



EFFECT OF INNOVATION DIMENSIONS ON KNOWLEDGE MANAGEMENT: AN EMPIRICAL STUDY OF PRIVATE SCHOOLS IN NORTHEAST NIGERIA

¹Adama Bappahyaya, ²Umar Usman ³Tijjani Abubakar and ⁴Aminu Ahmad

¹Department of Business Administration, Faculty of Arts and Social Science, Gombe State University

^{2,3&4}Department of Management and Information Technology, Abubakar Tafawa Balewa University Bauchi State, Nigeria.

adamabappayaya@gsu.edu.ng / adamabappayaya@gmail.com

Abstract

This study empirically investigates the relationship between innovation dimensions (collaboration, ideation, implementation, and value creation) and knowledge management (KM) within private schools in the Northeast geopolitical zone of Nigeria. Utilizing a descriptive survey research design, quantitative data was gathered from a proportionate stratified random sample of 288 school proprietors, owner managers and managers across six states (Adamawa, Bauchi, Borno, Gombe, Taraba, and Yobe). Data analysis was conducted using structural equation modeling. The results reveal that collaboration, implementation, and value creation exert a significant positive effect on knowledge management. while ideation exerts insignificant effect on knowledge management. The study concludes that deliberate innovation practices act as foundational drivers that compel educational institutions to systematically acquire, share, and apply knowledge assets to sustain their operational frameworks.

Keywords: Innovation Dimensions, Knowledge Management, Collaboration, Ideation, Implementation, Value Creation, Private Schools.

1.0 Introduction

In an increasingly volatile macro-environment, organizations are continuously forced to adapt, evolve, and deliver stakeholder value through innovative practices. Within the private schools sector of developing countries, such as the Northeast geopolitical zone of Nigeria, managing institutional knowledge is a core necessity for operational survival. Private educational institutions in this region struggle with resource scarcity, high teacher turnover, and structural instability; overcoming these hurdles requires a deep understanding of how knowledge is generated and retained.

Contemporary literature posits that modern organizational development relies on a multidimensional construct of innovation comprising four distinct dimensions: collaboration, ideation, implementation, and value creation. Because innovation is inherently a knowledge-intensive process, an institution's Knowledge Management (KM) infrastructure specifically its capability to acquire, codify, share, and apply insights depends heavily on the continuous stimuli provided by these active innovation workflows. Consequently, understanding the intersection between innovation dynamics and knowledge



optimization is vital for institutional sustainability.

Despite the established theoretical link between these constructs, empirical research remains highly fragmented. While the general concepts of innovation and information processing have been thoroughly investigated within the manufacturing and corporate sectors, there is a distinct paucity of literature exploring how these specific innovation dimensions directly cultivate KM routines outside the corporate domain. This oversight is particularly critical in resource-constrained educational environments, where active innovation workflows are urgently needed to drive and sustain institutional knowledge.

To address these distinct contextual and literature gaps, this study empirically investigates the direct effects of collaboration, ideation, implementation, and value creation on knowledge management within private nursery, basic, and secondary schools in Northeast Nigeria. Ultimately, this research operationalizes these dimensions within an educational framework by examining how collaboration (the participatory sharing of pedagogical insights), ideation (the generation of adaptive teaching strategies), implementation (the execution of novel classroom methodologies), and value creation (the tangible improvement of educational outcomes) serve to build and maintain robust KM infrastructures under resource limited conditions.

2. Theoretical Framework and Literature Review

2.1 Theoretical Framework

This inquiry is anchored on two complementary theoretical paradigms: the Knowledge-Based View (KBV) and the Dynamic Capabilities Theory (DCT).

- **KBV** posits that knowledge is the preeminent strategic resource that drives variations among organizations, highlighting the critical nature of internal knowledge processes.
- **DCT** explains how firms dynamically reconfigure, update, and deploy internal and external competencies to address rapidly shifting environments.

In this study, the four innovation dimensions (collaboration, ideation, implementation, and value creation) represent the dynamic processing inputs that actively trigger and shape an institution's reconfiguring capabilities, which manifest as structured knowledge management practices.

2.2 Empirical Review and Hypotheses Development

2.2.1 Collaboration and Knowledge Management

Collaboration operates as a primary behavioral mechanism that stimulates communication pathways and mutual trust within educational institutions (Islam, 2024). When organizations promote collaborative frameworks such as cross-functional task forces, peer-mentoring networks, or external institutional alliances they reduce the friction associated with information hoarding (Nguyen & Mohamed, 2021). Within knowledge-intensive environments, collaborative teams naturally encourage individuals to externalize their tacit insights, converting personal expertise into accessible institutional assets (Alwiyah & Lyraa, 2024).

Empirical evidence by Audretsch et al. (2023) demonstrates that collaborative networks significantly accelerate external knowledge acquisition capabilities, allowing organizations to easily absorb external industry advancements. Furthermore,



Rzepka (2024) observed that high-intensity teamwork patterns force administrators to establish formal communication platforms, which directly enhances internal knowledge sharing and collaborative storage routines. In the context of private schools, collaborative instructional planning forces teachers to continuously exchange pedagogical techniques, compelling the school to organize these practices into unified instructional archives (Olayemi & Ojo, 2023). Based on these collective insights, it is hypothesized:

HA₁ : Collaboration has a positive and significant effect on knowledge management among private schools in the Northeast geopolitical zone of Nigeria.

2.2.2 Ideation and Knowledge Management

Ideation involves the deliberate generation, conceptualization, and refinement of novel solutions to structural or operational challenges (Stremersch, 2024). The process of brainstorming and evaluating creative concepts serves as a cognitive trigger for knowledge creation and organization-wide learning (Casper et al., 2024). Because ideation requires individuals to retrieve existing knowledge from memory and recombine it with new perspectives, it inherently activates an organization's internal knowledge storage pipelines (Yang et al., 2023).

Liu and Wang (2025) note that structured ideation systems prevent cognitive decay by establishing formal processes to filter, document, and categorize raw abstract insights before they are lost. Similarly, dynamic feedback systems during brainstorming sessions compel administrative staff to clarify, codify, and debate ambiguous operational concepts (Madrid & Patterson, 2023). In emerging economies, deliberate ideation practices

challenge institutional inertia, prompting schools to actively seek out, codify, and update their administrative and academic toolkits to navigate local socio-cultural demands (Dahunsi, 2023). Therefore, we hypothesize:

HA₂: Ideation has a positive and significant effect on knowledge management among private schools in the Northeast geopolitical zone of Nigeria.

2.2.3 Implementation and Knowledge Management

Implementation refers to the operationalization of novel ideas, converting abstract concepts into concrete organizational routines, products, or services (Todorovic et al., 2022). While ideation surfaces potential opportunities, the actual execution phase reveals hidden operational bottlenecks, forcing organizations to engage in experiential learning and rapid knowledge application (Eze et al., 2020). Duru et al. (2023) argue that innovation implementation requires an end-to-end knowledge cycle, as executing new processes demands strict documentation, systematic staff retraining, and ongoing procedural adjustments.

During the rollout of an innovation, managers must actively translate complex technical procedures into localized operational guidelines, a process that relies heavily on effective knowledge codification and internalization (Bawa et al., 2023). Empirical findings by Adeogun (2024) confirm that executing service upgrades forces frontline staff to track errors, establish feedback loops, and systematically update internal databases. In an educational setting, introducing novel curriculum strategies or digital learning systems forces teachers to master, apply, and archive newly acquired digital and pedagogical skills (Kankam, 2023). Hence, it is hypothesized:

HA₃: Implementation has a positive and significant effect on knowledge management among private schools in the Northeast geopolitical zone of Nigeria.

2.2.4 Value Creation and Knowledge Management

Value creation is the ultimate strategic objective of innovation, focused on delivering enhanced utility, cost-efficiencies, or social benefits to internal and external stakeholders (Acosta-Prado et al., 2023). The systematic pursuit of value creation forces an institution to align its intellectual capital with the changing needs of its target market (Risitano et al., 2025). To sustain the value generated by an innovation, organizations must build robust knowledge integration frameworks to prevent competitive erosion (Wu et al., 2023).

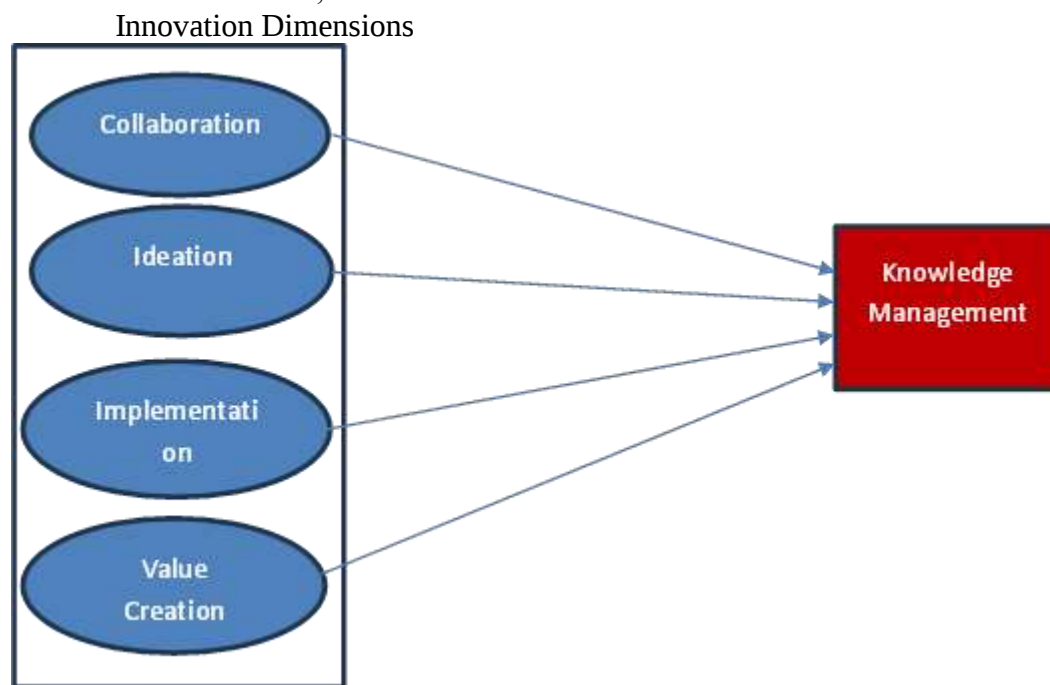
Bettiol et al. (2020) demonstrated that value-driven innovations rely heavily on digital knowledge management systems to maintain service quality and operational standards over time. Furthermore, Atkočiūnienė et al.

(2022) found that the push to co-create value with external clients or parents establishes an ongoing feedback loop, prompting institutions to continuously capture, analyze, and apply market intelligence. For private schools, designing value-added educational services requires a thorough understanding of student development and regulatory needs, which compels the institution to develop sophisticated knowledge acquisition and utilization routines (Febrianty, 2025). This leads to the final hypothesis:

HA₄: Value creation has a positive and significant effect on knowledge management among private schools in the Northeast geopolitical zone of Nigeria.

2.3 Conceptual Framework

The study's objectives serve as the foundation for developing the research conceptual model. One independent variable, and one dependent variable. Collaboration, ideation, implementation, and value creation are the four constructs that make up the independent variable.



3. Methodology

This study utilized a quantitative, descriptive survey research design to achieve objective verification and ensure generalizability. The target population encompassed all 4,602 registered private nursery, primary, and secondary schools operating across the six states of Northeast Nigeria (Adamawa = 969; Bauchi = 803; Borno = 474; Gombe = 759; Taraba = 1,393; Yobe = 204). Using the Yamane (1967) formula with a 5% allowable error margin:

The sample baseline was calculated as 390. The final sample size valid for the analysis is 288 utilizing a proportionate stratified random sampling technique to distribute questionnaires proportionately across the regional strata (Adamawa; Bauchi; Borno; Gombe; Taraba; Yobe).

Data collection was executed through a standardized 5-point Likert questionnaire administered to school owner manager,

proprietors, or managers. The item measures were adapted from validated empirical instruments: Collaboration from Krawczyk-Brylka et al. (2020); Ideation from Obialo and Akinjo (2021); Implementation from Larsson et al. (2018); Value Creation from Wang (2022); and Knowledge Management from Gold et al. (2001).

4. Data Presentation and Analysis (PLS SEM)

The data underwent analysis using Smart PLS-SEM, which involves assessing two models: the measurement model and the structural model.

Measurement Model

The measurement model encompasses the measurement of indicators or items associated with each construct, evaluating indicator reliability, internal consistency (composite reliability), convergent validity using Average Variance Extracted (AVE), and discriminant validity.

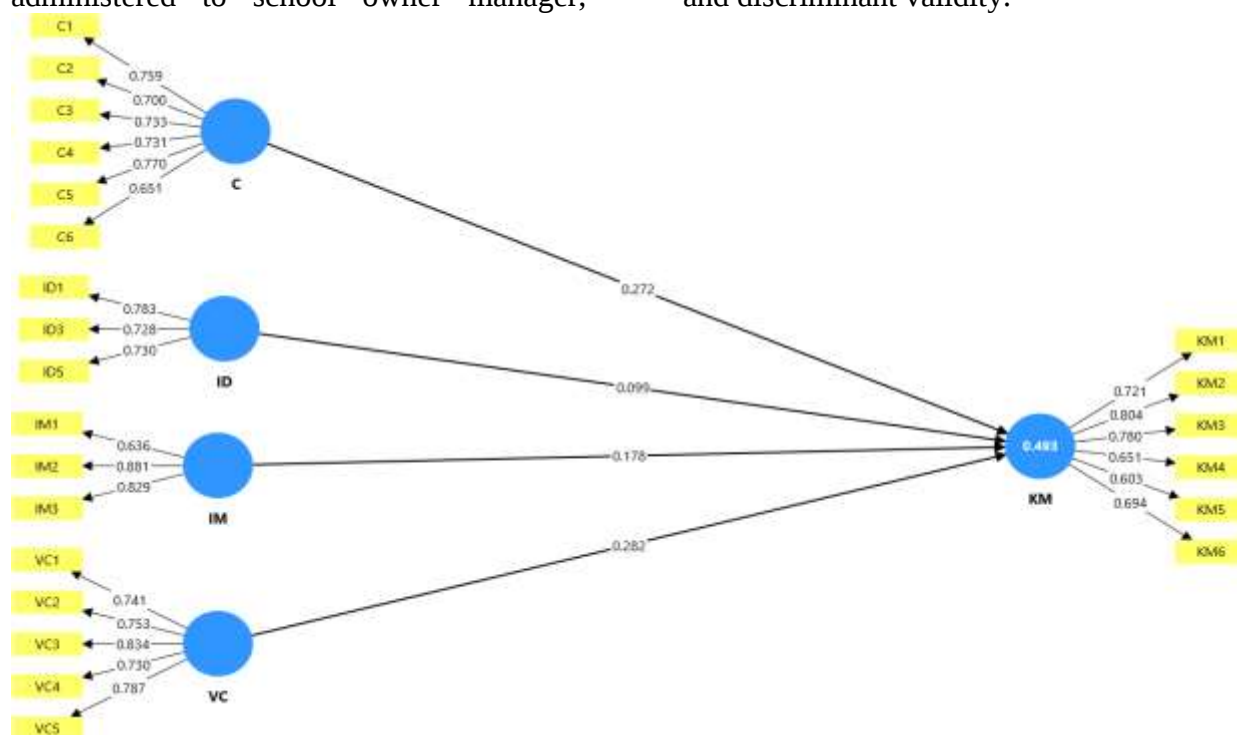


Figure 1: Measurement Model

Source: Field Survey (2025)



The internal consistency was assessed using both Cronbach's alpha and composite reliability. The threshold for both Cronbach's alpha and composite reliability in this study is 0.6. According to Taber (2017), a Cronbach's alpha ranging from 0.60 to 0.65 is considered moderate.

Table 1: *Construct Reliability and Convergent Validity*

Constructs	Cronbach Alpha	Composite Reliability	Average variance extracted (AVE)
C	0.820	0.869	0.526
ID	0.604	0.792	0.559
IM	0.694	0.829	0.622
VC	0.828	0.879	0.593
KM	0.805	0.860	0.508

Source: Field Survey (2025)

Table 1 presents the reliability coefficients, including Cronbach's alpha and composite reliability. All coefficients in the table met the acceptable threshold for this research, as

Fornell Larcker

Table 2: *Fornell Larcker*

Variables	C	ID	IM	KM	OP	VC
C	0.725					
ID	0.635	0.748				
IM	0.610	0.647	0.789			
KM	0.622	0.555	0.565	0.713		
OP	0.497	0.406	0.449	0.525	0.736	
VC	0.647	0.578	0.553	0.609	0.428	0.770

Source: Field Survey, 2025

The results in Table 2 demonstrate that discriminant validity is established based on the Fornell–Larcker criterion. According to Fornell and Larcker (1981), the square root of the Average Variance Extracted (AVE) for each construct should be greater than its correlations with other constructs. In this study, all constructs C (0.725), ID (0.748), IM (0.789), KM (0.713), OP (0.736), and VC (0.770) satisfy this requirement, as their diagonal values exceed the corresponding inter-construct correlations. This indicates that each construct shares more variance with its own indicators than with other constructs, confirming that the constructs are

Validity of the instrument was examined through tests of convergent and discriminant validity. Convergent validity was assessed using Average Variance Extracted (AVE), with a threshold of 0.5. Discriminant validity, on the other hand, was evaluated using the Fornell-Larcker criterion.

outlined by Taber (2017). Additionally, the Average Variance Extracted (AVE) values for all constructs were within the acceptable threshold of 0.5 (Bougie, 2012)

empirically distinct. Furthermore, this finding is consistent with the recommendations of Sarstedt et al. (2021) who emphasize that the Fornell–Larcker criterion is a widely accepted approach for assessing discriminant validity in PLS-SEM. Therefore, the measurement model demonstrates adequate discriminant validity and is suitable for further structural model analysis.

Structural model

During this phase, the focus is on assessing the relationships between independent variables and dependent variables. The evaluation includes examining



multicollinearity among the exogenous latent constructs, determining the coefficient of determination (R^2), evaluating the

significance of the path coefficient and effect size (F^2), and conducting hypotheses testing using PLS output.

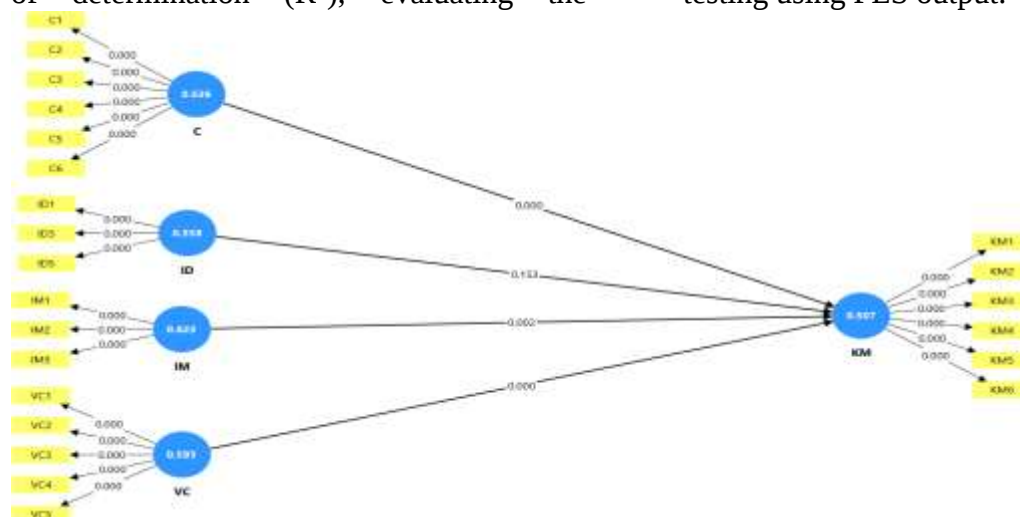


Figure 2: Structural Model

Source: Field Survey (2023)

Prior to conducting the regression analysis, a multicollinearity diagnostic was performed, revealing that three independent variables collaboration, ideation, implementation, and value creation demonstrated variance inflation factor (VIF) values safely below the threshold of 5, thereby confirming the distinctiveness, stability, and reliability of the predictors. Subsequently, the direct multiple regression model indicated a robust explanatory power, with an adjusted value of 0.493, meaning that these three innovation dimensions collectively account for approximately 49.3% of the variance in knowledge management (KM). While all three exogenous constructs were statistically significant, except ideation which is insignificant, an examination of their effect sizes via T-statistics revealed that value creation (4.067) exerted the highest relative impact on KM, followed closely by collaboration (4.050), implementation (3.044), and ideation (1.674). Taken together, these findings empirically underscore that prioritizing a culture of

comprehensive innovation workflows is an essential prerequisite for organizations seeking to optimize their institutional knowledge management frameworks. The tables below show R square adjusted, effect size and VIF value.

Table 3: R Square Adjusted

Variable	R^2	R^2 Adjusted	P Value
KM	0.500	0.493	0.000

Source: Field Survey (2025)

Table 4: Effect Size

Variables	t statistics	p Values
C -> KM	4.050	0.000
ID -> KM	1.674	0.094
IM -> KM	3.044	0.002
VC -> KM	4.067	0.000

Source: Field Survey (2025)

Table 5: Multicollinearity Statistics



Constructs	VIF
C	2.219
ID	2.128
IM	1.994
VC	1.921
KM	1.981

Source: Field Survey (2025)

5. Discussion and Practical Implications

The statistical validations derived from this study offer substantial support to the integrated Knowledge-Based View and Dynamic Capabilities frameworks. The finding that collaboration, ideation, implementation, and value creation directly drive knowledge management aligns with contemporary literature. This structural link implies that brainstorming creative methods (ideation) or hosting peer-teaching networks (collaboration) serves as the exact behavioral catalyst required to build formal KM pipelines. Without active innovation efforts, knowledge acquisition and sharing within private schools stagnate.

For school managers, owner manager and educational proprietors in developing regions, these findings provide a clear operational blueprint. Proprietors must transition from passive management styles to active innovation-driven environments to capture institutional intelligence. This includes creating teacher mentorship programs rooted in cross-school networks (collaboration) and designing formal repositories for new curriculum strategies (implementation). By engaging in continuous, structured innovation practices, private schools can naturally stimulate the codification, retention, and smooth transition of knowledge assets ultimately protecting the institution from the loss of intellectual capital caused by high staff turnover.

6. References

- Acosta-Prado, J. C., Gómez Sánchez, J. A., López-Montoya, O. H., & Tafur-Mendoza, A. A. (2023). Sustainable value creation and organizational performance in industrial manufacturing companies. *Measuring Business Excellence*, 27(1), 143–156. <https://doi.org/10.1108/MBE-06-2022-0078>
- Adeogun, B. G. (2024). Relationship between organisational innovation and organizational performance: A study of Nigeria Bottling Company. *British Journal of Management and Marketing Studies*, 7(4), 82–94. <https://doi.org/10.52589/BJMMS>
- Alwiyah, A., & Lyraa, N. (2024). The role of innovation in the success of modern startupreneurs. *Startupreneur Business Digital (SABDA Journal)*, 3(2), 98–106.
- Atkočiūnienė, Z. O., Gribovskis, J., & Raudeliūnienė, J. (2022). Influence of knowledge management on business processes: Value-added and sustainability perspectives. *Sustainability*, 15(1), Article 68. <https://doi.org/10.3390/su15010068>
- Audretsch, D. B., Belitski, M., Caiazza, R., & Phan, P. (2023). Collaboration strategies and SME innovation performance. *Journal of Business Research*, 164, Article 114018. <https://doi.org/10.1016/j.jbusres.2023.114018>
- Bawa, S., Attah, P. K., Agougil, A., & El Harch, M. (2023). Impact of knowledge management on firms' innovation performance. *Technology and Investment*, 14(4), 293–328. <https://doi.org/10.4236/ti.2023.144017>



- Bettiol, M., Capestro, M., Di Maria, E., & Micelli, S. (2020). Knowledge and digital strategies in manufacturing firms: The experience of top performers. In *Knowledge Management and Industry 4.0: New Paradigms for Value Creation* (pp. 85–111). Springer. https://doi.org/10.1007/978-3-030-43589-9_5
- Bougie, R. (2012). *Research methods for business: A skill-building approach* (6th ed.). John Wiley & Sons.
- Casper, L. M., Helminen, M., & Veinott, E. S. (2024). Design thinking: Experimental evidence of ideation strategies that support team innovation. *Proceedings of the Human Factors and Ergonomics Society Annual Meeting*, 68(1), 1205–1209. <https://doi.org/10.1177/21695067241246501>
- Dahunsi, O. J. (2023). Innovation types and firm performance in Nigeria. *Indo-Asian Journal of Finance and Accounting*, 4(1), 145–159.
- Duru, C., Fu, C., & Nimo, M. (2023). Influence of knowledge management enablers and processes on a sustainable manufacturing performance in Nigeria. *European Journal of Sustainable Development Research*, 7(3), Article em0223. <https://doi.org/10.29333/ejosdr/13217>
- Eze, N. D., Mateus, C., & Cravo Oliveira Hashiguchi, T. (2020). Telemedicine in the OECD: An umbrella review of clinical and cost-effectiveness, patient experience and implementation. *PLoS ONE*, 15(8), Article e0237585. <https://doi.org/10.1371/journal.pone.0237585>
- Febrianty, D. (2025). Knowledge management foundation, KM processes, innovation, and organizational performance in vocational higher education institutions. *Journal of Information Technology Management*, 17(3), 45–63.
- Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research*, 18(1), 39–50. <https://doi.org/10.1177/002224378101800104>
- Gold, A. H., Malhotra, A., & Segars, A. H. (2001). Knowledge management: An organizational capabilities perspective. *Journal of Management Information Systems*, 18(1), 185–214. <https://doi.org/10.1080/07421222.2001.11045669>
- Islam, R. B. (2024). Building trust and fostering collaboration: A guide for leaders and researchers managing multicultural teams. *World Journal of Advanced Research and Reviews*, 24(3), 2990–2996. <https://doi.org/10.30574/wjarr.2024.24.3.3992>
- Kankam, G. (2023). Service quality and business performance: The mediating role of innovation. *Discover Analytics*, 1(1), Article 6. <https://doi.org/10.1007/s44250-023-00005-9>
- Krawczyk-Bryłka, B., Stankiewicz, K., Ziemiański, P., & Tomczak, M. T. (2020). Effective collaboration of entrepreneurial teams—Implications for entrepreneurial education.



- Education Sciences*, 10(12), Article 364.
<https://doi.org/10.3390/educsci10120364>
- Larsson, L., Stahre, J., Warrol, C., & Rönnbäck, A. Ö. (2018). An assessment model for production innovation: The Program Production2030. *Procedia Manufacturing*, 25, 134–141.
<https://doi.org/10.1016/j.promfg.2018.06.067>
- Liu, G., & Wang, W. (2025). How entrepreneurial orientation influences project portfolio success: The roles of ideation portfolio management and firm size. *International Journal of Project Management*, 43(1), Article 102722.
<https://doi.org/10.1016/j.ijproman.2024.102722>
- Madrid, H. P., & Patterson, M. G. (2023). An examination of the relationship between idea generation versus idea implementation and subsequent self-efficacy and positive affect. *Journal of Business and Psychology*, 38(3), 529–537.
<https://doi.org/10.1007/s10869-022-09825-9>
- Nguyen, H. N., & Mohamed, S. (2021). Leadership behaviors, organizational culture and knowledge management practices. *Journal of Knowledge Management*, 15(2), 206–221.
<https://doi.org/10.1108/1367327111119664>
- Obialo, G. C., & Akinjo, O. S. (2021). Innovation processes and performance dynamics: Evaluating ideation mechanisms in contemporary corporate systems. *African Journal of Business and Economic Development*, 14(2), 45–61.
- Olayemi, O. A., & Ojo, O. J. (2023). Collaborative learning strategies and institutional knowledgesharing among educators in Nigerian secondary schools. *African Journal of Educational Management*, 26(2), 112–129.
- Risitano, M., Romano, R., & Sorrentino, A. (2025). Aligning internal competencies and strategic objectives for market-driven innovations. *Journal of Business & Industrial Marketing*, 40(2), 310–325.
- Rzepka, A. (2024). Teamwork structures as catalysts for organizational knowledge development. *Journal of Entrepreneurship, Management and Innovation*, 20(1), 45–59.
<https://doi.org/10.7341/20242013>
- Sarstedt, M., Hair, J. F., Pick, M., & Ringle, C. M. (2021). Progress in partial least squares structural equation modeling (PLS-SEM) in marketing and consumer research. *International Journal of Research in Marketing*, 38(3), 532–542.
<https://doi.org/10.1016/j.ijresmar.2021.04.001>
- Stremersch, S. (2024). Commercializing innovation: From ideation to market valuation. *Journal of Marketing*, 88(2), 201–218.
<https://doi.org/10.1177/00222429231214002>
- Taber, K. S. (2017). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education*, 47(6), 1273–1296.



<https://doi.org/10.1007/s11165-016-9602-2>

Todorovic, I., Anderson, M., & Williams, S. (2022). Deconstructing the transition from ideation to implementation in service sectors. *Journal of Management & Organization*, 28(4), 789-806.

<https://doi.org/10.1017/jmo.2022.14>

Wang, L. (2022). Value creation dimensions, knowledge integration capabilities, and sustainable strategic outcomes: An empirical framework. *Journal of Management and Strategy*, 13(3), 112–128.

<https://doi.org/10.5430/jms.v13n3p112>

Wu, R., Zhang, J., Yu, Y., Jasimuddin, S. M., & Zhang, J. Z. (2023). The impact of value cocreation on CSR innovation and economic performance. *Sustainability*, 15(5), Article 4008.

<https://doi.org/10.3390/su15054008>

Yamane, T. (1967). *Statistics: An introductory analysis* (2nd ed.). Harper and Row.

Yang, Z., Liu, Q., Zhao, X., & Zhao, Y. (2023). Empirical evidence of idea generation in open innovation community. *International Journal of Crowd Science*, 7(1), 40–45.

<https://doi.org/10.1108/IJCS-08-2022-0021>