


# “The impact of strategic orientations on service innovation: The moderating effect of technological capabilities”

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# THE IMPACT OF STRATEGIC ORIENTATIONS ON SERVICE INNOVATION: THE MODERATING EFFECT OF TECHNOLOGICAL CAPABILITIES

## Abstract

This study investigates the relationship between strategic orientations and innovation within the Sudanese service sector: hospitality, postal, bank, education, communication, and insurance spheres. Drawing upon the resource-based view, the paper examines the influence of market, service, and learning orientations on both incremental and radical innovation. Moreover, the study explores the moderating role of technological capabilities in this relationship. A quantitative research design was employed, utilizing a convenience sample of 160 managers from various service sub-sectors in Sudan. Empirical findings reveal that market orientation, service orientation, and learning orientation have a significant effect on incremental innovation (estimates = 0.164,  $p = 0.00$ ; estimates = .177,  $p = .014$ ). In addition, market and service orientations demonstrate a significant relationship with technological capabilities (estimates = 0.612,  $p = 0.00$ ; estimates = -.376,  $p = .018$ ). Further, incremental innovation and radical innovation significantly correlated with technological capabilities (estimates = .131,  $p = 0.00$ ; estimates = .365,  $p = 0.00$ ), while service orientation and learning orientation do not have a significant correlation with radical innovation (estimates = .153,  $p = .129$ ; estimates = .061,  $p = .491$ ). Learning orientation does not have a significant correlation with technological capabilities (estimates = .168,  $p > .228$ ). Furthermore, results indicate that technological capabilities do not moderate the relationship between strategic orientation and service innovation.

## Keywords

service sector, market orientation, service orientation, learning orientation, radical, incremental, large firms, Sudan

## JEL Classification

M12, M19

## INTRODUCTION

The service sector has emerged as a pivotal driver of economic growth, job creation, and development in recent years. Sustained success within this sector hinges on a firm's capacity to deliver exceptional service and meet customer demands (Yang et al., 2022). While the Sudanese service sector has grown, its contribution to the Gross Domestic Product (GDP) has declined, from 52.1% in 2020 to 51.7% in 2021, necessitating further investigation. Given the increasingly competitive Sudanese business landscape, firms must differentiate themselves through superior value propositions. This study focuses on the service sector, examining the influence of strategic orientation and technological capabilities on service innovation. Sudanese service firms often grapple with skill deficiencies, limited experience, and inadequate technology, hindering their ability to develop innovative service offerings. Consequently, there is an urgent need to determine whether strategic orientation and technological capabilities can enhance Sudanese firms' service innovation capacity and global competitiveness.



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### Conflict of interest statement:

Author(s) reported no conflict of interest

## 1. LITERATURE REVIEW AND HYPOTHESES

The increasing significance of servitization has prompted extensive research into the determinants of this transition (Zhang et al., 2021, p. 3). While numerous studies have identified operational factors driving servitization, the role of strategic-level elements remains under-explored. Given the inherent uncertainties and challenges associated with the shift to service and the subsequent need for tailored organizational responses (Yu et al., 2018), this domain warrants further investigation. Grounded on resource-based view and strategic choice theories, this study posits that strategic orientations can offer substantial explanations for organizational strategic decisions (Yu et al., 2018) and serve as a robust organizational ideology.

The concept of strategic orientation has been defined variously in the literature (Njuguna et al., 2022). Generally, it is understood as a set of guiding principles that shape an organization's operations, fostering behaviors conducive to long-term viability and performance. Essentially, strategic orientation reflects an organization's approach to cultivating positive behaviors for sustained competitive advantage. Previous research has identified multiple dimensions of strategic orientation, demonstrating that firms' strategic choices are influenced by their dominant orientation (Zhang et al., 2021, p. 4). Customer orientation, a key dimension in service contexts (Zhang et al., 2021, p. 4), serves as a foundation for this study.

By integrating market orientation, service orientation, and learning orientation, this paper develops a comprehensive framework grounded in existing literature. Market orientation is characterized as an organizational culture prioritizing customer value creation and sustained performance improvement (Cheng & Sheu, 2017, p. 470). It enhances innovative capabilities by providing valuable market insights (Tsou et al., 2014; Atuahene-Gima & Ko, 2001). Service orientation emphasizes employee behaviors focused on delivering exceptional service (Oliveira & Roth, 2012). Lastly, learning orientation involves the systematic creation and utilization of knowledge for competitive advantage (Cheng & Sheu, 2017, p. 471). Collectively,

these orientations deepen firms' market understanding (Klein et al., 2021), making them adaptable for manufacturers transitioning to service-based business models. Consequently, they are well-suited for research within the service sector.

The majority of previous research on strategic orientation and innovation has primarily focused on specific industry sectors such as banking, hospitality, and insurance (Cheng & Krumwiede, 2012, p. 488). This study expands upon this research by examining a broader spectrum of service industries, including communications, postal services, hospitality, education, insurance, and banking. While prior studies have predominantly concentrated on industrial and manufacturing firms, this paper addresses a gap in the literature by investigating strategic orientation within service organizations. This study contributes to the growing body of knowledge on strategic orientation, technological capabilities, and innovation in the service sector. Existing research (Obeidat, 2016; Tutar et al., 2015; Ejdys, 2015; Cheng & Krumwiede, 2012) has consistently demonstrated a positive relationship between strategic orientation and innovation. Strategic orientation is a widely studied determinant of firm performance, as outlined by Miles and Snow (1978). While their typology suggests that different strategic orientations may yield similar results (Anwar & Hasnu, 2017), empirical findings on this matter remain inconclusive (Otache, 2019).

Service innovation involves the creation, promotion, and implementation of novel service concepts to enhance existing offerings (Witell et al., 2016). Customer satisfaction and service quality are paramount for service success (Tajeddini et al., 2020). In today's dynamic market, organizations must understand how to foster innovation at various levels to gain competitive advantages (Qiu et al., 2019). The service firms examined in this study aim to optimize innovation performance, thereby enhancing competitiveness through the development of new or improved services. Innovation is crucial for meeting customer needs, optimizing service delivery, and achieving high levels of customer satisfaction, ultimately driving sustainable competitive advantage and business growth (Horng et al., 2018; Tajeddini et al., 2020). Unlike product innovation, service innovation is a pro-

cess-oriented concept (Engen et al., 2021; Garg & Dhar, 2017). This study defines service innovation as the creation, promotion, and implementation of new ideas to improve existing services (Yang et al., 2022). Innovation can be categorized into incremental and radical forms. Incremental innovation involves making minor adjustments to services for specific market segments (Cheng & Krumwiede, 2012). Radical innovation, on the other hand, introduces entirely new services that significantly enhance customer benefits (Cheng & Krumwiede, 2012). Moreover, it encompasses the development and implementation of novel approaches to operations, market interactions, or addressing stakeholder needs (Ringberg et al., 2019). Adequate resources, knowledge, and collaborative efforts are essential for effective service innovation (Gardner et al., 2012).

Previous research in the hospitality sector has established a link between developmental culture and firm innovation (Stoffels & Leker, 2018), suggesting that a supportive organizational climate can precede and facilitate service innovation. For this study, service innovation is defined as the creation, promotion, and implementation of novel service concepts to enhance existing offerings (Witell et al., 2016).

Technological capabilities refer to an organization's capacity to adopt, develop, and leverage a range of technologies, encompassing technology development, product development, manufacturing processes, and technological forecasting (Zang & Li, 2017). By cultivating robust technological capabilities, firms can gain a competitive edge through the creation of unique resources and skills, enabling distinctive strategic actions (Lin & Fai, 2021). Technological capabilities significantly influence intellectual capital, a key driver of innovation. Building a sustainable competitive advantage necessitates developing technological capabilities that enable the absorption and utilization of external knowledge or the generation of internal knowledge (Ahn et al., 2022, p. 4). A firm's capacity to acquire, apply, and manage technology, as well as its ability to recruit and deploy skilled technical personnel, is directly correlated with innovation success. Technology is a critical determinant of organizational performance, and intangible assets derived from technology, such as

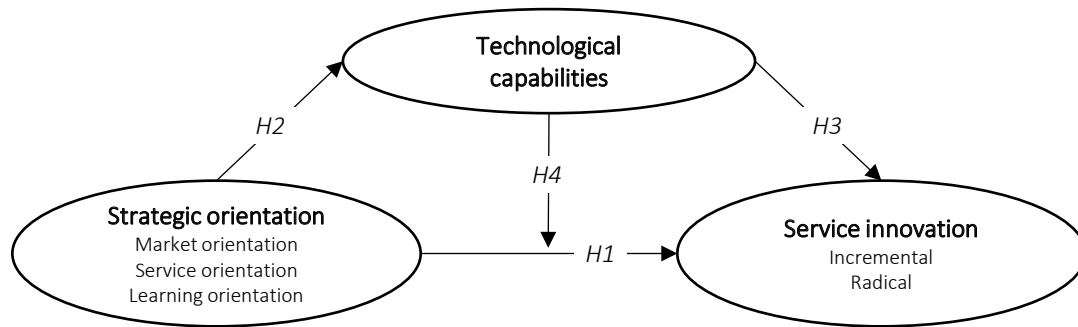
patents or proprietary knowledge, are often difficult to replicate (Ahn et al., 2022). Consequently, resource-constrained firms can achieve long-term competitive advantages by investing in technological capabilities.

Technological capabilities represent a firm's capacity to align strategic objectives with innovative processes for the development of new products and services (Heredia et al., 2022, p. 2). They encompass the ability to acquire, utilize, adapt, enhance, and replicate new technologies (Malhotra et al., 2022). Emerging as a critical organizational asset, technological capabilities have become instrumental in fostering competitive advantage. While research has explored the moderating role of technological capabilities on the relationship between strategic orientation dimensions and various dependent variables (Agustia et al., 2022; José, 2010; García et al., 2012; Haeussler et al., 2012; Srivastava et al., 2015), their specific influence on the strategic orientation-innovation nexus remains underexplored. This study aims to elucidate how technological capabilities moderate the relationship between strategic orientations and innovation.

Previous research consistently highlights the positive impact of technological capabilities on innovation and performance (Ritala, 2012; Luo et al., 2007). A conceptual framework, as defined by Saunders et al. (2007), provides a structured representation of the study's core concepts and their interrelationships. It visualizes the phenomena under investigation, explaining their dynamics and underlying mechanisms (Fayolle et al., 2013).

Drawing upon previous research and the tenets of resource-based view (RBV) and strategic choice theory, this study proposes a conceptual framework depicted in Figure 1. The framework posits service innovation as the dependent variable, strategic orientations as the independent variable, and technological capabilities as the moderating variable.

The primary objectives are to investigate the impact of strategic orientations on innovation and to determine the moderating role of technological capabilities in the relationship between strategic orientations and innovation within service firms



**Figure 1.** Conceptual framework

striving for enhanced competitiveness. Based on these research objectives, the following hypotheses are formulated:

- H1: There is a positive and significant relationship between strategic orientation and service innovation.*
- H2: There is a positive and significant relationship between strategic orientation and technological capabilities.*
- H3: There is a positive and significant relationship between technological capabilities and service innovation.*
- H4: Technological capabilities moderate the relationship between strategic orientation and service innovation.*

## 2. METHODOLOGY

A quantitative, cross-sectional research design employing a survey methodology was adopted for this study. A structured questionnaire (Appendix A) was distributed to 160 managers of Sudanese service firms. Data collection was conducted over a two-month period. Participants were assured of data confidentiality and anonymity. The questionnaire addressed the research objectives and facilitated subsequent analysis. The questionnaire comprised four sections: firm profile, independent variables, dependent variables, and moderating variables. Exploratory factor analysis (EFA) using principal component analysis was conducted to identify underlying factors, followed by confirmatory factor analysis (CFA) to assess construct validity. Strategic orientation was measured through three dimensions: market, learning (Cheng &

Sheu, 2017), and service orientation (Oliveira & Roth, 2012). Technological capabilities were assessed as a single dimension (Zang & Li, 2017; Kyläheiko et al., 2011). Innovation was measured using two components: incremental and radical innovation (Cheng & Krumwiede, 2012). A five-point Likert scale was employed for all items, with item sources detailed in Table 1.

**Table 1.** Items of study variables

Variables	Items	Source
Strategic orientation	8	Cheng and Sheu (2017)
Service innovation	5	Cheng and Krumwiede (2012)
Technological capabilities	5	Zang and Li (2017) and Kyläheiko et al. (2011)

## 3. RESULTS

A frequency analysis was conducted to characterize the participating firms based on five key dimensions: firm ownership, firm experience, number of laborers, sector, and number of competitors. Regarding firm ownership, 90% of firms were nationally owned, followed by foreign (6.8%) and mixed ownership (3.1%). In terms of experience, 26.1% had been with the firm for 20 or more years, 25.5% for 11-15 years, 14.9% for 5-10 years, and 21.8% for less than five years. Employee count revealed that 49.1% of firms employed 200 or more workers, followed by 13.3% with 151-200 employees, 12.4% with under 50 employees, and 11.2% with 50-100 employees. The majority of respondents (44.1%) were from the education sector, followed by banking (22.4%), hospitality (16.8%), insurance (8.7%), postal sector (5.6%), and communications (2.5%). Finally, concerning competition, 20 or more competitors was the most frequent response (49.1%), followed by 11-15 competitors (8.7%), less than five competitors (5.0%), and 5-10 competitors (2.5%).



To proceed with factor analysis, the correlation matrix required a sufficient number of significant correlations (Hair et al., 2010). The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was expected to be at least 0.6, and item communalities should exceed 0.45. Given the sample size of 161 service firm managers and a significance level of 0.05, the minimum factor loading was set at 0.45, with cross-loadings below this threshold. Promax rotation was employed to enhance factor interpretability. Factor extraction was based on eigenvalues greater than one. The seventeen-item scale underwent factor analysis to assess the underlying dimensions of strategic orientation (Table 2).

**Table 2.** Exploratory factor analysis

Sub-construct	Items	Items loading
1. Learning orientation	3	.809
2. Service orientation	2	.458
3. Market orientation	3	.848
4. Incremental innovation	3	.844
5. Radical innovation	2	.954
6. Technological capabilities	5	.785

A description of the variables is presented in Table 3. The greatest mean score was for technological capabilities (4.0709), followed by market orientation (3.7896), learning orientation (3.4771), service orientation (3.0972), radical innovation (3.0916), while incremental innovation (2.6259) showed the lowest mean score.

**Table 3.** Descriptive statistics

Variables	Mean	Standard Deviation
Learning orientation	3.4771	.57511
Service orientation	3.0972	.51144
Market orientation	3.7896	.67558
Incremental innovation	2.6259	.43749
Radical innovation	3.0916	.57081
Technological capabilities	4.0709	.90360

**Table 4.** Reliability and correlation

Factors	Cronbach's Alpha						
1. Learning orientation	.742	1					
2. Service orientation	.650	.441**	1				
3. Market orientation	.755	.419**	.569**	1			
4. Incremental innovation	.659	.434**	.440**	.436**	1		
5. Radical innovation	.647	.400**	.310**	.271**	.394**	1	
6. Technological capabilities	.835	.408**	.050	.177*	.270**	.578**	1

Note: \* means weak correlation; \*\* means strong correlation.

It is recommended to use Cronbach's alpha values greater than 0.60, but they can be lower during exploratory research (Hair et al., 2010). Nunnally (1978) recommends using Cronbach's alpha values greater than 0.60 during exploratory research. A correlation analysis indicates that a correlation coefficient value less than 0.30 indicates a weak relationship, whereas a correlation coefficient value between 0.30-0.70 indicates a medium relationship, but if the correlation coefficient is greater than 0.70, it is considered strong. Table 4 shows the reliability and correlation analyses.

After EFA, CFA is used to separate out the factor structure of a dataset. By analyzing inter-variable correlations, EFA explores the factor structure; CFA confirms the revealed factor structure, as exhibited in Figure 2. Figure 3 shows the results from the AMOS analysis on the research model.

Based on the results, there is a significant relationship between strategic orientation dimensions, which are market, service, and learning orientations, with incremental innovation (estimates = 0.164,  $p = 0.00$ ; estimates = .177,  $p = .014$ ). Using regression weights, it was determined that the market orientation has a significant correlation with radical innovation (estimates = .265,  $p = 0.00$ ), and service orientation and learning orientation do not have a significant correlation with radical innovation (estimates = .153,  $p = .129$ ; estimates = .061,  $p = .491$ ); therefore, hypotheses testing results indicated that the hypothesis one is accepted.

Technological capabilities are influenced by strategic orientation, according to the second hypothesis. Based on the results of the analysis, market and service orientations demonstrate a significant relationship with the technological capabilities (estimates = 0.612,  $p = 0.00$ ; estimates = -.376,  $p = .018$ ) at the expense of learning orientations (esti-

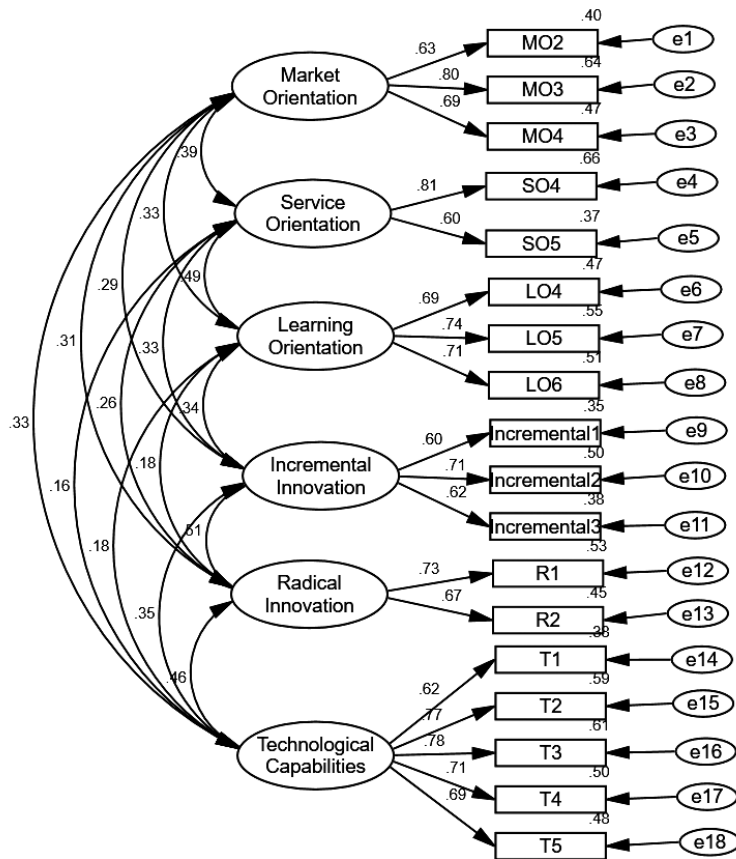
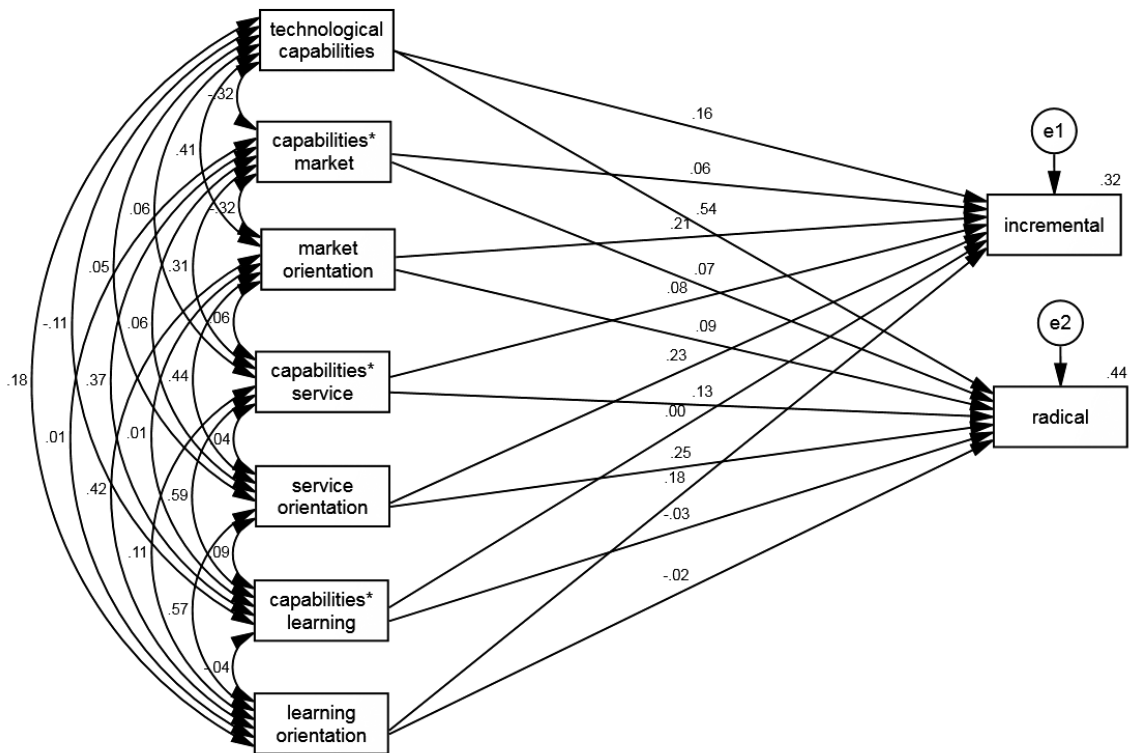


Figure 2. CFA results



Note: CMIN/DF = 1.593; RMSEA = .061; GFI = .887; AGFI = .839; RMR = .063; NFI = .804; CFI = 1; PCLOSE = .134.

Figure 3. Path analysis

mates = .168,  $p > .228$ ). Consequently, hypothesis two is accepted.

Technological capabilities are positively related to innovation (estimates = .131,  $p = 0.00$ ; estimates = .365,  $p = 0.00$ ); they were positively correlated with both incremental and radical innovation (estimates = .131,  $p = 0.00$ ). These results support the third hypothesis.

Finally, this study examined the possibility that technological capabilities might moderate the relationship between incremental performance and market orientation. In terms of anticipating incremental revenue, the interaction between market orientation and technological capabilities is not significant (estimation = .0024,  $p = .415$ ). Incremental innovation did not interact significantly with orientation (estimate = .035,  $p = .324$ ). For incremental predictions, the interaction between learning orientation and technological capabilities was also insignificant (estimate = -.000,  $p > .996$ ).

Furthermore, the study examines how technological capabilities affect the relationship between strategic orientation and radical innovation. Technological capabilities moderate market orientation and radical innovation. According to the results, the interaction between market orientation and technological capabilities did not predict radical innovation (estimation = .034,  $p = .322$ ). In the model expecting radical innovation, the interaction between service orientation and technological capabilities was insignificant (estimate = .069,  $p = .102$ ). However, in the case of anticipating radical innovation, the interaction term between learning orientation and technological capabilities was insignificant (estimate = -.014,  $p > .05$ ); therefore, hypothesis four is rejected.

## 4. DISCUSSION

Previous research has consistently established a strong link between market orientation and innovation across various sectors, including the service sphere (Cheng & Krumwiede, 2012). This study extends this body of knowledge by examining the relationship between these constructs within the context of service firms. Market orientation has been shown to be a significant driver of service innovation. For instance, Zhang and Duan (2010) found a positive correlation between market orientation and innovation in Chinese manufacturing firms, while Huhtala

et al. (2014) demonstrated a similar relationship in Finland, linking market orientation to innovation capability. Tutar et al. (2015) further supported this notion by indicating a positive correlation between proactive market orientation and innovation.

The current study found a positive relationship between service orientation and incremental innovation but no significant correlation between service orientation and radical innovation ( $p > 0.05$ ). These findings suggest that while service orientation can contribute to incremental service innovation, its impact on radical innovation is limited. This result aligns with Cheng and Sheu (2017), who also found a weak relationship between service orientation and collaborative service innovation performance. In contrast, Oliveira and Roth (2012) reported a more substantial impact of service orientation on service innovation within a B2B e-commerce context. Regarding learning orientation, the study revealed a positive correlation with incremental innovation but no significant relationship with radical innovation ( $p > 0.05$ ). This suggests that learning orientation can support incremental service innovation but has a limited impact on radical breakthroughs. These findings corroborate Ejdy (2015), who reported no significant relationship between learning orientation and residential care service innovation.

Secondly, this study's findings underscore the significance of strategic orientation components – market, service, and learning orientation – as determinants of technological capabilities. While these dimensions are partially linked to technological capabilities, previous research has shown that the impact of strategic orientation can vary depending on other factors (Njuguna et al., 2022). Furthermore, the results highlight the pivotal role of technological capabilities in driving service innovation, with a positive interaction between the two. While prior studies have explored the interplay of service innovation and technology in hotel development (Lemy et al., 2019) the empirical impact of these variables on brand equity remains underexplored. Ruan et al. (2020) demonstrated that the implementation of service innovation and technological competence can enhance brand loyalty. This study extends these findings by emphasizing the role of technology in fostering service innovation. Specifically, the hardware capabilities of technology facilitate the accelerated adoption of innovative service delivery methods, transform-



ing intangible services into tangible products with enhanced benefits.

Lastly, this study aimed to determine whether technological capabilities moderate the relationship between strategic orientation and service innovation. However, the results did not support technological capabilities as a moderating factor. This finding

suggests that, in the context of this study, technological capabilities did not influence the relationship between strategic orientation components (market, service, and learning orientation) and service innovation dimensions (incremental and radical innovation). Furthermore, a negative, albeit non-significant, relationship was observed between learning orientation and radical innovation (estimate = .014,  $p > .05$ ).

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## CONCLUSION

This study aimed to investigate the influence of strategic orientation on service innovation and to determine whether technological capabilities moderate this relationship within service firms. The results indicated a positive correlation between technological capabilities and innovation, yet no moderating effect of technological capabilities on the relationship between strategic orientation and innovation. The findings suggest that strategic orientation plays a pivotal role in enabling service firms to develop innovative solutions to business challenges. By fostering a comprehensive understanding of the business environment, strategic orientation empowers managers to create an innovation-conducive organizational climate. Consequently, managerial strategies should prioritize cultivating an environment that supports innovation and strategic thinking. From a managerial perspective, the study's outcomes can facilitate a shared understanding among decision-makers, thereby enhancing the firm's capacity to adapt effectively to environmental changes.

## LIMITATIONS AND SUGGESTION FOR FUTURE RESEARCH

Several limitations of this study warrant consideration for future research. First, the use of a single respondent per firm may have introduced bias. Employing multiple respondents per firm would provide a more comprehensive perspective. Second, future research could explore the behavioral aspects associated with each orientation to better understand the differential impact of the three strategic orientation components on service innovation. Third, incorporating environmental uncertainty or leadership style into the model could provide additional insights into the configuration of strategic orientation. Fourth, the use of panel or longitudinal data would strengthen causal inferences compared to cross-sectional data. Fifth, increasing the sample size would enhance the study's generalizability. Finally, while this study focused on incremental and radical service innovation, while future research could expand the scope to include process and product innovation.

## AUTHOR CONTRIBUTIONS

Conceptualization: Adam Yagoub Abker, Arafa Gebreil Musa.

Data curation: Adam Yagoub Abker, Arafa Gebreil Musa.

Formal analysis: Adam Yagoub Abker.

Investigation: Adam Yagoub Abker, Arafa Gebreil Musa.

Methodology: Adam Yagoub Abker, Arafa Gebreil Musa.

Resources: Adam Yagoub Abker, Arafa Gebreil Musa.

Validation: Arafa Gebreil Musa.

Writing – original draft: Adam Yagoub Abker, Arafa Gebreil Musa.

Writing – review & editing: Adam Yagoub Abker, Arafa Gebreil Musa.

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## REFERENCES

1. Agustia, D., Haryanto, S. D., Permatasari, Y., & Mudiantari, P. N. (2022). Product innovation, firm performance and moderating role of technology capabilities. *Asian Journal of Accounting Research*, 7(3), 252-265. <https://doi.org/10.1108/AJAR-12-2021-0266>
2. Ahn, S., Kim, K.-S., & Lee, K.-H. (2022). Technological capabilities, entrepreneurship and innovation of technology-based start-ups: The resource-based view. *Journal of Open Innovation: Technology, Market, and Complexity*, 8(3), Article 156. <https://doi.org/10.3390/joitmc8030156>
3. Anwar, J., & Hasnu, S. A. F. (2017). Strategic patterns and firm performance: Comparing consistent, flexible and reactor strategies. *Journal of Organizational Change Management*, 30, 1015-1029. <http://dx.doi.org/10.1108/JOCM-03-2016-0053>
4. Atuahene-Gima, K., & Ko, A. (2001). An empirical investigation of the effect of market orientation and entrepreneurship orientation alignment on product innovation. *Organization Science*, 12, 54-74. <https://doi.org/10.1287/orsc.12.1.54.10121>
5. Cheng, C. C. & Krumwiede, D. (2012). The role of service innovation in the market orientation – New service performance linkage. *Technovation*, 32(7-8), 487-497. <https://doi.org/10.1016/j.technovation.2012.03.006>
6. Cheng, C. J. C., & Sheu, C. (2017). When are strategic orientations beneficial for collaborative service innovation? *The Service Industries Journal*, 37(7-8), 466-493. <https://doi.org/10.1080/02642069.2017.1335713>
7. Ejdyś, J. (2015). Innovativeness of residential care services in Poland in the context of strategic orientation. *Procedia – Social and Behavioral Sciences*, 213, 746-752. <https://doi.org/10.1016/j.sbspro.2015.11.461>
8. Engen, M., Fuglsang, L., Tuominen, T., Sundbo, J., Møller, J. K., Scupola, A., & Sørensen, F. (2021). Conceptualising employee involvement in service innovation: An integrative review. *Journal of Service Management*, 32(5), 702-751. <https://doi.org/10.1108/josm-11-2019-0348>
9. Fayolle, A., Basso, O., & Bouchard, V. (2013). *Understanding the impact of culture on a firm's entrepreneurial orientation and behaviour: A conceptual framework* (Working Paper # 2008-02). London: European Entrepreneurship in the Globalizing Economy. <https://doi.org/10.4337/9781849808224.00009>
10. García, F., Avella, L., & Fernández, E. (2012). Learning from exporting: The moderating effect of technological capabilities. *International Business Review*, 21(6), 1099-1111. <https://doi.org/10.1016/j.ibusrev.2011.12.001>
11. Gardner, H. K., Gino, F., & Staats, B. R. (2012). Dynamically integrating knowledge in teams: Transforming resources into performance. *Academy of Management Journal*, 55(4), 998-1022. <https://doi.org/10.5465/amj.2010.0604>
12. Garg, S., & Dhar, R. (2017). Employee service innovative behavior: The roles of leader-member exchange (LMX), work engagement, and job autonomy. *International Journal of Manpower*, 38(2), 242-258. <https://doi.org/10.1108/IJM-04-2015-0060>
13. Haeussler, C., Patzelt, H., & Zahra, S. A. (2012). Strategic alliances and product development in high technology new firms: The moderating effect of technological capabilities. *Journal of Business Venturing*, 27(2), 217-233. <https://doi.org/10.1016/j.jbusvent.2010.10.002>
14. Hair, J. F., Black, B., Babin, B., Anderson, R. E., & Tath, R. L. (2010). *Multivariate data analysis*. Upper Saddle River, NJ, USA: Prentice Hall Inc.
15. Heredia, J., Castillo-Vergara, M., Geldes, C., Carbajal Gamarra, F. M., Flores, A., & Heredia, W. (2022). How do digital capabilities affect firm performance? The mediating role of technological capabilities in the “new normal”. *Journal of Innovation & Knowledge*, 7(2), Article 100171. <https://doi.org/10.1016/j.jik.2022.100171>
16. Horng, J. S., Liu, C. H. S., Chou, S. F., Tsai, C. Y., & Hu, D. C. (2018). Developing a sustainable service innovation framework for the hospitality industry. *International Journal of Contemporary Hospitality Management*, 30(1), 455-474. <http://dx.doi.org/10.1108/IJCHM-12-2015-0727>
17. Huhtala, J.-P., Sihvonen, A., Frösén, J., Jaakkola, M., & Tikkanen, H. (2014). Market orientation, innovation capability and business performance. *Baltic Journal of Management*, 9(2), 134-152. <https://doi.org/10.1108/BJM-03-2013-0044>
18. José, M. J. O. (2010). Competitive strategies and firm performance: Technological capabilities' moderating roles. *Journal of Business Research*, 63(12), 1273-1281. <http://dx.doi.org/10.1016/j.jbusres.2009.09.007>
19. Klein, S. P., Spieth, P., & Heidenreich, S. (2021). Facilitating business model innovation: The influence of sustainability and the mediating role of strategic orientations. *Journal of Product Innovation Management*, 38(2), 271-288. <https://doi.org/10.1111/jpim.12563>
20. Kyläheiko, K., Jantunen, A., Puu-malainen, K., Saarenketo, S., & Tuppurä, A. (2011). Innovation and internationalization as growth strategies: The role of technological capabilities and appropriability. *International Business Review*, 20(5), 508-520. <https://doi.org/10.1016/j.ibusrev.2010.09.004>
21. Lemy, D., Goh, E., & Ferry, J. (2019). Moving out of the silo: How service quality innovations can develop customer loyalty in Indonesia's hotels. *Journal of Vacation Marketing*, 25(4), 462-479. <https://doi.org/10.1177/1356766718819658>
22. Lin, F.-J., & Lai, C.-F. (2021). Key factors affecting technological capabilities in small and medium-sized Enterprises in Taiwan. *International Entrepreneurship and Management Journal*, 17(1), 131-143. Retrieved from [https://ideas.repec.org/a/spr/intemj/v17y2021i1d10.1007\\_s11365-019-00632-2.html](https://ideas.repec.org/a/spr/intemj/v17y2021i1d10.1007_s11365-019-00632-2.html)
23. Luo, X., Rindfleisch, A., & Tse, D. K. (2007). Working with rivals:

- The impact of competitor alliances on financial performance. *Journal of Marketing Research*, 44(1), 73-83. <https://doi.org/10.1509/jmkr.44.1.073>
24. Malhotra, A., Mathur, A., Diddi, S., & Sagar, A. D. (2022). Building institutional capacity for addressing climate and sustainable development goals: Achieving energy efficiency in India. *Climate Policy*, 22(5), 652-670. <https://doi.org/10.1080/14693062.2021.1984195>
  25. Miles, R., & Snow, C. (1978). *Organizational strategy, structure, and process*. New York: McGraw-Hill.
  26. Njuguna, E. W., Kabata, D., & Wambugu, H. (2022). Strategic orientation and the performance of insurance companies in Kenya. *Journal of Business and Management*, 24(1). Retrieved from <https://www.iosrjournals.org/iosr-jbm/papers/Vol24-issue1/Ser-5/A2401050112.pdf>
  27. Nunnally, J. C. (1978). *Psychometric methods*. New York: McGraw-Hill.
  28. Obeidat, B. Y. (2016). The effect of strategic orientation on organizational performance: The mediating role of innovation. *International Journal of Communications, Network and System Sciences*, 9(11). <https://doi.org/10.4236/ijcns.2016.911039>
  29. Oliveira, P., & Roth, A. V. (2012). Service orientation: The derivation of underlying constructs and measures. *International Journal of Operations & Production Management*, 32(2), 156-190. <https://doi.org/10.1108/01443571211208614>
  30. Otache, I. (2019). The mediating effect of teamwork on the relationship between strategic orientation and performance of Nigerian banks. *European Business Review*, 31(5), 744-760. <https://doi.org/10.1108/EBR-10-2017-0183>
  31. Qiu, S., Alizadeh, A., Dooley, L. M., & Zhang, R. (2019). The effects of authentic leadership on trust in leaders, organizational citizenship behavior, and service quality in the Chinese hospitality industry. *Journal of Hospitality and Tourism Management*, 40, 77-87. <https://doi.org/10.1016/j.jhtm.2019.06.004>
  32. Ringberg, T., Reihlen, M., & Rydén, P. (2019). The technology-mindset interactions: Leading to incremental, radical or revolutionary innovations. *Industrial Marketing Management*, 79, 102-113. <https://doi.org/10.1016/j.indmarman.2018.06.009>
  33. Ritala, P. (2012). Coopetition strategy – When is it successful? Empirical evidence on innovation and market performance. *British Journal of Management*, 23(3), 307-324. <http://dx.doi.org/10.1111/j.1467-8551.2011.00741.x>
  34. Ruan, W-Q., Zhang, S-N., Liu, C-H., & Li, Y-Q. (2020). A new path for building hotel brand equity: the impacts of technological competence and service innovation implementation through perceived value and trust. *Journal of Hospitality Marketing & Management*, 29(8), 911-933. <https://doi.org/10.1080/19368623.2020.1738302>
  35. Saunders, M., Lewis, P., & Thornhill, A. (2007). *Research methods for business students*. Harlow: FT Prentice Hall.
  36. Srivastava, M. K., Gnyawali, D. R., & Hatfield, D. E. (2015). Behavioral implications of absorptive capacity: The role of technological effort and technological capability in leveraging alliance network technological resources. *Technological Forecasting & Social Change*, 92, 346-358. <http://doi.org/10.1016/j.techfore.2015.01.010>
  37. Stoffels, M., & Leker, J. (2018). The impact of IT assets on innovation performance: The mediating role of developmental culture and absorptive capacity. *International Journal of Innovation Management*, 22(8). <https://doi.org/10.1142/s136391961840011x>
  38. Tajeddini, K., Martin, E., & Altinay, L. (2020). The importance of human-related factors on service innovation and performance. *International Journal of Hospitality Management*, 85, Article 102431. <https://doi.org/10.1016/j.ijhm.2019.102431>
  39. Tsou, H. T., Chen, J. S., & Liao, W. H. (2014). Market and technology orientations for service delivery innovation: The link of innovative competence. *Journal of Business & Industrial Marketing*, 29(6), 499-513. <https://doi.org/10.1108/JBIM-09-2011-0128>
  40. Tutar, H., Nart, S., & Bingöl, D. (2015). The effects of strategic orientations on innovation capabilities and market performance: The case of ASEM. *Procedia – Social and Behavioral Sciences*, 207, 709-719. <https://doi.org/10.1016/j.sbspro.2015.10.144>
  41. Witell, L., Snyder, H., Gustafsson, A., Fombelle, P., & Kristensson, P. (2016). Defining service innovation: A review and synthesis. *Journal of Business Research*, 69(8), 2863-2872. <https://doi.org/10.1016/j.jbusres.2015.12.055>
  42. Yang, M., Luu, T. T., & Qian, D. (2022). Nurturing service innovation through developmental culture: A multilevel model. *Journal of Hospitality and Tourism Management*, 50, 93-107. <https://doi.org/10.1016/j.jhtm.2022.01.001>
  43. Yu, Y., Li, M., Li, X., Zhao, J. L., & Zhao, D. T. (2018). Effects of entrepreneurship and IT fashion on SMEs' transformation toward cloud service through mediation of trust. *Information & Management*, 55(2), 245-257. <https://doi.org/10.1016/j.im.2017.07.001>
  44. Zang, J., & Li, Y. (2017). Technology capabilities, marketing capabilities and innovation ambidexterity. *Technology Analysis & Strategic Management*, 29(1), 23-37. <https://doi.org/10.1080/09537325.2016.1194972>
  45. Zhang, J., & Duan, Y. (2010). Empirical study on the impact of market orientation and innovation orientation on new product performance of Chinese manufacturers. *Nankai Business Review International*, 1(2), 214-231. <https://doi.org/10.1108/20408741011052609>
  46. Zhang, Y., Wang, Y., & Li, Y. (2021). Facilitating servitization in manufacturing firms: The influence of strategic orientation. *Sustainability*, 13(24), Article 13541. <https://doi.org/10.3390/su132413541>

# APPENDIX A

## Questionnaire

Dear Manager  
Peace, mercy, and blessings of Allah.....After

The aim of this study is to examine the role of technological capabilities in moderating strategic orientation and service innovation on Sudanese services firms. All information will be treated as strictly confidential and used for academic purposes.

### Guidelines:

- Please read each sentence and then tick the category that more accurately reflects your agreement or disagreement with the sentence.
- What is important is that you express your opinions as honestly as possible.
- Please remember to be sure that you give a mark for each sentence (do not omit any) and that you never give more than one mark to a single sentence.
- Please feel free to contact the researcher if you need any information concerning the questionnaire.

Section 1: General information about your firm						
<b>1. Ownership of your firm</b>						
Ownership of your firm	National		Foreign		Mixed	
<b>2. Experience of your firm</b>						
Experience of firm	less than 5 years	5 to 10	11 to 15	16 to 20	20 and more	
<b>3. Number of laborers</b>						
Number of laborers	less than 50 laborers	50 to 100	101 to 150	151 to 200	200 and more	
<b>4. Sector</b>						
Sector	Hospitality	Postal	Bank	Education	Communication	Insurance
<b>5. Number of competitors</b>						
Number of competitors	less than 5 competitor		5 to 10	11 to 15	20 and more	

Section 2: Strategic orientation (market, service, learning orientation)						
Market orientation						
	Item	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	We respond rapidly to competitive actions that threaten us.					
2	We constantly monitor our level of commitment and orientation toward customers.					
3	We measure customer satisfaction systematically and frequently.					
4	We give close attention to after-sales service.					
5	Information on customers, marketing successes, and marketing failures is communicated across departments in our firm.					
6	All of our departments are responsive to and integrated into serving markets.					

	Item	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
<b>Service orientation</b>						
1	Service quality values are explicitly addressed and actively promoted within our organization.					
2	Our employees are fully committed to customer service.					
3	Our metrics capture what is strategically important for measuring customer satisfaction.					
4	Our company has established service standards based on research into customer needs.					
5	Service standards are visible to both employees and customers.					
<b>Learning orientation</b>						
1	Our employees view themselves as partners in charting the direction of the firm.					
2	We place a high value on open-mindedness.					
3	We encourage employees to 'think outside of the box.'					
4	An emphasis on constant innovation is a part of our firm culture.					
5	We basically agree that our firm's ability to learn is the key to our competitive advantage.					
6	Learning in our firm is seen as a key commodity necessary to guarantee firm survival.					
<b>Section 3: Service innovation (incremental innovation, radical innovation)</b>						
<b>Incremental innovation</b>						
1	The services were modification of an existing company service					
3	The services were a revision of an existing company service.					
3	The services were repositioned from an existing company service.					
<b>Radical innovation</b>						
1	The services were totally new to the market.					
2	The services offered new features versus competitive services.					
3	The services required changes in the customer's buying behavior.					
<b>Section 4: Technological capabilities</b>						
1	The firm has strong internal technology operations capabilities.					
2	The firm has the technological infrastructure and competencies to engage in e-commerce initiatives.					
3	Our technological capabilities are top-class.					
4	The success of our research and development activities is based on long-term know-how.					
5	We have invested heavily in certain research and development projects.					