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### **Research Article**

# Customers' Perspectives on the Nepalese Cellular Telecommunications Services' Technological and Innovation Capabilities

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Abstract

The extent of technological capabilities (TCs) and innovative capabilities (ICs) to which service organizations like cellular telecommunications assist to enhance organizational effectiveness (OE) in the Nepalese context needs to be explored. The study's objective was to assess the Nepalese cellular telecommunication (NCT) industry's technological and innovation capabilities from customers' perspectives. The study's outcomes were based on survey data gathered from 385 cell phone users of the Nepalese cellular telecommunication industry (NCTI). The survey had 18 inquiries, and its reliability, validity, and common method bias were tested accordingly. The NCTI's technological and innovative capabilities were analyzed through the lens of four observed TCs' variables and five observed ICs' variables. The latent measures – TCs and ICs were found to positively and significantly affect the OE. The study's outcomes would provide a meaningful understanding and offer valuable information regarding the OE measurement system.

*JEL Classification:* L25 Firm Performance: Size, Diversification, and Scope L84 Personal, Professional, and Business Services M41 Accounting

Keywords: Competitive environment; performance measures; operational performance; organizational effectiveness; service organization.

### Introduction

Today's businesses are under pressure to increase efficiency and productivity in order to stay competitive. They must adapt to market changes by continuously improving their paradigms, products, practices, processes, systems, or services, as operational performance and organizational are primarily effectiveness (OE) dependent on technological and innovative capabilities (Tidd and Bessant, 2009). organizations, Service such as

telecommunications, invest significant resources in technological innovation to re-engineer their products and processes, but the extent to which these technologies and innovations help organizations improve OE still needs to be explored (Armbruster *et al.*, 2008). OE has been a significant concern for all types of organizations. Managers must know which factors influence the OE in order to take or begin appropriate measures. Defining, conceiving, and

measuring the OE has always been challenging (Elrahman *et al.*, 2020). They refer to the consequences of various organizational processes (Hussein *et al.*, 2014), and outcomes are what the organizations desire (Morgan *et al.*, 2009).

For firms functioning in highly competitive, inventive, and advanced technology environments, the use of financial measures-based performance systems alone is not sufficient to measure OE (Mat and Smith, 2014). Modern businesses need a multi-dimensional performance monitoring system to deliver more information to investors and other stakeholders. Service industries'particularly the telecommunications - two most essential elements, as measured by various performance and effectiveness indicators, are technology and innovation. In today's competitive marketplace, products/services or businesses that incorporate technology advancements with innovative ideas stand out. Accordingly, the study seeks to notice: What do customers think of the technological and innovation capabilities of the NCTI for delivering OE? Organizational excellence has become a pressing necessity, particularly cellular telecommunication. Therefore, the study aims to assess the technological and innovation capabilities regarding the NCTI.

A firm's competitive advantage can be enhanced by gaining a better grasp of its stakeholders' expectations regarding organizational performance, as well as how new technologies and innovations can be introduced to improve the OE (Slack et al., 2009). OE can be improved by setting performance goals and benchmarks. Many companies are missing out on the benefits of technological innovation because they either don't measure performance or the performance metrics they measure don't fit the context (White, 1996). It is important to note that telecommunication services are a very creative industry in which rapid developments are made. Consequently, telecommunications firms are under constant pressure to offer innovative products more quickly, cheaply, and improved quality in today's globally competitive business environment (Din et al., 2016). In addition, the peculiarities of cellular telephony involve a unique interaction with the customer, which necessitates measuring the OE in a larger sense from the consumer's perspective. As a result, this is a relevant study in the Nepalese context, given the rapid growth of cell phone users.

## Literature Review and Hypotheses Development

Numerous methods exist for assessing OE, as well as a wide range of measurement metrics, are available. It's challenging to identify a comprehensive body of literature to situate this subject because there are many different approaches to gauging technological and innovation capabilities (Rosenbusch *et al.*, 2011). Instead of gathering

today's capital, in knowledge-based economy, organizational growth is predominantly driven by innovative capacity, fueled by the correct information and technical externalities (Din et al., 2016). The world of technology is evolving at a breakneck speed, and the cellular telecommunication sector is no exception. Varela and del Rio (2003) found that technological advancements have a significant impact on marketing opportunities. Customers' preferences continually change, posing several challenges for any organization (Chen et al., 2009). Technological breakthroughs allow for the creation of previously unimaginable products and services (Huarng, 2011). New technologies provide business actors with new challenges and chances to provide customers with unique products/services to build long-term partnerships (Yeh and Fu, 2013) and set them apart from their competitors (Saco and Goncalves, 2008).

Maintaining or improving the OE has been identified as one of the most crucial concerns facing the cellular telecommunications industry, with which many organizations are grappling. Network and service quality impact telecom service providers' organizational performance (Saha et al., 2016). Negi (2009) and Rahman et al. (2011) recognized network quality as important in determining overall organizational effectiveness. Signal quality and network coverage have been found to improve user satisfaction and the company's image (Woo and Fock, 1999). Service certification in telecommunications networks includes voice quality. Rapid resolution of voice faults improves service provider performance (Aire et al., 2004). Calls drop is one of the main performance measures for network operators. It is thought to have a direct impact on consumer satisfaction (Eljaam, 2005). Electronic customer relationship management (e-CRM) allows frequent client communication while maintaining database purity (O'Leary et al., 2004). The adoption of e-CRM improves organizational efficiency and has a direct impact on overall organizational performance (Kim-soon and Zulkifli, 2012).

Innovation is the process of transforming an idea or creation into a product or service that customers want and pays its providers well. New corporate practices, workplace regulation, decision-making, and new ways of dealing with external relations are introduced through innovation performance measures (Polder et al., 2010). Product/service innovation satisfies customers and improves business value by reducing risk (Dotzel et al., 2013). Innovation assesses customer needs and desires and meets them by enhancing customer benefits and OE (Zaefarian et al., 2017). The conversion of new technologies into processes has a significant impact on corporate performance and a firm's competitiveness (Anning-Dorson, 2016b). Service competitiveness in the telecommunications sector influences technological and inventive performance and allows service systems to be tailored to a specific client inside a given use-case, creating unique value for that customer (Anning-Dorson, 2016a). Companies employ competitive innovation to gain a competitive advantage by offering unique products, doing things better than competitors, or delivering superior, cheaper, and faster services (Aziz and Samad, 2016). Marketing innovation involves considerable modifications in product design, placement, packaging, distribution, communication, and promotion strategies to reduce transaction costs and improve organizational performance (Hassan *et al.*, 2013). Organizations that adopt innovative practices will be better positioned in the market and can retain customers (Auken *et al.*, 2008).

Based on the review of literature, the study has the following two hypotheses:

- *H1: Technological capabilities positively and significantly affect the OE.*
- H2: Innovation capabilities positively and significantly affect the OE.

### **Materials and Methods**

In addressing the issues, the study took a quantitative approach which was based on a survey of customers in organizations affiliated with the NCTI. The study's intended populace consisted of all the global systems for mobile (GSM) customers of Nepal Telecom and Ncell. According to the management information system report of the Nepal telecommunication authority (July 2021), customers of the sample companies account for more than 94 % of the NCT market share. The respondents for the survey were chosen through purposeful sampling from a pool of service providers, university students, and freelancers. A sample plan based on the recommendations of Bowerman *et al.* (2004) as well as Krejcie and Margan's (1970) generalized scientific guideline was utilized to collect the responses of 385 participants.

A standardized survey questionnaire was used to collect data from the respondents. The questionnaire included 18 questions about the respondents' demographic and general information (6), technological and innovation capabilities measurements (10), and OE measures (2). On a six-point Likert scale, respondents were asked to rate their responses to 12 questions about technology and innovative capabilities and the OE. The Likert scale was set at 1 to 6, with 1 indicating strong disagreement and 6 indicating strong agreement. Five hundred fifty questionnaires were distributed in the Kathmandu valley during the 90-day period of June – August 2021 to conduct a field survey among service holders in various organizations, university students, and freelancers, and 385 properly filled-out responses were obtained and used.

#### **Result and Discussions**

The study assessed the reliability and validity to confirm the suitability of the constructs before assessing the hypothesized model. As per the recommendation of Nunnally (1993), the reliability of the constructs was measured using Cronbach's alpha ( $\alpha$ ). The value of alpha of the technological capabilities having five observed variables (VAR 7, 8, 9, 10, and 11) was 0.773. The analysis found that the VAR\_11 'the company alters and provides me all information through SMS' required to delete because of higher the value of alpha 0.805 if the item was deleted. Therefore, VAR\_11 was not relevant in the study and was deleted from the analysis. Similarly, the alpha value of the innovation capabilities with five observed variables (VAR 12, 13, 14, 15, and 16) was 0.767. None of the items were found to delete at this construct. Therefore, reliability statistics promoted nine variables within two constructs for further analysis. As suggested by Fornell and Larcker (1981), the validity of the constructs was measured using average variance extracted (AVE) and composite reliability (CR). Accordingly, as Podsakoff et al. (2003) advised, the study analyzed the Harman single factor test to identify the incidence and extent of the common method bias (CMB). The summary of the results with recommended cut-off values was presented in Table 1.

The cut-off values for reliability, validity and CMB insights were all met. As a result, the variables/constructs investigated were trustworthy, valid, and CMB-free, allowing for future exploration. As per the sample framed, the respondents general and demographic were as: service holders (38.1 %), university students (44.4 %), and freelancers (17.5 %); female (51.4 %) male (48.6 %); aged below 35 years (68.1 %) and aged above 35 years (31.9 %); from Nepal Telecom (50.1%) and from Ncell (49.9 %). The study showed that 71.8 % of cell phone users in Nepal used pre-paid SIM cards, and 1.9 % of customers used pre-paid and post-paid SIM cards. The study took 95 % of respondents with at least five or more years of experience using cell phone services in Nepal.

Multiple regression was run with OE as the dependent variable TCs and ICs as the independent variables. The model summary is shown in Table 2, and the ANOVA (Analysis of Variance) result is shown in Table 3. Multiple correlations revealed that the adjusted R Square was fundamentally different from zero (F = 115.424, p >.000), indicating that the dependent variables accounted for 37.7 % of the variation in the arrangement of independent variables. Table 4 depicts the total evaluation model.

	Technological	Total				
	Capabilities (TCs)	Capabilities (ICs)		Effectiveness (OE)		
Observed	Network and service quality	Product/service innovation Process innovation Customization Competitive innovation		Overall technological capabilities		
variables	Signal strength and coverage			Overall innovation		
				capabilities		
	Voice quality					
	Calls drop					
		Marketing inr	novation			
No engaged variables	4	5		2	11	
				Cut-off value	Recommended by:	
Reliabilty indicators:	0.805	0.767	0.702	> 0.70	Nunnally, 1993	
Alpha ( $\alpha$ )		0.707 0.702			- · · · · · · · · · · · · · · · · · · ·	
Validity indicators:						
CR	0.801	0.834	0.701	$\geq 0.70$	Fornell and Larcker, 1981	
AVE	0.514	0.502	0.536	≥ 0.50	Fornell and Larcker, 1981	
Common meth	od bias indicator:					
Harman Sing	le-factor variance	0.3816		$\leq 0.50$	Cho and Lee, 2012	

Table 1: Reliability, Validity and Common Method Bias Statistics

#### Table 2: Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate		
0.614	0.377	0.373	0.714		
Predictors:	(Constant), TCs, ICs				
Dependent variable:	OE				

#### Table 3: ANOVA Result

	Sum of Squares	df	Mean Square	F	Sig.
Regression	117.623	2	58.812	115.424	0.000
Residual	194.640	382	0.510		
Total	312.264	384			
Dependent variable:	OE				
Predictors:	(Constant), TCs, ICs				

	Unstandardized Coefficients <sup>a</sup> Standardized coefficients					Variance	Observations
Model	В	St. Error	Beta	t-statistics	Sig.	Inflation	on the
						Factor	hypotheses
(Constant)	1.070	0.208		5.139	0.000		-
TCs	0.177	0.043	0.179	4.123	0.000	1.159	Accepted
ICs	0.592	0.049	0.524	12.060	0.000	1.159	Accepted

a. Dependent variable: OE

In this study, it has been demonstrated that the independent variables are different and contribute significantly to the OE of the NCTI. In this case, multicollinearity was not an issue because the measured variance inflation factor (VIF) values were not greater than four, as Hair *et al.* (2010) indicated.

The NCTI's technological and innovative capabilities were analyzed through the lens of five different variables each. One of these variables, regarding TCs (VAR\_11\_ e-CRM), was not retained in the study; however, it was significant in the earlier studies (such as Kim-soon and Zulkifli, 2012; O'Leary et al., 2004). The latent measure TCs was examined from four observed variables: network and service quality ( $\beta = 0.685$ , p < 0.01); signal strength and coverage ( $\beta = 0.749$ , p < 0.01); voice quality ( $\beta = 0.774$ , p < 0.01); and calls drop ( $\beta = 0.653$ , p < 0.01) that directly influence OE. Technology facilitates innovation in competitive markets (Sood and Tellis, 2009). In consistent with the past studies (like Eljaam, 2005; Khan and Afsheen, 2012; Rahman et al., 2011; Saha et al., 2016), the study confirms that network and service quality, signal strength and coverage, voice quality, and calls drops to have significant influence to choose the cell phone operators as the service provider. That means cell phone operators must ensure good and robust TCs to please their subscribers. The fact that the TCs has emerged as one of the main constructs to measure OE demonstrates the strategic role.

To get a sense of the latent measure ICs, the study looked at the five observed variables: product/service innovation ( $\beta =$ 0.791, p < 0.01); process innovation ( $\beta = 0.686$ , p < 0.01); customization ( $\beta = 0.675$ , p < 0.01); competitive innovation  $(\beta = 0.772, p < 0.01)$ ; and marketing innovation ( $\beta = 0.662$ , p < 0.01). Service innovation influences customer satisfaction and retention (Salunke et al., 2013). In order to remain competitive and meet the needs of customers, a business must constantly innovate its processes. Enhancing a company's competitive edge through customization is viable (Prahalad and Ramaswamy, 2004). By implementing new ideas and technology, companies can set themselves apart from the competition and improve their products and services to remain competitive. Customer satisfaction and competitive advantage are the primary goals of marketing innovation. The study found that the observed variables had

a positive and substantial effect on the OE, consistent with prior studies (such as Afriyie *et al.*, 2018; Yildiz *et al.*, 2014). In addition, the study supports Nam's (2014) study that ICs have a positive and significant impact on operational performance. Hence, innovation culture has been pronounced as a pre-condition for improving organizational, marketing, and managerial entrepreneurship in a competitive environment (Aksoy, 2017).

### Conclusion

The study answered the research question 'how do customers view the NCTI's technological and innovation capabilities. It found that the TCs ( $\beta = 0.179$ , p < 0.01) and ICs ( $\beta = 0.524$ , p < 0.01) positively and significantly affect the OE. It is believed that the resulting standardized weights of the latent measures will assist organizations in enhancing operational performance and obtaining a competitive advantage. Technologies encourage on delivery of valueadding products or services of exceptional quality, on time, and at a competitive price. Organizations need high-quality information based on ICs to make various managerial decisions that can lead to better operational effectiveness. Studies of OE measurement systems span diverse fields, and methodological approaches differ substantially. This study cited a representative rather than striving to be exhaustive. The significant limitation is that the study employed only the quantitative survey with a structured questionnaire to acquire the essential information. The study's conclusions would provide useful guidance in understanding key driving variables of technological and innovative capabilities and offer meaningful information regarding strategic areas of the OE measurement system.

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