# The role of innovation and knowledge integration in relation to service quality and sustainable competitive advantage

#### Abstract

The present study aimed to evaluate the effect of quality of service on achieving sustainable competitive advantage through the mediating variables of learning capability, knowledge integration capability, customer-centric learning capability, and service innovation. The statistical population included employees and managers of Iran Steel Public Services Company. Data were collected by a questionnaire and by census method. Cronbach's alpha was used to determine the reliability of the questionnaire. Also, logic was used to determine validity. The results showed that the measurement tool has the necessary reliability and validity and the fit of the conceptual model structure was confirmed. In this study, the structural equation model of sectoral least squares was used to test the hypotheses. The results showed that the quality of services has a positive and significant effect on the learning capability, knowledge integration capability, and customer-centric learning capability. Also, sectoral learning capability and customer-centric learning capability have a positive and significant effect on knowledge integration capability. Also, knowledge integration capability has a positive and significant effect on service innovation. Moreover, service innovation has a positive and significant effect on gaining a competitive advantage. Finally, knowledge integration capability plays a mediating role in the relationship between sectoral learning capability and customer-centric learning capability, and service innovation.

**Keywords:** *Knowledge integration capability, Customer-centric learning capability, Sectoral learning capability, Quality of service, Sustainable competitive advantage, Service innovation* 

### Introduction

With increasing the market fragmentation and with increasing customers' expectations, service providers have shifted their focus toward providing customer-centric and innovative solutions designed to create more customer value and sustainable competitive advantage. Researchers have begun to investigate knowledge resources and the mechanisms resulting in the competitive advantage of service innovation (Windler et al., 2017) since knowledge resources are crucial to innovation (Chen et al., 2019). Increasing the number of studies on service innovation emphasizes that pathways for service-related knowledge are different from product-related knowledge (Halkiopoulos et al., 2020). Despite significant differences between commodity-based and service-based companies and a strong trend among researchers, the question of how companies organize and manage knowledge to provide new solutions to increase value and its association with competitive advantage has remained unclear (Zia, 2020).

In the present study, requests for the development and testing of more comprehensive models of service innovation are considered and the predictor variables that drive service innovation in enterprise-to-enterprise service areas are addressed (Almahamid et al., 2021). The present study argues that knowledge creation alone is not enough, but should be integrated to provide innovative service solutions that meet customer needs (van Greunen et al., 2021). Knowledge integration involves the use of formal processes and structures that enable the acquisition and integration of market knowledge and other types of knowledge among different

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operational units in the company (Ali et al., 2021). Iran Steel General Services Company (Private Joint Stock Company) was established in 1990 to provide commercial services, distribution, and warehousing of various goods with a focus on steel products. This company has been developing its business since 1997 by participating in the production and conversion of steel products and using 30000 square meters of workshop space and modern machinery.

Weakness in services including timely delivery of shipments, after-sales service, or return of shipments has prevented this company from gaining a sustainable competitive advantage. The current status suggests that the company uses less innovative activities in its production system and services, so the company's products and services cannot compete with many countries. This issue has caused the company to lose its position in the global market. The lack of purchasing this company's products and services in the foreign market indicates that the company is less familiar with current knowledge. Although this company produces steel such as sponge steel, which is considered an innovation in production, the diversity of knowledge and integration and coherence in applying the knowledge of steel production has not been institutionalized in this company.

Therefore, using the perspective of dynamic capabilities (Vu, 2020), it is assumed in the present study that the acquisition of new knowledge through external and internal sources encourages innovative companies to integrate such knowledge with current knowledge. As a result of knowledge integration capabilities (KIC), new configurations are created that enhance

the service company's capability to provide innovative service solutions that lead to sustainable competitive advantage. Providing superior services is one of the ways to gain a competitive advantage by providing service at the enterpriseto-enterprise level. Steel Public Services Company is one of the active companies in Iran, whose main activity is to provide extensive services to companies active in the steel industry.

Steel is one of the heavy industries that play a major role in the country's exports, currency, and employment. However, the steel industry in the world operates with a variety of innovations and services and knowledge production, and lagging in innovation and related services in this area means not gaining a sustainable competitive advantage. Iran's steel industry in recent years has experienced good growth in the area of production but also has major weaknesses. These industries do not have a good performance in the area of innovative products and up-to-date services. This issue has caused them to lose their position in the region and the world to competing companies. One of the most important necessities of this research is to better understand the sectoral learning capability, knowledge integration capability, customer-centric learning capability, and innovation to gain a competitive advantage. This issue has remained unknown in most studies (Salunke et al., 2018). One of the positive outcomes of the present study is recognizing the differences between the sectoral learning capability and customer learning capability, which have remained unknown until now (Salunke et al., 2018). Given what was stated above, the present study aims to investigate the impact of quality of service on achieving sustainable competitive advantage through the mediating role of the variables of sectoral learning capability, knowledge integration capability, customer-centric learning capability, and innovation.

### Theoretical foundations of research

## The impact of quality of service on learning capability

In this study, using the research works on dynamic capabilities (Helfat et al., 2007), sectoral learning capability (episodic) is defined as the capability of the company to purposefully create new knowledge from previous experience, develop this knowledge into value creation activities and turning this knowledge into the knowledge that takes into account changing market conditions. Since the traditional model of technological advancement through development and research is not sufficient for companies operating in dynamic environments, sectoral learning becomes a key resource through which the company can achieve cost savings in other processes (Acha et al., 2005).

Sectoral learning leads to innovation. Today's companies transfer the learning from specific segments of innovation to the overall strategy to ensure the exchange of business and business knowledge (Acha et al., 2005). These meta-routines

are not "behavioral patterns that shape the mindset of the organization's working practice" (Acha et al., 2005) to achieve learning and innovation, and automatic behaviors, but they are organizational responses in the form of human resource management policies and processes, knowledge management, and research and development (Acha et al., 2005). Thus, the hypothesis is developed in this way:

Hypothesis 1- Quality of service has a positive impact on sectoral learning capability.

The impact of quality of service on customer-centric learning capability

Customer learning capability is defined as the ability of a company to purposefully create new knowledge from its direct and indirect interactions with customers, to develop this knowledge into value creation actions, and adapt that knowledge to knowledge that considers the changing market conditions. By integrating service offers into customer business processes, companies are increasingly adopting a customer-centric perspective as a source of competitive advantage (Matthyssens & Vandenbempt, 2008).

This issue requires continuous reinvestment in customer education and customer service, and advanced technology (e.g., digitization) in the creation of customer-centric pathways. Previous studies have emphasized the importance of learning from customers/clients to create superior value (Slater & Narver, 1995). Gaining a deeper understanding of customers is a prerequisite for developing desirable customer service offers (Storey et al., 2016) and risk-reduction capability (Ulaga & Reinartz, 2011). It is also a prerequisite for shifting the pathway from products to solutions (Paiola et al., 2013) and building effective customer relationships. Given the emphasis on customer/ client source in service innovation, this study argues that quality of service can lead to customer-centric learning capability, so the following hypothesis is presented:

Hypothesis 2: Quality of service has a positive impact on customer-centric learning capability.

The impact of quality of service on the knowledge integration capability

The knowledge-based view of the company argues that the creation and application of knowledge are key actions that lead to the superior performance of the company (Leiponen, 2006). The concept of higher-level integration capabilities (Lawson & Samson, 2001) reflects the ability to manage distinct capabilities related to the creation and application of knowledge (Agarwal & Selen, 2009). Knowledge integration capability reflects the company's ability to integrate and apply current knowledge and acquired knowledge in pursuit of business opportunities. In the present study, knowledge integration capability is defined as the ability of a company to purposefully create new knowledge by combining knowledge resources, developing this knowledge into value creation

activities, and adapting this knowledge to knowledge that considers the changing market conditions (Kogut & Zander, 1992). This includes integrating knowledge acquired through multi-sectoral (focusing on internal dimension) learning and customer orientation (focusing on external dimension). Both of these sources of knowledge are prerequisites for innovation. New combinations in knowledge routines that are difficult to imitate ensure that the acquired competitive advantage cannot be easily copied by competitors (Storey et al., 2010). Entrepreneurial initiatives are the foundations of this process (Grant, 1991; Lado et al., 1992). Thus, the following hypothesis is presented:

Hypothesis 3- The quality of services has a positive impact on knowledge integration capability.

Sectoral learning capability impacts knowledge integration capability

The key role of knowledge integration capability in the company's innovation process is to ensure that the required new knowledge combinations are made available to the company's entrepreneurial managers. For this purpose, knowledge acquired through sources focusing on external dimensions and internal dimensions must be demonstrated in the company. However, new knowledge acquired by the company may not necessarily correspond to current knowledge, which should be a part of current knowledge acquired in its initial form may not easily be useful in meeting customer needs that may vary in different projects (Grant, 1996). Thus, acquiring new knowledge in the area of developing customer-centric solutions should logically lead to knowledge integration. Therefore, it is hypothesized that:

Hypothesis 4: The sectoral learning capability has a positive impact on knowledge integration.

Hypothesis 5: Customer-centric learning capability has a positive impact on knowledge integration.

Impact of knowledge integration on innovation

Innovation accelerates growth and profitability in service companies and leads to value creation in new ways for companies and customers (Moller et al., 2008). The two main theoretical perspectives in service innovation studies, including the delimitation approach and the integration approach, confirm the specificity of services versus goods in creating new value (Witell et al., 2016). Service innovation involves value creation for both the company and the customer, which is consistent with the duality of value creation in the customer-centric paradigm (Shah et al., 2006). It also integrates the concepts of value provided on the one hand and value consumption on the other, so acknowledges the importance of realized value (as opposed to potential value) in service innovation. Finally, the idea that innovation can be achieved internally or externally is consistent with the

knowledge-based framework of this study. As assumed, the knowledge integration capability enables the service company to offer customer-centric solutions by integrating new and complementary acquired knowledge with current knowledge. In a study on Finnish commercial service companies, Leiponen (2006) found a significant relationship between knowledge and service innovation, which emphasizes the need to integrate different sources of knowledge in the company. Innovation results from the ability to integrate different types of current knowledge bases with new market-product configurations to adapt to these opportunities (Storey et al., 2010). As stated before, the dual benefits of knowledge integration are more likely to be based on resource complementarity than on resource similarity (Wiklund & Shepherd, 2009). The company's innovation factor is included in the knowledge integration mechanisms that enable the company to acquire, interpret and use its knowledge resources and bases efficiently (Verona, 1999). Knowledge integration is related to the fundamentality of innovation (Ordanini & Parasuraman, 2011) and its success in the market depends on specific configurations of new service characteristics, with an emphasis on user engagement (Ordanini, Parasuraman, & Rubera, 2013). Therefore, we hypothesize:

Hypothesis 6: Knowledge integration capability has a positive impact on innovation.

Relationship between service innovation and competitive advantage

Sustainable competitive advantage refers to the company's ability to achieve a superior market position. This study adapts Barney's (1991) definition of sustainable competitive advantage. A company is said to have a sustained competitive advantage when it implements a value creation strategy that cannot be pursued simultaneously by any current or potential competitor, and when other companies are unable to copy the benefits of that strategy. The development of customer-centric solutions includes the establishment of operational links and intense exchange of information, which leads to the establishment of long-term cooperative relationships with clients. The high costs of change associated with these relationships create a barrier for competitors and provide a wider scope for sustainable competitive advantage. Knowledge resource combinations are particularly relevant to service companies, since they are task-oriented, adaptable, and flexible, and intend to provide specific services to their clients (Acha et al., 2005). These companies create complex solutions for their clients that usually involve integrating a large number of knowledge resources (Blindenbach-Driessen & van den Ende, 2006). Therefore, the sustainability of the competitive frontier for service companies is deeply rooted in these complexities involved in the knowledge integration process (Whitley, 2006). Therefore, we hypothesize

Hypothesis 7: Service innovation has a positive impact on achieving sustainable competitive advantage.

The mediating role of knowledge integration capability The presence of new knowledge may be necessary to pursue customer-centric service solutions, but it is not enough.

To create such innovations, companies use well-designed mechanisms to recombine knowledge stores (e.g., information, and knowledge acquired through internal and external learning) with innovative applications designed for new market opportunities (Kogut & Zander, 1992). Previous researchers have paid little attention to the mediating role of knowledge integration (De Luca & Atuahene-Gima, 2007). Thus, this study argues that the new knowledge acquired to develop new knowledge configurations to provide customercentric solutions require integration. Therefore:

Hypothesis 8: Knowledge integration capability plays a mediating role in the relationship between sectoral learning capability and service innovation.

Hypothesis 9: Knowledge integration capability plays a mediating role in the relationship between customer-centric learning capability and service innovation.

Figure 1 shows Conceptual research model .

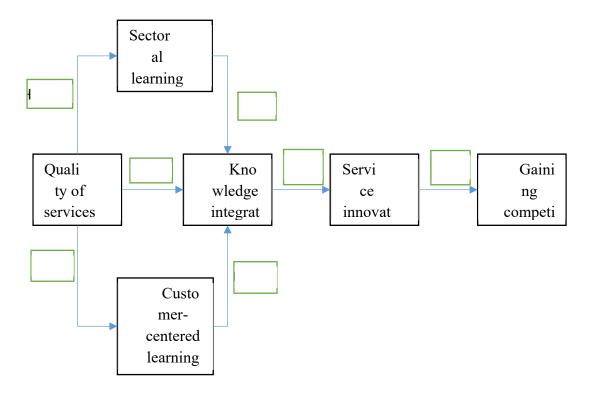


Figure 1: Conceptual research model (Salunke et al. (2018)

#### **Research Methods**

The present study is applied in terms of aim and descriptive in terms of type and survey in terms of data collection. Also, the field method is used for data collection. The statistical population of the study includes employees and managers of Iran Steel Public Services Company. According to available statistics, 195 people are working in Iran Steel Public Services Company. Due to the limited population, the census method is used to determine the sample size. In this study, the standard questionnaire of Salunke et al. (2018) was used.(**Table 1 & 2**)

Table 1: Divergent validity matrix by Fornell and Larker methods

	Customer- centric learning capability	Sectoral learning capability	Knowl integra capabil	tion	Gaining a competitive advantage	Service innovation	Quality service	of
Customer-centric learning capability	0.76068							
Sectoral learning capability	0.52065	0.73372						
Knowledge integration capability	0.57776	0.53948	0.78599					
Gaining a competitive advantage	0.54419	0.51273	0.5591	3	0.83675			
Service innovation	0.54758	0.59883	0.5622	9	0.53789	0.72728		
Quality of service	0.54456	0.50968	0.51792		0.51603	0.56794	0.719778	
Table 2: Cronbach's alpha			•					
Structure				Cronbach's alpha				
Customer-centric learning capability				0.85421				
Sectoral learning capability				0.82797				
Knowledge integration capability				0.87526				
Gaining a competitive advantage				0.85735				
Service innovation				0.85000				
Quality of service				0.76592				

In this study, the structural equation modeling method of at least sectoral squares is used to test the hypotheses.

## Results

The results revealed that the quality of services has a positive effect on learning capability. The results revealed that quality of service has a positive and significant relationship with learning capability (T =96.409;  $\beta$  = 0.9193). The quality of services has a positive effect on knowledge integration. The results showed that the quality of services has a positive and significant effect on knowledge integration capability (t = 6.3371;  $\beta$  = 0.2252)

The quality of services has a positive effect on customercentric learning capability. The results showed that the quality of services has a positive and significant effect on customercentric learning capability (t = 3.294;  $\beta = 0.3215$ ). Sectoral **Table 3:** T-Value and path standard coefficients learning capability has a positive effect on knowledge integration. The results showed that sectoral learning capability has a positive and significant effect on knowledge integration (t = 4.9608;  $\beta = 0.4408$ ).

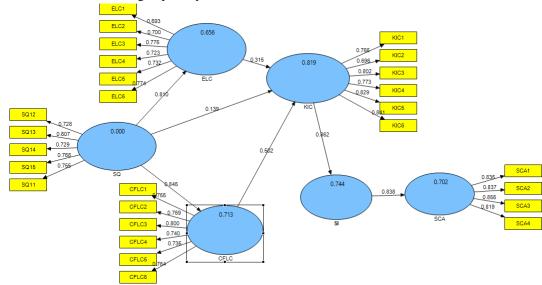
Customer-centric learning capability has a positive effect on knowledge integration. The results showed that customercentric learning capability has a positive and significant effect on knowledge integration (t = 4.2138;  $\beta$  = 0.3944). Knowledge integration has a positive effect on innovation. The results showed that the experience of luxury brands has a positive and significant effect on cognitive advantages (t = 6.2143;  $\beta$  = 0.6089). Innovation has a positive effect on competitive advantage. The results showed that innovation has a positive advantage (t = 4.1587;  $\beta$  = 0.423).

	path standard coefficients	SD	T-Value
Quality of service -> Sectoral learning capability	0.8097	0.0188	43.1463
Quality of service -> knowledge integration capability	0.1389	0.0647	2.1488
Quality of service -> Customer-centric learning capability	0.8446	0.0157	53.8125
Sectoral learning capability -> Knowledge integration capability	0.3153	0.0604	5.22

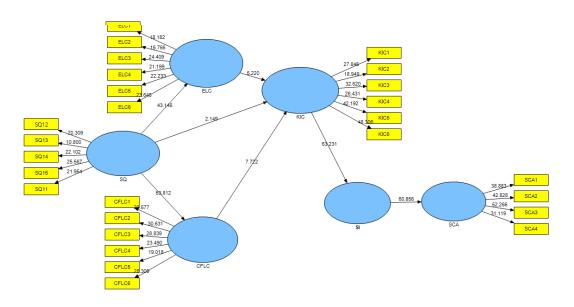
Customer-centric learning capability -> Knowledge integration capability	0.5017	0.065	7.7222
Knowledge integration capability -> service innovation	0.8623	0.0136	63.2313
Service Innovation -> Gaining competitive advantage	0.8379	0.0138	60.8557

The results(in **Table**3) revealed that knowledge integration capability plays a mediating role in the relationship between learning capability and service innovation. The results showed that there is a positive and significant relationship between learning capability and service innovation. A positive and significant relationship was found between sectoral learning and knowledge integration capability. There was a positive and significant relationship between knowledge integration capability and service innovation.

When the integration capability has introduced the relationship between sectoral learning capability and service innovation, the value of the standard path coefficient is reduced from 0.8194 to 0.4011, indicating that the relationship between learning capability and service innovation by 5.05% is due to the mediating variable of knowledge integration capability and by 48.95 is due to the direct relationship between sectoral learning capability and service innovation is. This value is greater than 1.96, indicating that the effect of the mediator variable in the relationship between the independent and dependent variables is significant.(**Figure 2**)



а



b

Figure 2:a) Graphic model of standard coefficients,b) Graphical Model of the significance of standard coefficients

Based on the results, knowledge integration capability plays a mediating role in the relationship between customer-centric learning capability and service innovation. The results showed that there is a positive and significant relationship between customer-centric learning capability and service innovation. There is a positive and significant relationship between customer-centric learning capability and knowledge integration capability. There is a positive and significant relationship between knowledge integration capability and service innovation. When integration capability is introduced between customer-centric learning capability and service innovation, the standard path value is reduced from 0.8488 to 0.3983, which shows that the relationship between customercentric learning capability and service innovation by 53.07% is due to the mediator variable of knowledge integration capability and 46.93% is due to the direct relationship between customer-centric learning capability and service innovation. As seen (according to Table 4&5), this value is greater than 1.96 and shows that the effect of the mediator variable in the relationship between the independent and dependent variables is significant.

	of	Index redundancy	predictor correlation
determination			
0.71329		0.57863	0.4107
0.65557		0.53835	0.3511
0.81867		0.61778	0.5056
0.70205		0.70015	0.4877
0.74354		0.52893	0.3914
		0.51808	
0.72663		0.58032	
0.64936			
	0.71329 0.65557 0.81867 0.70205 0.74354 0.72663	0.71329 0.65557 0.81867 0.70205 0.74354 0.72663	0.71329 0.57863   0.65557 0.53835   0.81867 0.61778   0.70205 0.70015   0.74354 0.52893   0.51808 0.72663

Table 4: Coefficient of determination and	predictor correlation index and model fit index

تعیین ضریب \* افزونگی شاخص ک = شاخص تناسب مدل Model fit index شاخص تناسب مدل : افزونگی شاخص: index redundancy: coefficient of determination

	CFLC -> SEI	CFLC -> KIC	KIC -> SEI	CFLC -> SEI mediated by KIC		
			KIC -> 5EI	CFLC -> SEI	CFLC -> KIC	KIC -> SEI
Beta	0.8488	0.8791	0.8628	0.3983	0.8779	0.5123
SE	0.0142	0.0124	0.0134	0.0688	0.0126	0.0699
t-value	59.5849	70.7016	64.3004	5.7858	69.6117	7.3291
Typeofmediation:SectoralSobel Z value: 47.66 significance at p< 0.000						

Table 5: The mediating role of knowledge integration capability in customer-centric learning capability and service innovation

#### discussion & Conclusion

The present study aimed to examine the effect of quality of service on achieving sustainable competitive advantage with the mediating role of innovation and knowledge integration. According to the results, quality of service has a positive effect on learning capability. The results showed that quality of service has a positive and significant relationship with sectoral learning capability (T = 409/969;  $\beta$  = 0.9193) These results are in line with the results of previous research (Rashtchi and Menhaj, 2018). Based on the results, quality of service has a positive effect on knowledge integration. The results showed that quality of service has a positive and significant effect on knowledge integration (t = 6.3371;  $\beta = 0.2252$ ). These results are in line with the results of previous studies (Rabiee et al., 2017; Barani et al., 2016; Salunke et al., 2018). Based on the results, quality of service has a positive effect on customercentric learning capability. The results showed that quality of service has a positive and significant effect on customercentric learning capability (t = 3.294;  $\beta$  = 0.3215). These results are in line with the results of previous studies (Salunke et al., 2018).

Based on the results, sectoral learning capability has a positive effect on knowledge integration. The results showed that sectoral learning capability has a positive and significant effect on knowledge integration (t = 4.9608;  $\beta$  = 0.4408) (Rashtchi and Menhaj, 2018; Macomed and Sub, 2020; Salunke et al., 2018). Based on the results, customer-centric learning capability has a positive effect on knowledge integration. The

results showed that customer-centric learning capability has a positive and significant effect on knowledge integration (t = 4.2138;  $\beta = 0.3944$ ). These results are in line with the results of previous studies (Sharbatian and Karimi Zand, 2018; Javad, 2020). Based on the results, knowledge integration capability has a positive effect on innovation. The results showed that the experience of the luxury brand has a positive and significant effect on cognitive benefits (t = 6.2143;  $\beta = 0.6089$ ). These results are in line with the results of previous studies (Rashtchi and Menhaj, 2018; Sharbatian and Karimi Zand, 2018; Javad, 2020).

Based on the results, innovation has a positive impact on gaining a competitive advantage. The results showed that innovation has a positive and significant impact on gaining a competitive advantage (t = 4.1587;  $\beta$  = 0.423). These results are in line with the results of previous studies (Shafiee Nikabadi and Ghochankanloo, 2015; Macomed and Sub, 2020; Salunke et al., 2018). Based on the results, knowledge integration capability plays a mediating role in the relationship between sectoral learning capability and service innovation. To determine the mediating role of knowledge integration in the relationship between sectoral learning capability and service innovation, Baron and Kenny's criteria were used. The results showed that there is a positive and significant relationship between sectoral learning capability and service innovation. There is a positive and significant relationship between learning and knowledge integration capability.

There is a positive and significant relationship between knowledge integration capability and service innovation. When the integration capability is introduced to the relationship between sectoral learning capability and service innovation, the value of the standard path coefficient is reduced from 0.8194 to 0.4011, which shows that 51.05% of the relationship between the sectoral learning capability and service innovation is due to the mediator variable of knowledge integration capability, and 48.95 is due to the direct relationship between the sectoral learning capability and service innovation. This result is in line with the results of previous research (Salunke et al., 2018).

The results showed that knowledge integration capability plays a mediating role in the relationship between customer-centric learning capability and service innovation. Baron and Kenny's criteria were used to determine the mediating role of knowledge integration capability in the relationship between customer-centric learning capability and service innovation. The results showed that: A: There is a positive and significant relationship between customer-centric learning capability and service innovation. B: There is a positive and significant relationship between customer-centric learning capability and knowledge integration. C: There is a positive and significant relationship between knowledge integration capability and service innovation. D: When integration capability is introduced between customer-centric learning capability and service innovation, the standard path value is reduced from 0.8488 to 0.3983, which shows that the relationship between customer-centric learning capability and service innovation by 53.07% is due to the mediator variable of knowledge integration capability and 46.93% is due to the direct relationship between customer-centric learning capability and service innovation. This result is in line with the results of previous studies (Salunke et al., 2018). In this study, individual respondents were used to answering all the questions in the questionnaire. Using this method can cause a common method bias error because the respondent is not necessarily allowed to know all the information. Future studies may use multiple respondents. Based on the results, using risky processes to improve the quality of innovative services, using team meetings and the presence of various experts to create new ideas, using the unique requirements of the customer to improve the current knowledge of the company to provide distinctive services, using the systematic methods to record the consequences of unforeseen events (good or bad) in service delivery activities to use them in future activities, to introduce new recruitment standards to provide the necessary resources for innovative service and to create well-developed guidelines for knowledge integration in different parts of the organization using knowledge management are recommended. Acknowledgments

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