intellectual property rights and potential information leaks. Intellectual property rights are utilized to protect a company's fundamental assets. No one can utilize it unlawfully if the corporation makes it commercially available. Intellectual property law grants only restricted rights to utilize the property creatively. However, these privileges are also geographically constrained. The fundamental goal of intellectual property is for corporations to readily provide the rights to utilize the property, which benefits stakeholders.

One of the obstacles to implementing open innovation is intellectual property management. Intellectual property management refers to both technical and intellectual property. Patents, trademarks, design rights, and copyright are all examples of intellectual property. If a corporation believes that its property is legally protected and being used lawfully, it grants permission to utilize it (Hagedoorn & Ridder, 2012). Intellectual property management boosts company trust and allows them to share their intellectual property with their R&D. IP management promotes open innovation, which improves business financial performance.

Hypothesis 1= Licensing, Copyrights & Patents has significant impact on intellectual property management.

Relation with External Stakeholders:

Organizations tend to create connections with external groups, individuals that are not directly part but indirectly play a significant role in improving their financial performance. Generally, organizations prefer sustainable and renewable energy projects to maintain the satisfaction level of all the key stakeholders, which becomes challenging in dynamic political and economic environments, especially in developing countries. More attention should be given to the comprehensive examination of the power interest matrix's role in optimizing stakeholder satisfaction within the context of renewable energy projects in the literature, despite studies on project leadership and shareholder relationships. Establishing solid ties with external stakeholders (such as customers, society, government, and consumers) is crucial for the success of an organization and can aid in enhancing a business's financial success. Research evidence also found that external stakeholders are strongly related to external knowledge (Hameed, Nisar, & Wu, 2021). Therefore, good relations with external stakeholders positively change the firm's financial performance.

Prior research revealed that innovation plays a crucial role in enabling companies to meet the expectations of consumers and other stakeholders. The significance of innovation is growing in various domains, encompassing the textile sector. Organizations offering competitive advantages and innovative solutions may experience advantages when implementing change. Nevertheless, it is essential to note that not all alterations are readily apparent, and innovation is intrinsically challenging to define and evaluate. The intangibility of investments necessitates the creation of instruments that can aid managers in effectively monitoring the results of their efforts. The study posits that implementing open innovation, strong leadership, and cultivating cooperation might potentially augment a company's success (Santos & Dieguez, 2021).

To overcome communication barriers and contract challenges, open innovation necessitates a range of complicated interactions between firms and other groups (Hoffmann & Schlosser, 2001). A suitable institutional framework must exist for all stakeholders to interact to lower company monitoring costs. From the standpoint of institutional guarantee, the government can give a range of financial assistance to stimulate the construction of collaborative linkages among organizations to raise the number of open innovation activities of firms and make them more open. Several studies have shown that government support encourages active collaboration between businesses, universities, research institutes, and other groups (Ghisetti, Marzucchi, & Montresor, 2015).

External Knowledge Incorporate

Chesbrough and Crowther (2006) highlight that one of the significant problems that corporations encounter in adopting open innovation is that workers are hesitant to use extra organizational knowledge and avoid obtaining information from the environment, which is a significant barrier to adopting open innovation.

The process of open innovation involves the outflow and inflow of knowledge. Due to the process of integration of external and internal information, new ideas develop. External knowledge positively impacts the adoption of open innovation (Pollok, Lüttgens, & Piller, 2019). Specifically, when internal knowledge is insufficient in the textile industry to address the difficulties of a competitive corporate environment, external information from corporate and market players tends to assist the firm (Hameed et al., 2021).

Pakistan's textile industry must properly utilize external knowledge to get information about the latest technology or customer trends. For this purpose, corporations need to collaborate for mutual advantage. Coordination is another major issue that impedes the inflow of external knowledge (López-Nicolás & Meroño-Cerdán, 2011). Divergence is also a problem with coordination (Almirall & Casadesus-Masanell, 2010).

The significance of assimilating external knowledge as a predictor of competitive advantage has been highlighted in earlier studies on deploying open innovation. The notion of open innovation regarding absorptive capacity is widely recognized at necessary research- and development-oriented (R&D) institutions. The academic discussion surrounding the primary factors influencing the acceptance and

implementation of open innovation centers mainly focuses on incorporating external knowledge. The concept was initially expressed and examined by Chesbrough (2003). Subsequently, numerous scholars (Hannen et al., 2019) contend that including external information is a crucial element in generating novel ideas (Teirlinck & Spithoven, 2008).

Hypothesis 2= Relation with external stakeholders has significant impact on external knowledge incorporation

Firm Open Innovation Performance:

Due to the growing complexity and uncertainty of the environmental and technical landscape, businesses rely on open innovation to maintain long-term competitiveness. As a result, businesses are changing and approaching open innovation, participating in a range of activities from bilateral deals to group partnerships with many parties. However, adopting open innovation can also present hazards; it is more than just a source of opportunity for businesses. Businesses may enhance their innovation processes by utilizing open innovation centered on the co-development of concepts and products. Inbound and outward open innovation fields have involved increasing interest from academics and professionals.

Firms primarily depend on closed innovation models in their early stages (Chesbrough, 2012). This innovation process entails firms relying entirely on internal resources and refraining from seeking chances beyond the firm's borders (Chesbrough, 2006a). The strategy indicated above experiences a transition towards a new paradigm that prioritizes the creation and commercialization of inventive ideas through joint endeavors, including consumers, suppliers, and other research entities (Abulrub & Lee, 2012; Fichter, 2009). Most of textile industry in Pakistan lack innovative offerings owing to poor service quality, the notion of enterprises' open innovation performance should be established. (Salampasis, Mention, & Kaiser, 2017).

Some researchers demonstrate a U-shaped relationship between organizational success and open innovation. Several research findings have observed that open innovation negatively impacts organizational performance during the initial stages. More revenue was required to purchase new technologies (Salge, Farchi, Barrett, & Dopson, 2013), , and training of the employees to operate new technology at early open innovation showed slight growth. According to Chesbrough, Lettl, and Ritter (2018) Trott and Hartmann (2009) innovation trends are now changing. Now, the firms working are different, and they are boundless as they emphasize conceptualization and commercialization. Innovative firms are considering open innovation models as compared to closed innovation methods. Many external bodies, including suppliers, customers, competitors, and dealers, participate in innovation activities (Moghaddam et al., 2023).

Hypothesis 3= Intellectual property management has significant impact on firm open innovation.

Hypothesis 4 = External knowledge incorporation has significant positive impact on firm open innovation performance.

Firm Financial Performance:

The concept of firm financial performance pertains to evaluating a business's financial well-being and overall performance. Several financial measures may be used to assess this, including revenue, profit margins, return on investment, cash flow, and debt-to-equity ratio. A company performing well financially is likelier to have a steady and rising revenue stream, high profitability, positive cash flow, and less debt. A company with poor financial performance, on the other hand, can have trouble making money, low or negative profitability, negative cash flow, and excessive debt levels. To preserve long-term survival and profitability, businesses must maintain excellent financial performance.

Firm performance has both operational and financial performance. Financial performance is a device that tells how well a company can adequately utilize resources and generate income. It can also be used as a tool to indicator of an organization's long-term financial sustainability. Analysts and investors look at the

financial performance of the organizations before investing in any sector. Investors also compare financial performance in similar or different sectors(Sohn, Joo, & Han, 2007).

In this research, we measure the firm's performance using its financial ratios like ROA, ROE, and sales. Three financial performance measures are used, i.e., liquidity, leverage, and profitability (Ramaswamy & Waegelein, 2003). Moreover, we are developing a model to measure firms' financial performance, particularly in Pakistan. Most of the financial ratios tells about the availability of the funds and their investments in different portfolios needed to be included in the past studies. In developing countries, most investors and stakeholders like to invest in projects whose financial performance is exceeding and whose financial performance is improving and showing positive growth (Busienei, 2010).

Hypothesis 5=Firm open innovation has significant impact on firm financial performance.

Data, Variables, and Methodology

The questionnaire utilized in this study has been derived from prior research studies. The study variables were evaluated using a 5-point Likert scale, where a score of 1 represented strong agreement, and 5 represented extreme disagreement. The financial performance metric utilized in this study was derived from the work of Hameed et al. (2021). Firm open innovation performance is measured from the scale adopted (Hameed et al., 2021). Intellectual property management is measured from the scale adopted by Davoudi et al. (2018) and external knowledge incorporate, which is measured from the scale adopted by Hameed et al. (2021).

Data was collected between March 2023 and August 2023. Self-administrated survey was used. Some online methods like Linked In, Facebook, and Gmail accounts were used to collect data online. To gather data from individuals holding positions as both low-level and middle-level managers within the textile business. Simple random sample procedures were utilized for participant selection. The employed sampling technique effectively generates representative groups from the population, ensuring that each individual within the population group has an equal probability of being selected. Additionally, this methodology reduces the likelihood of errors in the obtained evidence, supporting the rationale for generalizing the findings from the selected sample (Saunders, Lewis, & Thornhill, 2009).

The subjects of observation in this study consist of the managerial staff employed in the textile sector, with the unit of analysis being the individual employees within this group. The proposed sample size was determined by Krejcie and Morgan (1970) was used. The sample size of 265 was deemed appropriate. The G*Power programmer, namely version 3, was utilized in order to ascertain if the sample size was adequate. The proper sample sizes were estimated using G*Power's a priori power analysis, considering several statistical characteristics (Faul, Erdfelder, Lang, & Buchner, 2007). The suitable sample size for this study was determined by considering four predictors by the established convention for medium impact size, defined as 0.15, and employing a significant criterion of 0.05. Consequently, 265 participants were included in the sample, ensuring a statistical power of 0.95.

Four hundred questionnaires were disseminated, and 280 questionnaires were returned. The study yielded a response rate of 70%. During the screening procedure, a total of 10 questionnaires were excluded from the study, leaving 270 questions that were then utilized for data analysis. The provided sample size is deemed sufficient for conducting data analysis using partial least squares structural equation modeling (PLS-SEM), a statistical technique capable of performing analyses even with limited sample sizes (Hair Jr, Hair Jr, Hult, Ringle, & Sarstedt, 2021).

Table 1

Demographic profiles of the survey.

Demographics	Categories	Frequency (N = 270)	Percentage
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Gender	Male	200	74
	Female	70	26
Age	18-25	40	14.8
	26-35	150	55.55
	36-45	30	11.11
	46-55	10	3.70
Qualification	Matric	0	0
	Intermediate	30	11.11
	Bachelor	90	33.33
	Masters	98	36.29
	M. Phil	70	25.92
	PHD	9	3.33
Job Experience	Less than 2 years	40	14.81
	2-4 years	190	70.37
	5-10 years	35	12.96
	>10 years	5	1.85

Findings of the Study:

The Partial Least Squares Structural Equation Modelling (PLS-SEM) technique was employed for data analysis utilizing Smart PLS 3, which is widely recognized as a prominent and contemporary assessment method in the textile sectors (F. Ali, Rasoolimanesh, Sarstedt, Ringle, & Ryu, 2018; Rasoolimanesh & Ali, 2018). The Partial Least Squares (PLS) algorithm was employed, followed by bootstrapping approaches to ascertain the factor loadings, path coefficients, and their corresponding significance levels. The evaluation of the measurement model was performed by analyzing the assessment of the structural model.

Measurement Model Assessment Results:

Reliability of the data is measured by the measurement model assessments. Convergent validity and reliability were also checked.

Convergent Validity

Convergent validity was assessed by examining the concepts of factor loadings, average variance extracted (AVE), and composite reliability (CR), which are essential measures in academic research. These measures are commonly used to analyze factor analysis or structural equation modeling data. Factor loadings refer to the strength of the relationship between observed variables and latent factors. The AVE (Average variation Extracted) is a statistical metric used to quantify the extent to which a latent component accounts for the variation in a dataset, considering the presence of measurement error. CR, on the other hand, represents the model employed is depicted in Figure 5. In Table 2, it can be observed that all of the factor loadings surpass the required threshold of 0.60 for each item. Moreover, it is worth noting that all of the composite dependability ratings surpassed the suggested threshold of 0.70 (J. F. Hair Jr et al., 2021). Furthermore, it is worth noting that all of the average variance extracted (AVE) values for the constructs under investigation are above the required threshold of 0.05 (J. F. Hair Jr et al., 2021).

Discriminant Validity

Discriminant validity pertains to how a variable is differentiated from others under investigation (Hair, 2009). In the present study, two approaches were selected to assess the discriminant validity, namely the Fornell-Larcker criterion (FLC) (Fornell and Larcker (1981) and the Heterotrait-Monotrait Ratio (HTMT) (Henseler, Ringle, & Sarstedt, 2015).

The FLC

The assessment of discriminant validity was conducted using the Fornell-Larcker criterion (FLC), which involves comparing the square root of the average variance extracted (AVE) for each construct with the correlation coefficients of the other components (Fornell & Larcker, 1981). The square root coefficients of the Average Variance Extracted (AVE) were displayed in the correlation matrix below notably on the diagonal. To ensure discriminant validity, the square root of the average variance extracted (AVE) values must surpass the squared correlation estimations (Hair, 2009). The present investigation observed that the square root values of the average variance extracted (AVE) surpassed the correlation among all constructs. The diagonal items inside the respective rows and columns demonstrated discriminant validity across all constructs, as they exhibited higher values than the off-diagonal elements.

Table 2: Standardized Factor Loadings, AVE & CR.

Factor (Cronbach's α)	Items	Loadings	CR	AVE	Mean	SD
Licensing, Copyrights & Patents ($\alpha=0.841$)	LCR1	0.723	0.876	0.586	4.00	1.646
	LCR2	0.694			3.21	1.67
	LCR3	0.819			3.89	1.572
	LCR4	0.76			3.87	1.571
	LCR5	0.81			4.1	1.452
Intellectual Property Management ($\alpha=0.766$)	IPM1	0.655	0.842	0.516	3.94	1.169
	IPM2	0.766			3.93	1.295
	IPM3	0.738			3.90	1.168
	IPM4	0.679			4.07	1.434
	IPM5	0.748			3.84	1.452
Relation with external stakeholders ($\alpha=0.797$)	RES1	0.789	0.862	0.557	3.10	1.322
	RES2	0.812			3.21	1.382
	RES3	0.8			3.50	1.235
	RES4	0.662			3.69	1.09
	RES5	0.651			3.3	1.177
External Knowledge ($\alpha =$ 0.776)	EK1	0.578	0.849	0.533	3.89	1.376
	EK2	0.71			3.87	1.183
	EK3	0.757			3.87	1.202
	EK4	0.792			3.83	1.201
	EK5	0.791			3.19	1.130
Firm's Open Innovation Performance ($\alpha =$ 0.846)	FOIP1	0.57	0.888	0.572	3.81	1.153
	FOIP2	0.772			3.85	1.082
	FOIP3	0.747			3.87	1.179
	FOIP4	0.78			3.81	1.277
	FOIP5	0.814			3.88	1.259
	FOIP6	0.826			3.8	1.308
Financial Performance ($\alpha =$ 0.784)	FP1	0.723	0.853	0.593	4.13	1.221
	FP2	0.77			4.15	1.32
	FP3	0.837			4.02	1.311
	FP4	0.747			4.26	1.363

The HTMT

The HTMT (Heterotrait-Monotrait Ratio) was employed to evaluate the discriminant validity of the constructs is being assessed. is being examined., and the corresponding values were shown in Table 3 .All of the results observed were below the suggested threshold of 0.90 (Gold, Malhotra, & Segars, 2001) therefore, discriminant validity has been established for all notions.

Table 3: HTMT

	EKI	FOIP	FP	IPM	LCR	RES
EKI						
FOIP	0.743					
FP	0.586	0.783				
IPM	0.679	0.634	0.563			
LCR	0.365	0.434	0.45	0.373		
RES	0.542	0.65	0.616	0.741	0.602	

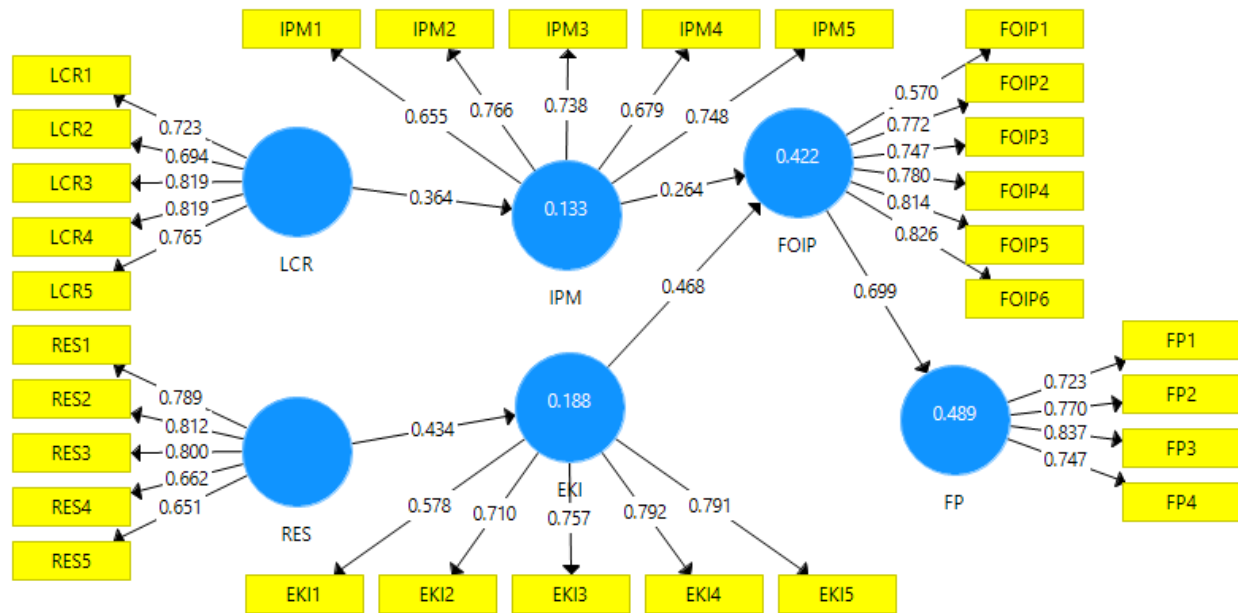


Figure 4: Measurement Model Assessment

Note: LCR= Licensing and copyrights, RES= Relation with external stakeholders, IPM= Intellectual Property Management, EK = external knowledge, FOIP = firms’ open innovation performance = Financial performance

PLS-SEM Direct relationship Results (the structural model)

The Partial Least Squares Structural Equation Modeling (PLS-SEM) technique was employed subsequent to the evaluation of the measurement model. The model is seen in Figure 5. Hence, the assessment of the model's significance was conducted by considering path coefficients, t-values, and standard errors. The main and indirect effects hypotheses were examined using the bootstrapping process in Smart PLS 3 (Ringle, Wende, & Will). As displayed in Table 4, Copyrights, licensing & patents has significant positive

impact on intellectual property management ($t=7.056, p<0$) H1 was supported as P value is smaller than 0. Further intellectual property management has significant positive relation with firm open innovation performance ($t=4.262, P<0$); H2 was also accepted. Furthermore, there exists a substantial positive correlation between the integration of external knowledge and the performance of open innovation within firms ($t=6.986, P<0$). Also, Furthermore, relation with external stakeholders has significant positive impact on external knowledge incorporate ($t=6.32, p<0$). Moreover, firm open innovation performance has significant positive relation with firm financial performance ($t =21.497, P <0$). Therefore, H5 is also accepted.

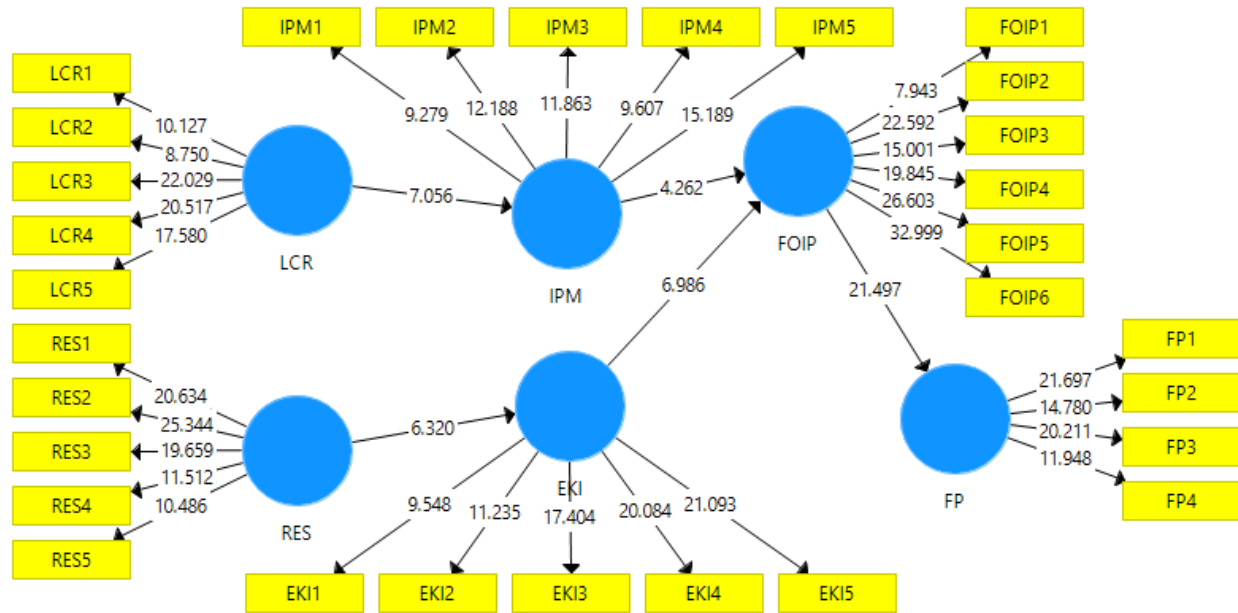


Figure 5: Structural Model Assessment

Table 4: Results

Hypothesis	Relationship	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values	Decision
H1	LCR -> IPM	0.364	0.385	0.052	7.056	0	Accepted
H2	RES -> EKI	0.434	0.447	0.069	6.32	0	Accepted
H3	IPM -> FOIP	0.264	0.263	0.062	4.262	0	Accepted
H4	EKI -> FOIP	0.468	0.472	0.067	6.986	0	Accepted
H5	FOIP -> FP	0.699	0.703	0.033	21.497	0	Accepted

Conclusion and Discussion:

Prior research has explored the importance of innovation and its influence on organizational performance. Still, scholars have yet to specifically address the function of FOIP in improving the financial performance of textile firms in Pakistan. To effectively tackle this prevailing issue in research, the present study introduces six constructs: Copyright, patents and licensing, relation with external stakeholders, external knowledge, intellectual property management, firms' open innovation performance, and firms' financial performance. In addition, a scholarly framework is proposed to elucidate the interrelationships among these

constructs, drawing upon the Resource-Based View (RBV) theory. The model underwent testing using a dataset comprising responses from 250 individuals occupying managerial roles within Pakistan's textile industry. A comprehensive analysis of the relevant scholarly works was conducted to construct a theoretical framework encompassing the aspects above. This research investigates the correlations among external knowledge, intellectual property management, open innovation performance, and corporate financial success. The study tests five hypotheses derived from the current literature. The current study examines the impact of firms' open innovation performance on firms' financial performance, using the assistance of H5. The findings indicate that the performance of firms in open innovation has a notable and favorable influence on their financial performance (Hameed et al., 2021). Moreover, it is well acknowledged in the manufacturing sector that the presence of a Research and Development (R&D) department is crucial for the advancement of new product development and product innovation (Cassiman & Veugelers, 2006; Wang, Lin, & Huang, 2010). Additionally, it should be noted that the inclusion of the Research & Development (R&D) department is not an obligatory component of the open innovation process, as it primarily relies on the establishment of collaborative networks between customers and suppliers (Santos-Vijande, López-Sánchez, & Rudd, 2016; Stokburger-Sauer, Scholl-Grissemann, Teichmann, & Wetzels, 2016).

External knowledge, intellectual property management, and the performance of organizations in terms of open innovation also exert a notable impact on their financial performance (Chesbrough, 2017; Marco-Lajara, Zaragoza-Sáez, Claver-Cortés, & Úbeda-García, 2018; Rangus & Slavec, 2017). A robust positive link has been seen between the open innovation performance of organizations and their financial performance. The research findings indicate that the performance of open innovation significantly and positively affects the financial performance of textile enterprises in Pakistan. Furthermore, the findings are consistent with the resource-based View (RBV). The notion of a resource-based view posits that both internal and external knowledge, namely opportunities, significantly contribute to success in business (Umrani, 2016).

Implications

Implications for academic research

The present paper presents a theoretical framework to enhance understanding of the five constructs' interconnectedness. Exploring topics such as copyright licensing, the relationship with external stakeholders, intellectual property management, and the adoption of open innovation by firms to enhance the financial performance of companies operating in the Pakistani textile sector remains an unexplored area in academic research. Numerous previous researchers (M. A. Chen, Wu, & Yang, 2019; Chesbrough, 2006a, 2006b, 2012, 2017; Hameed, Basheer, Iqbal, Anwar, & Ahmad, 2018; Saebi & Foss, 2015; Warren & Wiid, 2018). This study initiates a novel discourse regarding the correlation between a firm's open innovation performance and its financial performance, with specific emphasis on the textile industry. This paper additionally aims to investigate the primary factors influencing the open innovation performance of enterprises within the textile industry. This study presents novel findings indicating that the management of external information and intellectual property significantly influences the open innovation performance of enterprises in the textile industry, hence playing a crucial role in augmenting the financial success of these firms. The present study contributes significantly to the extant literature on the textile sector as it represents the first empirical investigation into the connections between the primary factors influencing firms' open innovation performance and their financial success within the context of the Pakistani textile industry. The textile industry serves as the cornerstone of Pakistan's export sector. The majority of the revenues are derived from it.

Practical Implications

The present research offers significant perspectives for textile management to enhance their commercial efficacy. The study offers a framework that textile management may use to improve the company's financial performance, encourage open innovation, and develop new services. Textile management can enhance the

comprehension of their business operations and make well-informed decisions to foster business expansion by adhering to this framework. Drawing upon the theoretical framework of the resource-based approach, the study's conclusions provide textile experts with insightful information. The findings give practitioners a thorough grasp of how open innovation has succeeded in the textile sector. There are many categories into which the study's practical consequences might be divided. In particular, the study aids in improving textile management's comprehension of the connection between firms' open innovation performance and financial performance.

Additionally, the study's findings indicate that utilizing external knowledge significantly contributes to accelerating textile sales operations. Hence, it is imperative for textile management to acknowledge the significance of external knowledge acquired from diverse sources, including suppliers, distributors, competitors, partners, and internal knowledge about the market. To enhance the pace of inventive endeavors, it is imperative for textile management to prioritize the incorporation of external ideas. In addition, their priorities address customer expectations through fashion modifications and actively engage in competition within the international market.

Furthermore, the study's findings indicate a noteworthy correlation between enterprises' open innovation performance and the textile industry's financial performance. Hence, it is imperative for textile management to optimize financial outcomes by fostering enterprises' open innovation capabilities through effective intellectual property management and the acquisition of external information. Current study findings demonstrate that the management of external information and intellectual property positively impacts the promotion of textile services through the provision of new services. Hence, based on the findings of this study, it is imperative for textile management to use proactive measures to enhance manufacturing innovation through the utilization of external knowledge and effective intellectual property management. The study's findings play a crucial role in textile management as they offer valuable insights into enhancing textile services, which is pivotal for success in the textile business.

Limitations and future directions

Despite its valuable insights on the problem, the study has its limits, as mentioned above. However, these drawbacks are potential areas for future research. To commence open innovation and examine the impact of firms' open innovation performance on textile service innovation, the research must consider several additional criteria. Open innovation necessitates internal creativity, motivation spillovers, external knowledge, and intellectual property management. Copyright and patents should be utilized to protect the most recent innovations since the techniques and concepts for the phenomena are still open.

Therefore, future studies should consider internal innovation and motivation spillovers as distinct variables. Second, the scope of this study refers to the extent or range of topics, variables, or phenomena considered and investigated within the research project. It is just the textile sector. Future research could concentrate on Pakistan's other sectors. Third, open innovation practices are typically expensive and need a lot of development-related tasks, which drives up the cost. Therefore, financial restrictions should also be considered when evaluating the textile industry's success if all textile companies fail to follow open innovation policies. Innovative ideas also need to be safeguarded by copyright and patent laws, which substantially raises the cost. Including consumers, suppliers, distributors, and other stakeholders in collaborative efforts is vital to get external knowledge, but at an increased overall cost.

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