



## Investigate the Mediating Impact of Absorptive upon Capacity Innovation and Firm Performance

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### ABSTRACT

The main goal of the research is to investigate how absorptive ability influences innovation and company performance. Employing Partial Least Square Structural Equation Modeling (PLS-SEM). The data from registered medium-sized manufacturing firms in Punjab, the study aims to provide valuable insights for academicians, CEOs/managers, and policymakers. In order to evaluate the research hypotheses, the planned operational study model was verified using PLS-SEM. Through innovation and absorptive capacity, negotiation examination was used to investigate the dependent variable's indirect impacts of independent variables. Furthermore, the research contributes to enriching theories in the field and offers practical implications for enhancing SME competitiveness and fostering economic development. Through an analysis of key economic indicators such as employment, value addition, and exports, the study sheds light on the SME growth is essential to Pakistan's economic development.

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## 1. Introduction

Several initiatives leading to sustainable economic growth are necessary for the successful transition of industrial economies into knowledge economies. These initiatives include information infrastructure development, innovation and technology adoption, education and training, and institutional and business support. It appears that information and intellectual assets have become the primary drivers of wealth creation, and that the process itself has changed (Song, Anees, Rahman, & Ali, 2024). In the knowledge era, intellectual capital has come to represent an indicator of economic viability & vitality. According to Zhao, Rahman, Afshan, Ali, Ashfaq, and Idrees (2023) the majority of financial and physical assets are commodities that cannot realize additional economies of scale, and their average yield is equal to their cost of capital. On the other hand, the primary competitive advantage that increases a company's worth is its intellectual capital, according to Tanveer Ahmed Shahid, Rahman, Sheikh, and Allahrakha (2024) have dubbed it the single primary driver of business value due to this rationale. A knowledge-based non-financial intangible asset that is not entirely under a company's ownership or control is called intellectual capital. Introduction (Shahzadi, Sheikh, Sadiq, & Rahman, 2023). This introduction delves into the assessment of SME performance through the lens of intellectual capital dimensions mediated by absorptive capacity and innovation, and its subsequent impact on economic growth in Pakistan. Intellectual capital encompasses the intangible assets of organizations. By exploring how intellectual capital dimensions interact with absorptive capacity to stimulate innovation within SMEs, we uncover the pathways through which knowledge assets are translated into economic value (Ullah, ur Rahman, & Rehman, 2023). Innovation, driven by effective management of intellectual capital and absorptive capacity, contributes not only to SME performance but also to broader economic growth by enhancing productivity, competitiveness, and market penetration.

The theories and models created for large organizations have often been the basis for research on SME performance, it is therefore challenging to understand how intellectual capital gives SMEs a competitive edge (Dawood, ur Rehman, Majeed, & Idress, 2023). In order to assess the integrated sequencing mediation model experimentally, this study will make use of two dynamic capabilities: invention and absorptive ability. Though within the past 20 years, innovation and the ACAP have garnered a lot of scholarly attention. The way SMEs handle their innovation and intellectual capital is different from that of larger companies. The way SMEs handle their intellectual resources and innovation endeavors differs from that of larger enterprises.

## **2. Literature Review**

As per the source, "absorptive capacity" is an organization's capability to obtain, analyze, modify, and utilize external data from suppliers, consumers, and partners to foster creativity (Minhas, Maqsood, Shahid, & Rehman, 2024). In order to increase productivity and competitiveness, it refers to a company's capacity to take in, evaluate, and use new information. Absorbent capacity is a key concept in economics that helps explain how businesses may innovate and adjust to shifting market conditions. The relationship between absorptive ability and economics can be seen in the way it affects productivity and economic growth. Companies with a high capacity for absorption are better able to use it to create new products, services, and processes. This might lead to productivity increases, which would increase competitiveness and economic growth (Zahra, Nasir, Rahman, & Idress, 2023).

### **2.1. Innovation**

According to Tanveer Ahmad Shahid and Rehman (2023) A business's ability to compete and survive in an entrepreneurial environment is generally seen as reliant on its invention, which is seen as a fundamental component of business innovation (K. Nkundabanyanga, Balunywa, Tauringana, & M. Ntayi, 2014). Product innovation is the process of creating novel items that satisfy consumer demands and offer a business an edge over competitors. Using a fresh approach to sell existing items and bringing them to new markets to boost sales is known as market innovation. Innovation is the process of using new strategies and techniques to effectively and efficiently use a company's resources and skills. The creation of new tactics to establish company values is referred to as strategic innovation. Finally, the term "behavioral innovation" describes how individuals, management, or businesses behave and see novelty. Thousands of academic publications, as well as a large number of corporate rankings and indexes, demonstrate how important innovation is to both scholars and practitioners. But according to Hafiza, Manzoor, Fatima, Sheikh, Rahman, and Qureshi (2022), innovation research is dispersed, has weak theoretical foundations, and hasn't been thoroughly examined anywhere.

### **2.2. SMEs Performance and Economic Growth**

Researchers and policymakers have been paying more and more attention in recent years to the connections that exist between firms (SMEs) and economic growth. Studies on the significance of SMEs for the growth of the economy in emerging nations are, nonetheless, few and far between. This is unexpected considering that both national and international assistance organizations focus on the SME sector. In fact, SME support programmers totaling US\$ 1.3 billion were approved by the World Bank in 2003. A notable study that examined the impact of SMEs on economic growth was conducted by Tanveer Ahmad Shahid and Rehman (2023) they estimate an adjusted standard growth regression that takes into account the relative sizes of small and medium-sized businesses for a cross-section of countries. Audretsch and Keilbach (2004) both use a similar methodology to assess how innovation affects economic development in industrialized nations. Studies looking at wealthy nations indicate a favorable impact of small- and medium-sized innovations on economic growth, while studies examining a sample of emerging nations show either no effect at all or a negative one summaries the findings of empirical research and offer evidence suggesting that innovation has a beneficial effect on growth in industrialized nations and has the opposite effect on developing ones. These variations in empirical findings have been ascribed by Zulfiqar, Ansar, Ali, Hassan, Bilal, and Rahman (2022) to various inventive reactions to institutional configurations. Furthermore, various nations and regions will probably offer distinct incentives for rent-seeking activities due to differences in institutional setups and levels of human capital.

### **2.3. Absorptive capacity**

Understanding the intricacies of market dynamics and customer-supplier relationships is imperative for firms striving to navigate the ever-evolving business landscape and chart a course for future growth. At the heart of this endeavour lies absorptive capacity (ACAP), hailed as a cornerstone for enhancing firm performance. Emphasize the crucial function of ACAP in utilizing knowledge resources, which are praised as the foundation of a company's strategic advantage (Mei, Rentocchini, & Chen, 2023). Redefining and leveraging knowledge-based assets becomes critical to organizational success in the competitive business world, where success depends on creativity and flexibility. Companies can gain a competitive advantage in the market and create new avenues for performance enhancement by refining their ability to leverage these assets. The foundation of organizational agility and growth, absorptive capacity, has attracted a lot of interest from academics in a variety of fields. This dynamic idea emphasizes how important it is for businesses to acquire external information in order to mitigate technology uncertainties and manage the ever-changing business landscape (Lane & Lubatkin, 1998).

Absorbent capacity enables businesses to break through current barriers and explore areas of scientific innovation that were previously unattainable by creating an atmosphere that is favorable to learning and adaptation. Businesses improve their capacity for innovation by assimilating outside information, which puts them in a better position to seize new possibilities and outwit rivals (Shahzadi, Ali, Ghafoor, & Rahman, 2023). As noted by Lane, Koka, and Pathak (2006), absorptive capacity is employed in a variety of contexts, including product creation, inter-organizational learning, and mergers and acquisitions. These many uses highlight its critical function in improving business performance and creating a sustainable advantage over rivals (Lane, Koka, & Pathak, 2006). While a large body of research has examined absorptive capacity from a variety of angles, such as innovation generation, organizational reconfiguration, and technology forecasting, there is still a significant vacuum in the literature with respect to its role as an intermediary between the performance of a company and the attributes of intellectual capital. This emphasizes the necessity of additional research and empirical validation to fully understand the complex relationship that exists between organizational effectiveness and absorptive capacity (Tanveer Ahmed Shahid et al., 2024).

#### **2.4. Role of Absorptive Capacity and Innovation**

Scholars herald ACAP not merely as an organizational trait but as a dynamic force driving knowledge creation and deployment in the arena of knowledge-centric competition, serving as the bedrock for gaining and retaining an edge over competitors. In the tumultuous seas of modern business, ACAP emerges as a guiding beacon, empowering firms to navigate stormy waters and seize opportunities amidst uncertainty. Through the cultivation of a culture that values curiosity, agility, and cooperative learning, businesses can fully realize of ACAP, propelling themselves towards enduring success and industry leadership. Undoubtedly, SMEs form the bedrock of economic development, occupying a paramount position in the economic landscape. Consequently, governments worldwide have accorded them primacy, positioning SMEs at the forefront of national economic agendas. Yet, despite concerted governmental endeavors, exemplified by initiatives such as empowering agencies like SMEDA and SME banks in Pakistan, the sector grapples with persistent challenges, including a struggle for survival and lackluster performance (Ali, Akram, & Hafeez, 2021).

#### **2.5. The mediating effect of absorptive**

According to and Kotabe, Jiang, and Murray (2017), innovation is the primary source of competitive advantage in the modern information economy. Innovation plays a crucial role in establishing "isolation mechanisms" that safeguard a company's profit margins and yield financial advantages. According to recently published research, innovative organizations outperform non-innovators in terms of profitability, with innovation outputs having a noteworthy beneficial impact on firm performance. claims that a firm's continual level of innovation achievement results in consistently high earnings. The pace and amount of innovation also had a favorable impact on company ROA, according to Kotabe, Jiang, and Murray (2017), innovation has a favorable impact on the expansion of service companies' sales. Hafiza et al. (2022) also found that high-technology enterprises had a bigger impact on revenue growth from new inventions when their knowledge assets were higher, based on manufacturing firms in Canada. Moreover, innovation helps businesses develop and utilize their

strengths to support long-term company success. Successful innovations make it difficult for rival enterprises to copy them, allowing the company to maintain its. The association between innovation performance and company performance is seen in Figure 3.5.

H1: The mediating effect of absorptive capacity and innovation and SMEs Performance is significant positive

### **3. Data and Methodology**

#### **3.1. Research Paradigms**

Thomas Kuhn developed the paradigm philosophy in the early 1960s. It reinforced thought patterns and behaviors indicative of value assessments, societal norms, established standards, environmental influences, ideologies, cultural beliefs, and theoretical frameworks, along with accepted methodologies. Research methodology is invariably shaped by both the subject matter and the underlying research paradigm, the research paradigm is a collection of beliefs and reasonable assumptions that help create a roadmap. The positivist approach is widely regarded as the most advantageous and has gained broad acceptance in social scientific inquiry. Further affirm this viewpoint highlighted an important aspect regarding the efficacy of this approach, focusing on the examination of realities, things, and other quantifiable entities. These investigations underscore the essence of social science, particularly concerning the cognitive processes, actions, and behaviors of individuals, which necessitate exploration by the participant(s). As per the methodological analytical philosophical framework, the detachment and objectivity inherent in Research from positivists advances the concepts of validity and dependability through the use of quantitative research methods. Conversely, interpretive research faces difficulties in applying these concepts due to challenges in analyzing the interaction between the researcher and the subject matter. In the realm of strategic management, logical positivism is still a widely used methodological viewpoint.

##### **3.1.1. The Research Paradigm Choice Justification**

Quantitative technique, empirical epistemology, and positivist ontology serve as the foundation for this study. Several rationales for selecting this methodology are outlined below. Initially, prominent scholars within this research field have advocated for a positivist stance. When developing a model or research paradigm for a study, researchers need to have a clear understanding of the framework around the phenomena and its behaviors, which is mostly shaped by the literature review. Similarly, this study employs a quantitative approach, as existing literature offers substantial support for integrating established variables and theories into the investigation. Moreover, this research aims to identify critical junctures, either affirming previous findings or challenging them. Additionally, the quantitative approach offers numerous advantages, such as its scientific nature in exploring realities, which underpins positivist research principles. Therefore, there are persuasive motivations to examine hypotheses and utilize data that corroborates prior research, which is an essential element of the interpretive methodology have emphasized the advantages of employing the quantitative method to guarantee reliability and validity after verifying hypotheses. Furthermore, utilizing a scientific method enables future replication of data, a fundamental aspect for theory testing. In the context of Pakistan, adopting a positivist technique gives several options for assessment the extensive benefits of Intellectual Capital. Moreover, Intellectual Capital is a subject that has been predominantly examined utilizing the quantitative technique. As a result, studies that use the quantitative technique tend to choose the quantitative approach when researching Intellectual Capital and SME performance, making it a good strategy for performing this study among Pakistan's manufacturing sector SMEs.

##### **3.1.2. Research Design**

The research design as the overarching plan established to address research questions by specifying data collecting sources, identifying potential research limits, and justifying the selection of certain institutions or domains for study. Generally speaking, the goals of the study dictate how a research design is created, justification, research domain, researcher capabilities, and level of analysis needed. In this study, a survey approach is used to investigate the interrelationships, distribution, and relative occurrence of social and psychological factors. Furthermore, secondary data is used to investigate the link between SME success and economic development. The study methodology aims section describes the research design in full.

### **3.2. Technique for Data Collection**

This section addresses survey method problems, sampling methodologies, and the demographic characteristics of respondent firms relevant to this study.

#### **3.2.1. The Survey Method**

It has been mentioned previously survey technique, particularly employing questionnaires, emerges as the most appropriate tool for data collection due to several reasons. Firstly, it aims to capture the attitudes and orientations of survey respondents' thoughts, getting their opinions and comments. Second, it provides an accurate yardstick for assessing data, allowing investigators to extrapolate findings from answers to the full population. The questions about the validity and reliability of measuring tools as well as the conclusions that can be made from results that are consistently distorted. Survey methods come with problems such not having control over timeliness, having trouble guaranteeing the accuracy of responses, and having limited data depth. Therefore, the suggested guiding principles were taken into account to guarantee accuracy and lessen related issues. In order to allay these worries, steps were done, such as assessing underlying variables using valid and dependable scales that were obtained from well-regarded publications (all measures were adapted from ISI, Q1, and Q2 ranked journals). Furthermore, the questionnaire was designed to minimize distortions in symmetrical responses by facilitating easy comprehension and unbiased responses from respondents.

#### **3.2.2. Survey Questionnaire Development**

To gather primary data, many surveys use questionnaire methodology, which consists of pre-formulated and specially crafted questions on a given study topic. This method is commonly used to collect data from large samples, with the aim of eliciting written or vocal replies from participants. The length of the questionnaire is one issue that researchers using this instrument must contend with. An excessive amount of questions could make it difficult for respondents to answer and lead to incomplete data gathering. Different researchers have different opinions about what the ideal length is contend that a questionnaire of twelve pages is sufficient, although the suggests that it should not be longer than six pages. The length of the questionnaire employed in this study is within the approved range—less than six pages. Care was taken to number and space questions to reduce eyestrain, ensure logical sequencing, and maintain the flow of topics, thereby minimizing incomplete responses. Field specialists tested a draft questionnaire to find and fix any problems, improve clarity, and guarantee validity and reliability. In response to suggestions from academics and business experts, the questionnaire was revised, with statements made better and questions deemed unsuitable for emerging nations removed. Furthermore, the poll, which focused on SMEs in Pakistan, featured questions in both Urdu and English to accommodate respondents' preferred languages.

## **4. Analysis Structural Model Estimation**

Assessing the suggested exploration premises is the core way in which the basic model seeks to answer the research questions. It is possible to investigate the inner model, also known as the essential ideal, the variables have shown adequate validity and reliability. This analysis explores the predictive power of the model and the connections between theorized variables, demonstrating how goal of partial least squares, or PLS. Consequently, examining the coefficient of determination ( $R^2$ ) values for the dependent variables allows for the evaluation of the PLS model's efficacy. Additionally, the path coefficients and coefficient of determination ( $R^2$ ) are used to assess the structural model's validity. This study also looks at the relationships that are suggested to be mediations within the research model.

### **4.1. Coefficient of Determination ( $R^2$ )**

The dependent variable's (DV) fraction of variation that can be accounted for by the independent variable is indicated by the  $R^2$  value. As a result, a structural model with a higher  $R^2$  value is more predictive. The Smart-PLS algorithm function is used in this study to calculate the  $R^2$  value, and the Smart-PLS bootstrapping function, which generated 2000 samples from 417 cases, is used to get the t-statistics value. ACAP, INNO, SoC, HC, and SC together explain 60.3% of the variation in the firm's performance. Furthermore, 58.1% of the variance in INNO and 55.4% of the variance in ACAP are explained by HC, SC, and SoC.

**Table 1: Coefficient of Detrmination (R<sup>2</sup>)**

	R-square	R-square adjusted
AC	0.315	0.313
AS	0.272	0.270
EX	0.244	0.243
FP	0.389	0.387
PD	0.149	0.147
PR	0.391	0.386
TR	0.305	0.303

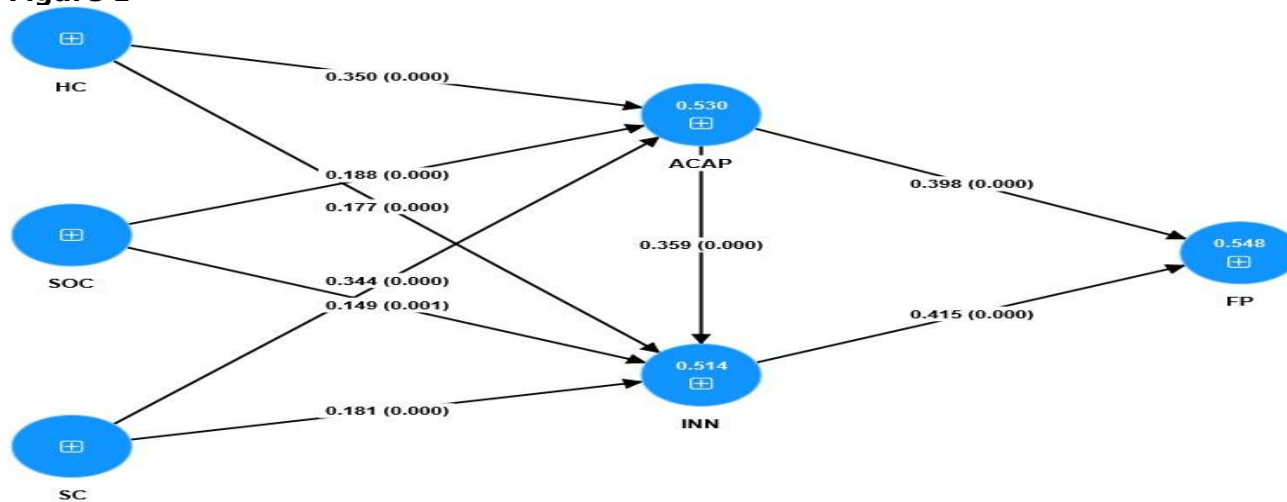
**4.2. Relevance and Significance of Path Coefficient**

The structural model enables the assessment of both the magnitude and significance level of path coefficients. However, to evaluate the structural model in PLS-SEM, bootstrapping is necessary. Through PLS, the formulated hypotheses were scrutinized by analyzing path coefficients, their importance, and the variance explicated. Prior to hypothesis testing, undergoes tests for convergent validity, discriminant validity, and reliability to ensure adequate validity and reliability. The outcomes regarding path coefficients, significance levels, and t-statistics are detailed in table 2.

**Table 2: Path Coefficients**

	Original sample (O)	T statistics ( O/STDEV )	P values
ACAP -> FP	0.398	7.743	0.000
ACAP -> INN	0.359	6.384	0.000
HC -> ACAP	0.350	6.961	0.000
HC -> INN	0.177	3.707	0.000
INN -> FP	0.415	7.747	0.000
SC -> ACAP	0.344	6.564	0.000
SC -> INN	0.181	3.609	0.000
SOC -> ACAP	0.188	4.119	0.000
SOC -> INN	0.149	3.433	0.001

**Figure 1**



Mediation in the PLS path model happens when a mediating variable partially absorbs the outcome of an external factor pertaining to an internal construct. Due to its lax distribution assumptions, this study used the approach for mediation analysis rather than the conventional. There are two stages to the bootstrapping procedure used by (Preacher & Hayes, 2008). The bootstrapping method first evaluates a direct relationship's significance level in the absence of the mediating variable in the model, the route coefficient is used to assess the significance of the indirect effect and related T-values. and Table 2 lists the outcomes of the mediation analysis. The association between INC dimensions and INNO was shown to be considerably mediated by ACAP, according to the results of the mediation study. As an illustration, consider the following: SoC  $\diamond$  ACAP  $\diamond$  INNO ( $\beta=0.068$   $p < 0.001$ ), HC  $\diamond$  ACAP  $\diamond$  INNO ( $\beta=0.125$ ,  $p < 0.000$ ), and SC  $\diamond$  ACAP  $\diamond$  INNO ( $\beta=0.124$ ,  $p < 0.001$ ).

## 5. Conclusion

In order to verify the validity and reliability of reflective and formative measures, partial least square structural equation modeling, or PLS-SEM, was then utilized to examine the measurement model. A comparison between the theoretical model and a complete structural model was one of the research hypotheses that were tested using PLS-SEM for the suggested structural research model. Examine how the variables indirectly affect the dependent variable through ACAP and INNO, mediation analysis was done. To determine the model's overall validity, its goodness of fit was assessed. The studies' findings show that all direct association hypotheses are significantly relevant, and that the connection between INC dimensions and enactment aftermaths (FP) is refereed by ACAP and INNO. While INNO intercedes the association among ACAP and FP, ACAP further acts as a mediator in the connection amongst INC dimensions and INNO.

### 5.1. Policy Recommendations

According to the survey, SMEs' CEOs and management ought to make use of these techniques to fully leverage the benefits of incorporating INC to enhance company performance. This study highlights the importance of SMEs in promoting economic growth and generating employment. It emphasizes the need for CEOs and managers to leverage INC (innovation and new technology) to enhance their firms' performance. Absorptive capability and creativity are crucial dynamic resources for creating a favorable environment for maximizing the benefits of INC aspects. SMEs can speed up business operations and meet performance goals by concentrating on knowledge development and seizing business opportunities. Small and medium-sized businesses (SMEs) are crucial for creating jobs, lowering poverty rates, and fostering economic expansion. In underdeveloped nations, SMEs are valuable has grown due to their higher labor intensity and ability to function with less resources and lower managerial costs. The study investigates the impact of SMEs on Pakistan's economic growth, revealing their significant role in fostering economic development.

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