The Nexus of Institutional Pillars and Service Innovation in Pakistan's ICT SME Sector: An Empirical SEM Analysis

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Abstract

Service innovation is a critical driver of economic growth and competitiveness in the Information and Communication Technology (ICT) sector, especially in developing countries like Pakistan. However, the full potential of the ICT sector innovation capacity remains unrealized due to the absence of adequate measures for evaluating and managing the factors that influence innovation, particularly institutional factors. SEM (Structural Equation Modeling) in Pakistan is empirically examined to determine the impact of institutional pillars on their ability to innovate service offerings. The study SEM to analyze data collected from 320 project managers of ICT SMEs in Lahore, Karachi, and Islamabad. The findings reveal that normative, and cognitive institutions have a significant positive impact on service innovation while the regulative pillar has an insignificant impact on ICT SMEs in Pakistan. The comprehensive institutional framework is also found to be positively correlated with service innovation. The findings from this study have important implications for Pakistani policymakers and SMEs in the ICT sector. Policymakers should focus on creating a supportive institutional environment that facilitates service innovation. ICT SMEs should also be aware of the institutional factors that influence innovation and develop strategies to mitigate the negative impact of institutional constraints.

Keywords: Institutional pillars, service innovation, ICT, SMEs, Pakistan, structural equation modeling

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1. Introduction

Global Innovation Index (GII) is a ranking of countries according to their ability to innovate, published annually by the World Intellectual Property Organization (WIPO). In 2021, Pakistan was at 99th place among all countries in this regard, but it improved in 2022 to 87th position in 2022 according to GII (Dutta et al., 2022). However, it positioned at 88th in line in 2023 (World Intellectual Property Organization [WIPO], 2023). This innovative culture of the Pakistani ICT sector has been noted by Abbasi et al. (2022). But even more impressive is Pakistan's position on the Early-stage Entrepreneurial Activity (TEA), as the Global Entrepreneurship Monitor (GEM, 2023) found that out of the 50 countries, Pakistan is positioned at 21st position. This ranking makes it clear the huge potential that exists in ICT to generate new jobs and spur economic growth. It now needs the unreserved support of the Government and other stakeholders to realize its full potential, making itself a major global force in innovation and entrepreneurship.

Digital technologies are changing at an unprecedented pace. To adapt and remain competitive in the ICT sector while achieving sustainable growth necessitates renewing services within this industry, especially those of software development (Hagberg et al., 2016; Kamalaldin et al., 2020). Utilizing this strategic tool allows organizations to excel in an increasingly competitive and demanding market, giving them considerable advantages such as substantial profits, user engagement with the platform itself, and brand image (Am et al., 2020; Kuo et al., 2017; So et al., 2022). As ICT SMEs face the challenges and changes brought on by a digital environment, they must keep up with advancements like Industry 4.0 to maintain their competitiveness in providing information services. As a result, although the sector is capable of innovation on its own, it cannot yet offer services and develop products from within (Raza 2018). Consequently, the ICT sector's role can have a great effect on promoting innovation in services.

According to theories such as the resource-based view (RBV) and resource advantage theory (RAT), a firm's ability to gain a competitive edge over their competitors is dependent on the availability of the firm's internal resources that cannot be easily duplicated by rivals, or advantages in capabilities (Hunt, 2000). However, Service-Dominant Logic as a meta-theoretical framework (Vargo & Lusch, 2004) includes actors-generated institutional logics as a complex phenomenon of innovation (Vargo et al., 2022) by involving three institutional pillars as regulative, cognitive, and normative (Scott, 2013). In a similar vein, D'Ingiullo and Evangelista (2020) argue quite forcefully that institutional quality is indeed what drives innovation. This is one reason why we need institutions to guide and encourage individual determination (Bui et al., 2023), thus every company has a unique structure that cannot be overlooked. Although similar businesses would have the same level of human capital and experience as many start-ups, slight variations can make a big difference. (Busenitz et al., 2000) The literature indicates that the innovative practices of countries vary, and are greatly influenced by institutions with high regulative, cognitive, or normative power (Bui et al., 2023). Nevertheless, it is significant to note that the impact of institutional pillars on service innovation within ICT and Small Medium-Sized Enterprises (SMEs) in Pakistan has not been studied extensively so far. It is quite important to study the impact and relationships of these constructs.

The economic actors known as businesses have been studied from many angles. They are viewed both as individual firms, and potential successors to future business owners (Endres, 2020). People with unique qualities, like a powerful drive to succeed and an entrepreneurial spirit are more willing and able than others (Chen et al., 2022) to discover what is profitable. However, with the emergence of an institutional framework perspective, a different viewpoint is provided here. It stresses that entrepreneurial practice within each country depends enormously on how those specific countries constitute their institutional frames. Busenitz et al. (2000) argue that the operation of new firms and established firms relates to the institutional environment in which they are embedded. Ali et al. (2020) points out that institutional factors exert a great deal of influence on the spread of new establishments. Likewise, when we turn to research on developing countries, Adomako et al. (2020) also point out that the obstacles created by home country institutional barriers are harmful to the expansion of Small and Medium-Sized Enterprises overseas regions as well and it is felt most acutely by SMEs trying to expand into developed markets.

Bui et al. (2023) also point out that institutions have a great influence on social enterprises, using information from different kinds of active social entrepreneurs doing all sorts of endeavors as their source material. Their research reinforces the importance of these institutional frames for understanding social innovation practices in developing countries. Furthermore, true service innovation does not come in isolation. It comes between firms and customers, where co-creation unfolds to provide value (Lusch & Nambisan, 2015). In the case of Pakistan, women's entrepreneurial practices from an institutional perspective have already been examined (Yunis et al., 2018), while previous studies focused on understanding the phenomenon of information technology failures at institutions. A limited amount of research has probed the complex dialectic between institutional settings, cultural norms, and attitudes toward social entrepreneurship among those in Pakistan (Bux & Siddiqui, 2021). The existing body of previous research yields contradictory results that provide various possible interpretations. Therefore, these academics advocate that service innovation should be approached by including institutional pillars. The overall goal of this study is to explore empirically the influence that institutional pillars exert on service innovation, around Information and Communication Technology (ICT) in small and medium enterprises in Pakistan.

This study aims to investigate the following objectives:

- To investigate the impact of cognitive institutions on service innovation within the ICT SME sector.
- To assess the influence of regulative institutions on service innovation within the ICT SMEs.
- To scrutinize the effects of normative institutions on service innovation within the context of ICT SMEs.

These objectives will help to answer the following research questions:

- What is the impact of the cognitive institutional pillar on service innovation within the ICT SME sector?
- What is the influence of the regulative institutional pillar on service innovation within ICT SMEs?

- What is the influence of the normative institutional pillar on service innovation within the context of ICT SMEs?

This study used a Structural Equation Modeling (SEM) approach to quantify the effect that institutions exerted upon firm performance in Lahore, Karachi, and Islamabad, Pakistan's three biggest metropolitan cities. SEM is a statistically powerful methodology ideally suited to the assessment of the relationship between latent variables. The study initially conducted a Confirmatory Factor Analysis (CFA) to validate two key constructs: Institutional pillars drawn from Busenitz et al. (2000) and adapted service innovation from the study of Hsieh and Hsieh (2015). Finally, a regression analysis was done to see the effect of institutions on service innovation. For this purpose, data were collected by sampling 320 firms in the ICT sector operating across Pakistan.

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2. Literature Review

2.1. Theoretical Development

Service-dominant logic (SDL) adopts a lens that fits into the modern vision of competitive advantage (Vargo & Lusch, 2008). Vargo and Lusch (2016) provide a structure for understanding the dynamic mutuality among linked actors who collaborate to build value. On another level, SDL also highlights the role of institutional logics in shaping such interactions. Thinking in terms of the institutional environment, SDL recognizes that norms, rules, and cultural beliefs exert influence over resource integration and service creation (Vargo & Lush, 2014). SDL brings a new vision to actors and resources, portraying them as modern subjects. It puts forward that all resource integrators should be seen as actors, and their decisions made against the background of institutional realities (Vargo & Lusch, 2016). This is the perspective of resources and actors, which emphasizes how institutions integrate various resource carriers into service ecosystems, as well as knowledge fusion among these components.

The three supporting institutional pillars are examined in this study from the perspective of the Service-Dominant Logic (SDL) framework, which is based on findings within existing research from a wide range of angles. (Vargo & Lusch, 2016). A fascinating contrast appears, however, between people from individualistic and collectivist cultures. Studies have shown that people with backgrounds of individualism are more likely to

perform innovative behaviors, while those from collective societies will therefore naturally gravitate toward highly traditional employment (Eid & Agag, 2020). People from risk-averse cultures are less likely to embrace innovation than those who perceive lower risks. People with higher uncertainty avoidance tend toward the stable path rather than climbing down a possible slippery slope (Eid & Agag, 2020). This evidence suggests that this aspect of cultures is positively correlated with individualistic, risk-taking ones that have a greater tendency to become innovative.

Nonetheless, the SDL framework and institutional theory question this perspective (Vargo & Lusch, 2016), claiming that cultural factors in themselves are not sufficient to explain entrepreneurial activities between countries. Busenitz et al. (2000) hold that we need to consider other factors to understand where and in what way innovation spreads. To complement traditional cultural factors and facilitate cross-country comparisons of entrepreneurship proliferation, researchers have introduced three equally significant institutional pillars: regulative, normative, and cognitive (Busenitz et al., 2000). Based on the research of institutional theorists that look at how institutions affect organizational legitimacy (Scott, 1987), these pillars provide a structure to explain under what conditions there are differences in innovation practices.

The empirical study done in Pakistan also shows the role institutional structures play (Kazmi et al., 2021). According to this study, coercive and normative pressures have a strong impact on project performance. They also found that these kinds of pressure are the most important factors limiting time and cost viability in projects at home or abroad. This also points to the importance of pressures from outside factors on project performance; although concerns are expected at initiation, they still affect external environmental pressure. Though several studies have investigated the role played by institutional pillars (Gohar & Abrar, 2016; Rashid et al., 2023; Zulfiqar et al., 2019) these all looked at corporate auditors, female entrepreneurs, and social entrepreneurship. Furthermore, many studies on service innovation in Pakistan have been concerned with the education sector and customer satisfaction (Kashif et al., 2023; Mirza et al., 2023). Therefore, this will be the focus of current research which examines service innovation at ICT SMEs in Pakistan.

While there is a richness of studies on service innovation, one critical void pertains to its relationship with the institutional pillars within Pakistan's fast-changing ICT SME sector. This study fills this vacuum, consistent with Service-Dominant Logic (SDL), in that service innovation growth is not completely determined by internal factors. Instead, the external institutional environment has an impact as well. The proposed institutional profile framework is an important tool by which appraises the underlying forces driving service innovation and how they influence firm success, particularly concerning SMEs.

This study aims to cast light on the complex processes within ICT SMEs that promote service innovation. Also, by overcoming the separation between academia and practitioners in industry, this research goes beyond academic contribution to provide practical advice for people working within Pakistan's ICT SME sector. The findings of this research will not only open new fields of study but also help decision-making from informed ends among policymakers at all levels of government related to information

technology development strategy as well as the structure of institutions. The next section presents the literature that relates to both independent as well dependent variables, forming basic elements in two strands of theoretical structure. The three supporting institutional pillars are examined in this study from the perspective of the Service-Dominant Logic (SDL) framework, which is based on findings within existing research from a wide range of angles. (Vargo & Lusch, 2016).

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2.2 Service Innovation

Firms providing services constantly re-evaluate their offerings in response to customer needs (Ryu & Lee, 2018). Service firms must use innovation as a weapon to compete (Witell et al., 2011). Although the importance of service innovation is well recognized, theoretical progress in this area remains primitive (Gustafsson et al., 2020). It's necessary to specify what service innovation is; Gustafsson et al. (2020) define it as introducing a new process or offering that is adopted by and creates value for one or more stakeholders.

This issue has attracted attention in the literature (Ryu & Lee, 2018). There are two contrasting perspectives: one that embraces the era of technology (Huang & Rust, 2017) and another stressful people-to-people encounters between employees with customers (Dotzel et al., 2013). From the SDL prism, these viewpoints are reconcilable. Both humans and technology matter for service innovation (Sharma & Bhat, 2020). An excellent topic to consider in the practical applications of service innovation is the knowledge that Vargo and Lusch (2004) have emphasized, as specialized capabilities. In evaluating service innovation, a range of indicators comes into play, encompassing traditional measures such as profitability, market share, and the growth of both customer and employee numbers. Additionally, process improvement remains a key factor. However, when operating in environments with restricted data availability, such as in many developing countries, alternative proxies for performance are invaluable. These proxies include performance perception and comparative performance.

Furthermore, it's important to highlight that performance perception variables have been incorporated, encompassing how the company is perceived in terms of its service innovation compared to competitors. As evidenced by our consistently high success rate in conceiving and implementing innovative solutions that effectively cater to client's needs, our service innovation surpasses that of our competitors. This innovation has profound implications for our competitive advantage, financial performance, customer satisfaction, and customer retention. Therefore, two indicators of service innovation are examined: performance perception and comparative performance. The three supporting institutional pillars are examined in this study from the perspective of the Service-Dominant Logic (SDL) framework, which is based on findings within existing research from a wide range of angles. (Vargo & Lusch, 2016). A fascinating contrast

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2.2.1 Performance Perception

The performance perception evaluation method measures financial returns, success in fostering innovative opportunities, and marketplace opportunity identification and increases customer loyalty (Hsieh & Hsieh, 2015). Its value for service innovation comes in several ways. One is that it affects customer acceptance of new services, willingness to pay for them, and extent of loyalty (Rianti et al., 2023). Organizations perceived as high achievers have a greater chance of having their new services adopted by customers. In addition, customers will also invest more resources in the services of companies with higher perceived performance.

2.2.2 Comparative Performance

Comparative performance measures to what extent services innovate about performance, then classifies rates of customer needs achieved, service innovation success

rate, and overall execution (Hsieh & Hsieh, 2015). Much research has been done about how comparative performances have influenced what consumers buy and made them loyal (Edwin et al., 2022). Sustainability, responsiveness, and personalization are the mandate of empowered consumers in the digital age. Compared to other firms, those that excel in these areas are better equipped to promote customer loyalty and establish trust (Wheeler, 2023).

2.3 The Role of Cognitive Institutional Logics

Cognitive institutional logics is very important in shaping service innovation and competition. Such policies for the cognitive institutional pillar, Sarfaraz et al. (2014) emphasize that it is education in innovative economies can enhance innovation and foster problem-solving ability among women interested in science-based occupations. The underlying aim of such policies is the conservation and optimum use of cognitive resources. They are thereby aimed at an increase in utility (Sarfaraz et al., 2014). Vargo and Lusch (2016) point out that while within these realms of cognitive constraints, institutions contribute to the flow of service exchanges between organizations that give rise to value co-creation.

The pillar of cognitive institutional conditions includes factors related to reality, culture, and the frameworks for knowledge preservation, synthesis, and analysis as well as generation used by entrepreneurs (Audretsch et al., 2021). Entrepreneurial education is an important factor that affects independence, innovation ability, and the tendency to become a high-growth entrepreneur. Educational capital then becomes a discriminating factor for distinguishing profitable market opportunities from non-profitable ones (Fritsch & Wyrwich, 2014). Also, according to research by Alvedalen and Boschma (2017), there is a positive correlation between cognitive proximity in an area and enterprise creation. Local entrepreneurial culture has a strong impact on how opportunities and achieving them in high-growth, adventurous entrepreneurship is seen (Holmes Jr et al., 2013).

In the socio-cultural environment the cognitive pillar of institutional structures is a defining feature in determining whether entrepreneurship turns out to be productive or unproductive (Malecki, 2018). However, norms and culture also play an important role in the success of entrepreneurship. High-growth entrepreneurship ultimately requires both education and networks. Business education teaches people how to identify opportunities and become active entrepreneurial participants. However, the lack of education may give rise to unproductive entrepreneurship. Informal entrepreneurial networks and role models provide sources of inspiration for innovative, high-growth entrepreneurs. This is why such factors integrate people into cognitive frameworks, inhibiting unproductive and destructive behaviors (Bosma et al., 2018; Chowdhury et al., 2019).

H1: Cognitive institutional logic in the ICT sector significantly determines service innovation, with the strength of cognitive logic impacting innovation variably.

2.4 The Role of Regulative Institutional Logics

The impact of regulative institutional logics on service innovation and competitive advantage is a central theme in entrepreneurship and innovation research. Extensive

empirical evidence underscores the significance of regulatory and normative institutional arrangements in shaping productive entrepreneurial activities (Chowdhury et al., 2019). In developing countries, government programs, such as tax reductions and lower start-up costs, play a pivotal role in bolstering the supply side of entrepreneurship, especially in the absence of significant financial and labor resources for entrepreneurs (Estrin et al., 2019). Moreover, the strength of intellectual property rights has been shown to have a substantial impact on innovation activities, emphasizing the role of regulation in fostering innovation (Papageorgiadis & Sharma, 2015).

Regulative institutional logics, which encompasses formal rules, legal structures, and regulations, not only guides but also constrains entrepreneurial behavior, often backed by sanctions to enforce compliance (Corsaro, 2022). Additionally, the importance of trust in institutions, markets, and governments cannot be understated, as it underpins long-term investments in innovation and influences entrepreneurship and venture creation (Oecd, 2019). Finally, the interplay of trade openness and strict institutional frameworks can lead firms to seek international opportunities, influenced by the need to manage compliance costs and gain strategic advantages (Arshed et al., 2022). These collective findings emphasize the critical role of regulative institutional logics in shaping the entrepreneurship landscape and fostering service innovation.

H2: Regulative institutional logic in the ICT sector has a significant impact on service innovation, with the strength of regulations influencing the level of innovation.

2.5 The Role of Normative Institutional Logics

The logic of normative institutions has a tremendous impact on the terrain of service innovation. This outlook is shared by (Yip & McKern 2014), who stresses the surpassing importance of companies' symbiotic relationship with universities in driving innovation. Fischer et al. (2019) explain that such normative frameworks are required to make the cooperation of these entities. These norms are deeply rooted in prevailing societal values and conceptions, acting as powerful catalysts or obstacles for entrepreneurs (Content et al., 2019). As a theme in this discussion, the quality of institutions greatly affects entrepreneurial productivity. The higher quality is therefore correlated with more productive activities by entrepreneurs (Chowdhury et al., 2019).

H3: Normative institutional logic in the ICT sector significantly influences service innovation, and the strength of normative logic has a variable impact on innovation levels.
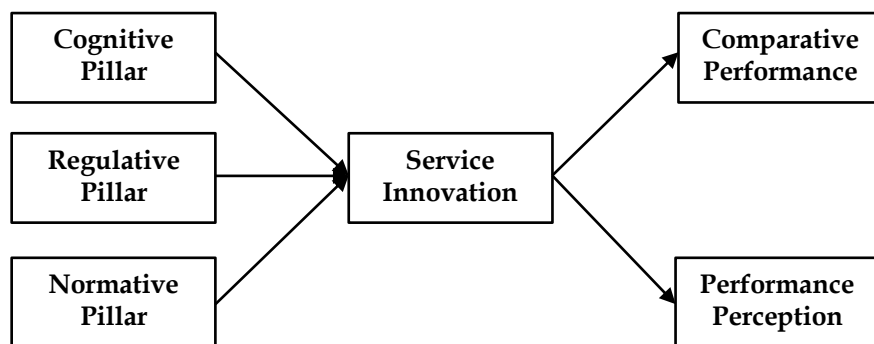

Figure 1: Research Model

3. Methodology

This study applies a cross-sectional quantitative research methodology to investigate the determinants of service innovations. This section describes data collection procedures and sampling techniques. A list of ICT SMEs was compiled from the Pakistan Software Export Board (PSEB) website, upon which data collection began. To get a representative sample, the proportionate stratified sampling method was taken. See Table 1 below for details.

Table 1: Proportion of Software Houses in Major Cities of Pakistan

City	Software Firms	% of Software Houses in Each Strata	Sample Selected Based on Strata Size
Islamabad	494	34%	167.96
Karachi	530	33%	174.9
Lahore	510	32%	163.2
Total	1543	100%	506

Finally, given the extreme concentration of ICT SMEs in Pakistan's major metropolitan cities, only these were retained. Later, registered ICT firms in PSEB were selected by a stratified random sampling approach to identify 500 companies. To exclude firms without valid postal addresses or website information, only 491 software companies with verified contact details were put on data. After further scrutiny, which weeded out duplicates, the result was a survey-ready list of 441 firms.

Project managers for the survey were selected by convenience sampling. Project managers from each of the selected software houses were carefully chosen according to their availability, accessibility, and willingness to participate; care was also taken that they should have completed a project in the last six months. For firms in Karachi and Islamabad, data was also collected through email surveys. One project manager from each ICT firm was surveyed, and a total of 441 survey instruments were distributed. Ultimately, 344 responses were obtained. With the survey responses collected, a preliminary screening of data was carried out. Twenty-four cases with incomplete information (i.e., more than 10 % missing values) were excluded by this process. The 320 cases in which there are less than 10 % missing values were retained for further analysis. As a result, the study attained an overall response rate of 78 %; usable responses accounted for 72.5 %.

3.1 Statistical Method

The study uses Structural Equation Modeling (SEM), based on the partial least squares (PLS) approach, with Smart PLS 4.0 used for the assessment of the research model (Ringle et al., 2005). Starting with an analysis of construct reliability and validity, the next step is to observe structural relationships among latent constructs. It is imperative to mention here that PLS-SEM is a nonparametric statistical method, and therefore does not require the data to have normal distributions. One alternative to covariance-based structural equation modeling (CB-SEM), is dependent on larger sample sizes and stricter distributional assumptions but may fit better with the data at hand. On the other hand, as Hair et al. (2017) point out, there are difficulties in determining what is significant when SmartPLS is used along with data that departs substantially from normality. To

evaluate data normality, skewness, and kurtosis are examined using the WebPower tool, which can be accessed at: https: //webpower.psychstat.org/models/kurtosis/. The results show that all the variables are skewed or kurtotic within a +2 range (George, 2011), which is considered acceptable. Also, the skewness (β = 31.86) and kurtosis values (β = 201.80), with significance levels well below pre-set limits, show that data do not follow multivariate normality assumptions either. This is the logic behind using non-parametric SmartPLS software for analysis.

3.2 Measures

The exploration of various variables in academic research has yielded valuable insights into the dynamics of relationships of variables. For the institutional logics' variable, Busenitz et al. (2000) instrument was used. In addition to these investigations, Hsieh and Hsieh (2015) explored two dimensions of service innovation: performance perception and comparative performance. Performance perception was analyzed through four items, utilizing a 5-point Likert scale for measurement, while comparative performance was investigated through three items employing the same Likert scale.

4. Data Analysis and Findings

4.1 Measurement Model

The convergent validity analyses shown in the table also illustrate that the measurement model used here is best suited. Every first-order construct (CGPL, CMPR, NRPL, PFPC, and RGPL) has high convergent validity. High factor loadings (ranging from 0.685 to 0.908) indicate that the recommended threshold is well exceeded in this case. Secondly, the CR values for each construct ranging from 0.83 to 0.86 demonstrate that the constructs are reliable in themselves. Moreover, each AVE is from 0.528 to 0.777 (average = .691), which shows that the measured items are good indicators of these constructs 'intended attributes in particular, the second-order construct SRIN composed of CMPR and PFPC has a high factor loading. This further strengthens the overall convergent validity for higher-level constructs.

Table 2: Convergent Validity: Loadings, Composite Reliability (CR), and Average Variance Extracted (AVE) for 1st and 2nd Order Constructs

1st Order	2nd Order	Items	Loadings	CR	AVE
CGPL		CL1	0.876	0.886	0.661
		CL2	0.849		
		CL3	0.825		
		CL4	0.689		
NRPL		NL1	0.686	0.83	0.552
		NL2	0.861		
		NL3	0.685		
		NL4	0.725		
RGPL		RL1	0.751	0.848	0.528
		RL2	0.736		
		RL3	0.704		
		RL4	0.792		
		RL5	0.642		
CMPR		CP1	0.808	0.882	0.714
		CP2	0.863		

	CP3	0.863		
PFPC	PP1	0.838	0.87	0.626
	PP2	0.801		
	PP3	0.706		
	PP4	0.813		
SRIN	CMPR	0.854	0.874	0.777
	PFPC	0.908		

Note: CGPL: Cognitive Institutional Logic, NRPL: Normative Institutional Logic, RGPL: Regulative Institutional Logic, CMPR: Comparative Performance, PFPC: Performance Perception, SRIN: Service Innovation, CL: Cognitive Logic, RL: Regulative Logic, NL: Normative Logic
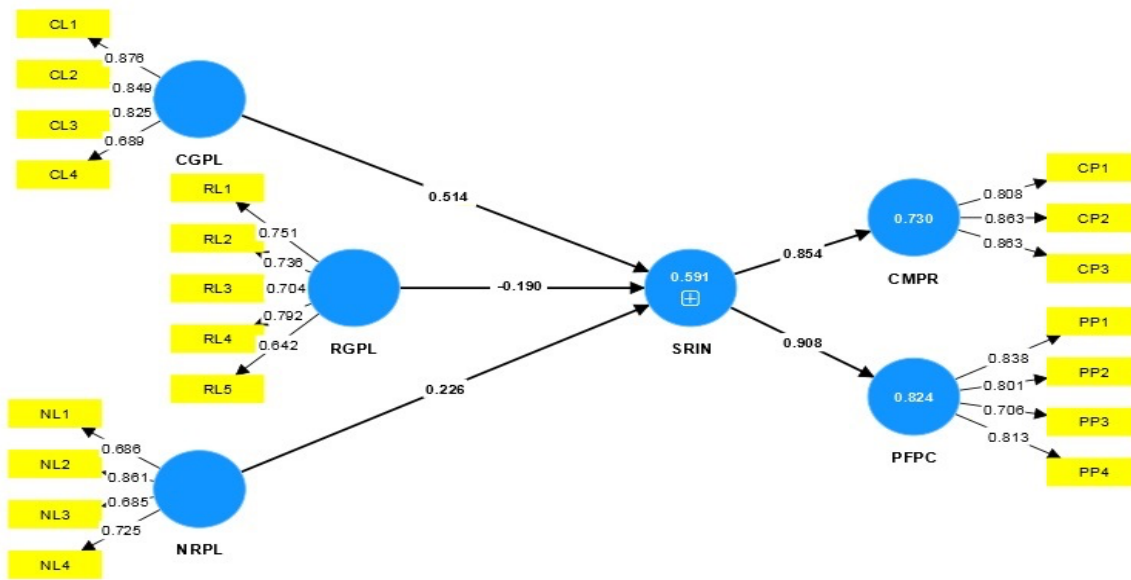

Figure 2. Measurement Model

4.1.1 Model's predictive power (R²)

R-squared values are indicators of how much of the variance in constructs can be explained by the model. 0.75, 0.5, and 0.25 accounting for significant, moderate, or weak associations (Henseler et al., 2009). The model explains 73 % and 82.4 % of the variance for CMPR and PFPC, respectively. With SRIN the model explains 59.1 % of the variance. These levels correspond to a good fit of the model in terms of representing construct variances and relationships.

Table 3: *R- square*

R-Square		
CMPR	0.73	0.727
PFPC	0.824	0.822
SRIN	0.591	0.578

Note: CMPR: Comparative Performance, PFPC: Performance Perception, SRIN: Service Innovation

4.1.2 Discriminant Validity

The Heterotrait-Monotrait (HTMT) ratios are a critical measurement of discriminant validity for the first-order and second-order constructs, as presented in

Table 4 and Table 5. CGPL, CMPR, NRPL, PFPC, and RGPL, the HTMT-1 values consistently are less than the recommended value of 0.85, which depicts that there is a high discriminant validity among the above-mentioned constructs. The highest HTMT-1 value is 0.695 which is also less than the threshold value. Likewise, the second-order construct, SRIN, discriminant validity about its first-order constructs CGPL, NRPL, and RGPL remain below 0.85 as shown in Table 5. However, the highest HTMT-2 value is 0.874 between SRIN and RGPL, posing the discrete characteristic of SRIN, further posing the overall validity of the measurement model.

Table 4: Discriminant Validity Analysis HTMT-1

HTMT-1	CGPL	CMPR	NRPL	PFPC	RGPL
CGPL					
CMPR	0.555				
NRPL	0.433	0.651			
PFPC	0.531	0.695	0.623		
RGPL	0.547	0.659	0.668	0.9	

Note: CGPL: Cognitive Institutional Logic, NRPL: Normative Institutional Logic, RGPL: Regulative Institutional Logic, CMPR: Comparative Performance, PFPC: Performance Perception

Table 5: Discriminant Validity Analysis HTMT-2

	CGPL	NRPL	RGPL	SRIN
CGPL				
NRPL	0.433			
RGPL	0.547	0.668		
SRIN	0.597	0.7	0.874	

Note: CGPL: Cognitive Institutional Logic, NRPL: Normative Institutional Logic, RGPL: Regulative Institutional Logic, SRIN: Service Innovation

4.1.3 Variance Inflation Factor and SRMR

The variance inflation factor (VIF) was used to assess collinearity and standard method bias in the study. No values in this research exceeded the threshold of 3.3, indicating a lack of bias as shown in Table 6 (Hair et al., 2017).

Table 6: Collinearity statistics (VIF)

Paths	VIF
CGPL -> SRIN	1.283
NRPL -> SRIN	1.426
RGPL -> SRIN	1.543

Furthermore, the standard root means square residual (SRMR), a measure of fit, demonstrated a value of 0.079 as shown in Table 7, indicating a good fit to the data according to the suggested threshold of less than 0.08 (McNeish, 2023).

Table 7: SRMS (Model Fit Value)

SRMR	Fit	Reference
0.079	Good	McNeish (2023)

5. Structural Equation Model Assessment

Path coefficients, shown in Table 8 are key to understanding the relationships between variables that make up this model. These coefficients are standardized regression coefficients. They provide evidence of how a change in one variable affects another when considering the existence of other variables within the structural model.

Service Innovation (SRIN) holds a most substantial positive and statistically significant impact on Cognitive Pillar (CGPL), with path coefficient (β)= 0.514, p-value = 0. NRPL exhibits a significantly positive influence on SRIN, with β = 0.23; p < .05. Yet, there is a relatively insignificant negative impact on SRIN by a regulative pillar (RGPL) with β -0.19 and p-value=0.073.
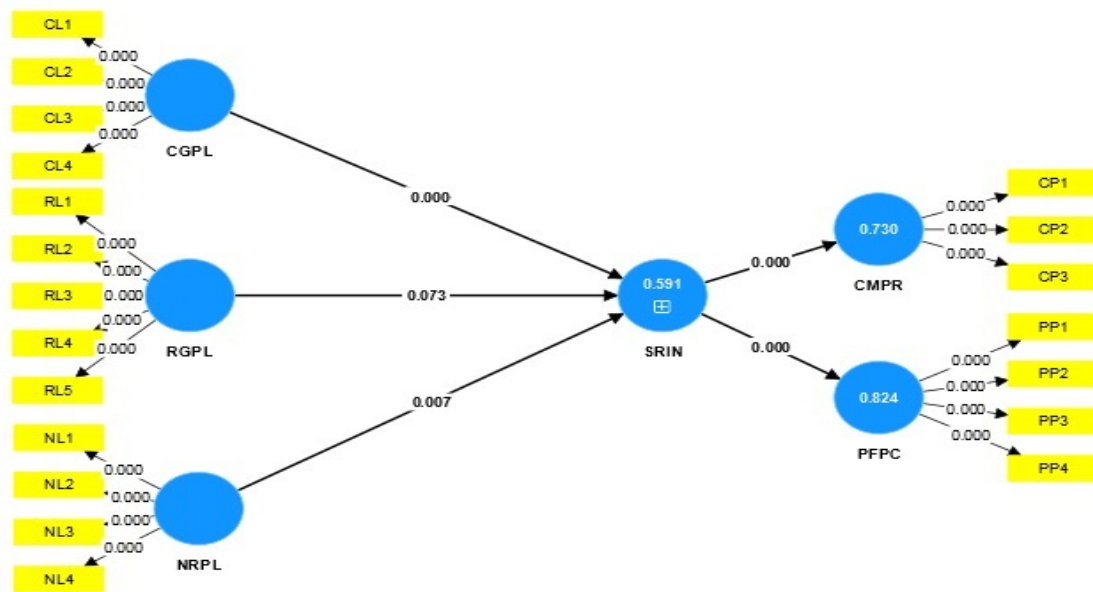

Figure 3. Structural Model

SRIN, which in turn plays an important role in the model. A path coefficient (β) for CMPR of 0.85 and one with a p-value of 0.00 is also the case, so it noticeably affects that standard; Furthermore, SRIN has an enormous effect in influencing PFPC, with a β of as high as 0.91 and p-value at zero level (p = 0.0). Among all institutions, the positive effects on service innovation (SRIN) are highest for cognitive institutions (CGPA), with normative ones coming second. Noteworthy is the fact that the performance of RGPL does not have a negative effect. CMPR and PFPC both give Service Innovation (SRIN) a high degree of influence. All direct and indirect hypotheses are supported according to the values in Table 6.

Table 8: Assessment of Structural Model

Path Coefficients	β	Sample Mean	SD	t	P	LL	UL	Decision
CGPL -> SRIN	0.514	0.193	0.076	2.489	0.000	0.34	0.67	Supported
NRPL -> SRIN	0.226	0.232	0.084	2.679	0.007	0.07	0.4	Supported
RGPL -> SRIN	-0.19	0.511	0.085	6.039	0.073	-0.05	0.35	Not Supported

Note: *CGPL: Cognitive Institutional Logic, NRPL: Normative Institutional Logic, RGPL: Regulative Institutional Logic, SRIN: Service Innovation*

6. Discussion

This study makes a significant contribution to the Service Innovation (SI) research field by utilizing the Service-Dominant Logic (SDL) framework to analyze service innovation in the context of institutional pillars. It identifies key factors and develops a theoretical model for future empirical investigations, enhancing its scholarly importance. The study findings underscore the crucial role of cognitive and normative pillars in driving SI, while also revealing the limited impact of the regulative pillar. Furthermore, it highlights that performance perception, encompassing metrics like financial success, innovation opportunities, market opportunities, identification, and increased customer loyalty, is a more influential dimension of service innovation than comparative performance. Moreover, the incorporation of empirical data from Pakistan's ICT SME sector addresses a significant gap in the existing literature within this domain.

However, norms and cultural influences are more important than formal institutional support for service innovation (H1, H2, H3). Formal institutions play an important role in firm success, but they should not be overinterpreted. A firm's success is not only influenced by formal institutions but also by normative dimensions and cognitive factors under the institution umbrella (Audretsch et al., 2021; Corsaro, 2022). There is insufficient evidence to support the importance of the regulative dimension alone for service innovation. Research indicates that normative and cognitive dimensions are the underlying drivers of firm performance (Endres, 2020). Service innovation in small and medium enterprises in the present study area is negatively affected by the regulatory environment, including the five indicators.

This suggests that the normative and cognitive institutional domain has a more significant relationship with service innovation than the regulative domain. Prior research has shown that a lack of appropriate skills among workers assigned to business development services often results in business development support for businesses failing to achieve the intended results. Even though most of these workers are eager and committed to serving the business community, they may not be able to offer the specific services that businesses need, such as market information and marketing training (Chen et al., 2022; Rizvi, 2023). This is important to consider when developing policies and programs to support service innovation in Pakistan.

In numerous studies, the primary focus has been on identifying the challenges and opportunities faced by small businesses and private entrepreneurs. The Economic Development Research Institute (EDRI) conducted an extensive analysis in 2018, summarizing various factors from substantial data. Findings revealed that financial constraints, market information gaps, and inadequate infrastructure hinder entrepreneurial efforts across the country. Notably, institutional challenges have been understudied (Endres, 2020). Business owners need to understand societal norms to produce goods and services that are aligned with societal needs. Cultural influences play a significant role in an organization's legitimacy, particularly when societal values support innovation. This aligns with prior findings (Busenitz et al., 2000; Muhumad, 2016), highlighting a positive relationship between cultural facets and innovativeness across the region, a perspective not uniformly observed before. Cultural values and societal norms do not impede entrepreneurial practices; they cultivate admiration and

foster service innovation. Our data analysis reveals a significant variance, indicating that many project managers in the ICT SME sector hold a positive perception of societal norms and actively utilize them as catalysts for innovation. This suggests that aspiring project managers within this sector should cultivate a favorable outlook on their societal values. Notably, these findings underscore the substantial societal and cultural support for service innovation, particularly within Pakistan's ICT sector. Contrary to prior assumptions, the empirical evidence indicates a genuine appreciation for innovative practices within society, even ICT before businesses embark on their ventures.

This study reveals the significant influence of normative aspects on service innovation within Pakistan's ICT sector. Cultural norms, values, and beliefs impact strategic decisions, requiring ICT firms to recognize and embrace these nuances for successful project completion. Additionally, the study advocates for Service-Dominant Logic (SDL) as a more relevant paradigm for service innovation in the digital age. By prioritizing customer-centricity, cultural awareness, and effective communication within the SDL framework, Pakistani ICT firms can enhance their innovation capabilities and seize growth opportunities in the global market. These compelling findings not only challenge conventional wisdom but also provide strong support for the adoption of SDL as a more suitable approach for driving service innovation in the context of digital-era ICT firms.

6.1 Theoretical Implications

It is through the sophisticated application of concepts from Service-Dominant Logic (SDL) that this study makes unique theoretical contributions. The three institutional pillars--the regulative, the cognitive, and the normative are inseparably intertwined. It acknowledges nonetheless the basic recognition that institutional pillars are central to their role and significance in context-based service ecosystems. Even more, this study brings to the forefront institutional conflicts and frictions. They can be regarded, in several ways, as helping service innovation. Using SDL as part of the research framework presents a possibility for a systematic theoretical perspective intersecting with meta-theorization. The study investigates what is contained within subjective regulative, cognitive, and normative institutions. Therefore, the results have shown that many parts of SDL need to be integrated into a much larger field. But more importantly, concerning service innovation, they show that these three pillars have different functional characteristics and purposes at every stage in systems.

6.2 Managerial implications

From a practical standpoint, this study helps encourage the service innovation of the information and communications technology (ICT) sector in Pakistan. It emphasizes the value of understanding and supporting institutional pillars with three components-regulative ones being explicit laws (rules) or regulations intentionally adopted by decision makers; normative ones comprising implicit rules that actors in each system internalize as standards for their actions based on various factors including experiences they have gone through; cognitive one remodeling people's thinking. Other than these institutional aspects, the study emphasizes that legislation and accredited bodies are also necessary to establish a comprehensive set of institutions. managers of small and medium-sized enterprises (SMEs) working in the information, communications, and

technology ICT sector should see that these institutional pillars, legislative frameworks, and accredited bodies weigh heavily upon their dynamic environment for service innovation. There are very important policy implications of these findings for policymakers. Policymakers should focus on entrepreneurial education and training programs, offering exposure to the latest technology, while also creating environments that are conducive for entrepreneurs. This must operate within a framework of legislation about this area followed by accreditation systems designed to ensure quality control. Understanding the multipurpose nature of institutional pillars, legislative frameworks, and accredited bodies can allow policymakers to develop widespread innovation policies that help take ICT further in Pakistan. This holistic approach makes space for entrepreneurial activities that are inspired by innovation (Khobdeh & Tayebinaz, 2021).

6.3 Limitations and Future Research

The limitations of the study include a small sample of ICT firms registered with the Pakistan Software Export Board; it only provides an insider point of view and considers only service providers to exclude customer insights. Furthermore, its focus does not spread beyond primary areas such as software development companies involved in projects related to application system design and programming. The next step is deploying longitudinal studies, combining qualitative and quantitative methods. Also, future studies should conduct comparative analyses with international organizations, and broaden institutional logics framework to enrich understanding.

7. Conclusion

Through an analysis of service innovation within the framework of institutional pillars, this study uses Service-Dominant Logic (SDL) as a structure to comprehensively explore SI. It points the way toward some key factors and establishes a model for future studies. It demonstrates how important are two pillars of cognitive (which involves cognition) and normative (values, beliefs), while its third regulative (rules and regulations). The study points out that in a society of solidarity, performance perception counts more than comparative performance. The study also points out that this legislative structure for service innovation needs to be established within the ICT sector. Due to the absence of regulation in service innovation, this framework is necessary as a mechanism for clarifying and providing definitive answers regarding expectations within the industry related to service innovation. Moreover, this scheme would provide guidelines for investments and stimulus mechanisms that will enhance sustainable service innovation with win-win results all around.

Likewise, the normative and cultural aspects form an important bridge for service innovation. They help establish an environment conducive to innovation, supplying a stable base for the setting of expectations and working out decisions. What's more, they make choices in favoring all aspects that support creativity; thenceforth would offer these sufficient resources). Finally, adopting SDL provides Pakistani ICT companies with a complete and flexible framework that strengthens their competence to innovate, while allowing them to seize the growth offered by change in today's digital world. Central to this research is the role of societal values and norms in determining entrepreneurs' perceptions, behaviors, and standards. The following reflect practical considerations with a nuanced understanding of these dynamics in contemporary service innovation efforts.

Ethical Consideration

The authors declare that this submission follows the policies of AJSS as outlined in the Guide for Authors and in the Ethical Statement. Full consent was obtained from the participants before the study and all procedures were carried out by approved ethical standards.

Informed Consent

A fully informed, considered, and freely given decision about whether or not to participate in the study, without the exercise of any pressure or coercion was taken from the respondents.

Declaration of Interest Statement

The authors declare that we have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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