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Intangible Resources and Organizational Performance of Higher Education Institutions: A Multigroup Analysis in Gandaki Province

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Abstract

Purpose: The study examines impact of intangible resources, organizational learning and knowledge management, on organizational performance of HEIs with mediation and multi-group analysis in Gandaki Province, Nepal.

Methodology: Descriptive and causal-comparative design were used with proportionate stratified sampling of 487 staffs of constituent and affiliated campuses. PLS-SEM and PLS-MGA were conducted for hypothesis testing using SmartPls version 4.

Findings: Results corroborate that KM has a significant positive effect on OP, with OL playing a partial mediating role. While affiliated campuses exhibited stronger direct KM–OP links, constituent campuses relied more on OL to translate KM into performance. Multi-group analysis did not reveal any statistically significant differences among campuses.

Implications: HEIs must strengthen digital KM systems, foster continuous learning cultures, and apply governance-specific measures to maximize performance. Future studies can employ longitudinal or mixed-method designs including leadership style, autonomy, and technology adaptation variables.

Keywords: *Knowledge management, organizational learning, organizational performance, higher educational institutions, Nepal.*

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Introduction

Knowledge management (KM) and organizational learning (OL) have been extensively recognized as essential intangible resources that influence organizational performance (OP). The knowledge-based view (KBV) accentuates that knowledge represents the most significant resource of organizations, yielding sustained competitive advantage if well developed, stored, disseminated, and applied (Grant, 1996; Nonaka & Takeuchi, 1995; Barney, 1991; Camilleri, 2020). Complementarily, organizational learning theory (OLT) explicates how organizations transform knowledge into capabilities through adaptive and generative processes (Argyris & Schön, 1978; Senge, 1991; Crossan et al., 1999; Fiol & Lyles, 1985). Together, these perspectives illuminate how knowledge integration and learning mechanisms enable sustained organizational success. Within the context of higher education institutions (HEIs), these theories provide a sound foundation to which KM and OL drive innovation, governance, and performance outcomes (Al-Hakim & Hassan, 2013; Abdi et al., 2018; Hussein et al., 2014; Mills & Smith, 2011; Inthavong et al., 2023). However, existing literature is inconclusive on the precise magnitude of mediation between KM, OL, and OP. OL mediates to partially or fully between KM and OP, signifying how learning processes enhance the value of knowledge practices (Ngah et al., 2016; Imran et al., 2017; Rawashdeh et al., 2021; Rehman et al., 2019; Obeso et al., 2020). Conversely, some studies depict that KM itself acts as a mediator between OL–OP, and thus, routines and knowledge systems can provide the mechanisms whereby learning translates into performance outcomes (Kordab et al., 2020). To address these ambiguities, this study merges the KBV and OLT, positing that KM practices construct the foundations where OL is erected, and that their synergistic interaction can enhance OP.

Existing studies establish that KM and OL affect OP through numerous ways. The use of KM practices such as knowledge acquisition, conversion, and application straight away improves competitiveness, efficiency, and innovation (Gold et al., 2001; Zheng et al., 2009; Iqbal & Piwowar-Sulej, 2021; Meher & Mishra, 2021; Garcia-Fernandez, 2015; Abou-Moghli, 2025; Imam & Jagodič, 2021; Cheng et al., 2024). OL also substantiates these findings by incorporating knowledge into organizational routines, causing flexibility, and promoting creativity (García-Morales et al., 2011; Obeso et al., 2020; Paudel, 2023; Al-Sulami et al., 2022; Lusiana et al., 2023; Iqbal et al., 2025; Alneyadi & Cherian, 2025; Chong & Duan, 2025). And OL capability provides greater long-term effects (Zhang & Ilisko, 2025). Moreover, organizational culture, leadership, and environmental turbulence have been recognised to intervene the success of KM and OL practices (Abdi et al., 2018; Wahda, 2017; Donate & Sánchez de Pablo, 2020; Leal-Rodríguez et al., 2018; García-Morales et al., 2018). Collectively, these scholarly insights advocate that knowledge processes and learning are crucial to organizational operations but are highly context-specific.

KM and OL exploration has gained momentum but remains dispersed in Nepal. Gautam (2012) assessed KM activities in TU faculties, while some studies established the positive impact of KM on academic performance (Paudel et al., 2021) and competitiveness in banking and business (Adhikari, 2020; Bhandari, 2021; Chalise & Adhikari, 2024; Parajuli et al., 2022; Parajuli, 2025). Studies on OL revealed its beneficial effects on job satisfaction and performance in the banking sector (Devakota & Bhattarai, 2025; Parajuli, 2025) and linked intellectual capital to service quality and innovation in universities (Bhusal, 2023). Few other studies discussed the use of KM in governance and transformation (Gautam et al., 2024), its application in hospitality (Maharjan, 2020), and relevance to political institutions (Gautam et al., 2024). Despite this variety, Nepalese studies are descriptive, sectoral, and rarely employ integrated frameworks or advanced modelling for examining KM–OL–OP relations. This indicates the necessity for context-specific studies and comparing within types of HEIs.

Although KBV and OLT are widely applicable, results of studies are varied and occasionally conflicting. KM is most typically associated with immediate positive effects on OP (Adhikari, 2020; Namdarian et al., 2020; Ghimire et al., 2024; Suparwadi et al., 2024), though studies also revealed insignificant effects (Liao & Wu, 2009; Chawla & Joshi, 2011; Rawashdeh et al., 2021) and even adverse outcomes if KM systems become excessively bureaucratic (Fugate et al., 2008). Similarly, while OL is repeatedly supposed to sustenance OP (Bhusal, 2023; Nafei, 2014; Rehman et al., 2019), however, there are conflicting results of its mediating role (Ngah et al., 2016; Imran et al., 2017; Rawashdeh et al., 2021; Obeso et al., 2020) or even inverse causality, given that KM mediates the relationship between OL and OP (Kordab et al., 2020). OL depends on industry dynamics and environmental change (Zheng et al., 2010; García-Morales et al., 2018), while others reported inconsistent effects (Hui et al., 2013; Sahibzada et al., 2020). Zoubi et al. (2025) reported the adverse impact of OL on innovative performance. These results attest that the KM–OL–OP nexus is inconclusive, with outcomes relying on organizational structure, culture, and resource conditions.

Furthermore, structural heterogeneity of HEIs, in terms of governance, autonomy, and resource endowments, means that KM and OL would have non-uniform effects across institutions (Khanal, 2017; Paudel, 2023; Khanal & Mathur, 2020; Bhusal, 2025; Subedi, 2025; Gautam, 2025; Hawamdeh & Al-Edenat, 2025). Therefore, this study attempts to (a) examine the direct association of KM with OP, (b) analyze the mediating effect of OL, and (c) determine whether these relationships differ by campus types of Gandaki Province, Nepal. Using PLS-SEM along with multigroup analysis, the study contributes to explaining conceptual ambiguity in KBV and OLT and offering contextually grounded results for HEIs.

Literature review

Organizational Performance

OP refers to the ability of an institution to achieve strategic objectives and attain stakeholder expectations with efficiency, productivity, and resilience (Suparwadi et al., 2024). In HEIs, OP is complex and encompasses financial sustainability, student satisfaction, internal process efficacy, learning and improvement, and research output, typically measured by the balanced scorecard (BSC) framework (Abubakar et al., 2018). It combines operational effectiveness and strategic fit to deliver competitive advantage in evolving conditions (Parajuli et al., 2022; Sadiq et al., 2020). Financial performance is overemphasized but other dimensions of performance are ignored, calling for the balanced approach.

Knowledge Management

KM describes systematic processes of generating, storing, transferring, and applying knowledge to enhance organizational performance and creativity (García-Fernández, 2015; Nonaka & Takeuchi, 1995). This study utilizes a threefold matrix of KM practices, knowledge creation, storage, and application, derived from Nonaka's (1994) SECI model and supplemented by contemporary perspectives emphasizing strategic and contextual agility (Sahibzada et al., 2020; Kordab et al., 2020). KM translates scattered intuition into practical knowledge through processes including tacit-to-explicit conversion, digital databases, and knowledge aggregation to workflows (Alavi & Leidner, 2001; Grant, 1996).

Organizational Learning

OL is the process where institutions learn, decode, absorb, and internalize knowledge in the effort to enhance adaptability and performance (Argyris & Schön, 1978; Crossan et al., 1999). It works through adaptive (single-loop) and generative (double-loop) learning, balancing incremental change with paradigm-breaking innovation (Senge, 1991). Supported by learning cultures, adaptive leadership, and arrangements like communities of practice, OL transforms internal and external knowledge and understanding into collective wisdom.

Theoretical review

KBV and OLT postulate a ground-breaking foundation to apprehend how intangible resources shape performance results in HEIs. KBV points out that knowledge is the company's most strategic and distinctive asset, with sustainable competitive advantage rooted in its creation, integration, and recombination (Grant, 1996; Nonaka, 1994; Spender, 1996; Kogut & Zander, 1992; Vyas, 2024). In HEIs, knowledge creation and transfer are focal points of institution missions, and hence KBV is notably relevant to explaining differences in performance in terms of intangibles management, dynamic capabilities, and innovation (Bontis, 1998; Teece, 2007; Secundo et al., 2016; Rehman et al., 2023). However, the potential of the intangibles cannot be turned into reality without effective learning mechanisms that enable organizations to shift and transform these resources into valuable output. OLT fills this void by relating how organizations internalize, share, and learn knowledge through single-loop and double-loop learning processes (Argyris & Schön, 1978; Fiol & Lyles, 1985; Crossan et al., 1999; Senge, 1991). It also emphasizes adaptive learning for efficiency and generative learning for innovation and regeneration (Vera & Crossan, 2004; Bapuji & Crossan, 2004), mechanisms that have been exhibited to mediate the connection between knowledge management and performance (García-Morales et al., 2011; Liao & Wu, 2009; Obeso et al., 2020). Resilient OL capability not only allows for the sharing of knowledge but also supports innovation and operational excellence (Jerez-Gómez et al., 2004; López-Cabrales et al., 2009; Antunes & Pinheiro, 2020). In Nepalese HEIs, in which affiliated and constituent campuses are endowed with heterogeneous resources and learning capacities (Adhikari, 2010; Parajuli et al., 2022; Bhusal, 2025; Subedi, 2025; Gautam, 2025), the integration of KBV and OLT provides a rigorous theoretical foundation to examine how knowledge-based resources and learning processes concurrently influence performance outcomes.

Empirical Review and Hypothesis Development

Knowledge management and organizational learning

Empirical studies time and again ratify that KM is an imperative facilitator of OL. Knowledge creation, warehousing, and sharing activities are the foundation on which OL processes are developed, enabling organizations to capitalize knowledge into adaptive and generative competencies (Gold et al., 2001; Zheng et al., 2009; Crossan et al., 1999). ZhengKang et al. (2025) reported that by nurturing a learning-centric ecosystem, establishments can augment knowledge-sharing activities. KM contributes significantly to OL by enabling collaborative learning cultures, experimentation, and shared vision (Senge, 1991; García-Morales et al., 2011). Effective KM systems positively influence OL, such that structured mechanisms for the acquisition and application of knowledge in real-time enhance adaptive and generative learning orientations (Obeso et al., 2020; Rehman et al., 2019; Rawashdeh et al., 2021). Among Nepalese HEIs, Chalise and Poudel (2025) also revealed a positive effect of KM on OL with the experience that processes of knowledge create continuous learning even in poor resource conditions. Thus, the following hypothesis is presumed.

H1: There is a significant positive effect of KM on OL

Knowledge Management and organizational performance

KM facilitates OP as a primary predictor of systematic knowledge creation, storage, sharing, and utilization, enhancing innovation, decision-making, and responsiveness, particularly in knowledge-intensive settings like HEIs (Davenport & Prusak, 1998; Gold et al., 2001; Wang & Wang, 2012). Based on the KBV, KM generates sustainable competitive advantage, and studies endorse its ability to enhance productivity, knowledge sharing, and innovation capability (Grant, 1996; Nonaka & Takeuchi, 1995; Cabrita & Bontis, 2008; Fugate et al., 2008; Andreeva & Kianto, 2011; López-Cabrales et al., 2009). For developing nations like Nepal, the success of KM depends on technical infrastructure, managerial capability, and institutional support, particularly in higher education where structural disparities between constituent and affiliated campuses influence resource availability (Adhikari, 2010; Khanal, 2017; Chalise & Adhikari, 2024; Bhusal, 2025; Gautam, 2025; Subedi, 2025). Studies affirmed the positive KM-OP relationship and indicates the need to transcend contextual and structural factors in an effort to pursue the greatest possible of KM, especially in limited-resource settings (Inkinen, 2016; Bayari et al., 2021; Payal et al., 2019). Thus, the following hypothesis is presumed.

H2: There is a significant positive impact of KM on OP.

Organizational learning and organizational performance

OL is one of the most crucial OP drivers by means of enhanced capacity of an institution to learn, understand, and utilize knowledge, causing innovation, augmenting problem-solving capacity, and improving adaptive responsiveness towards environmental changes (García-Morales et al., 2011; Crossan et al., 1999; Fiol & Lyles, 1985). This is where attention is, as in learning organization philosophy, on the ways continuous learning processes and knowledge integration mechanisms backing to enhance operational performance as well as strategy benefits (Senge, 1991; Marsick & Watkins, 1996; Yang et al., 2004). Organizations with a strong learning culture fare better in terms of different aspects like improvements in productivity, innovative capacity, and application of knowledge (Jerez-Gómez et al., 2004; López-Cabrales et al., 2009; Andreeva & Kianto, 2011). However, the OL-OP relationship varies and is situational in terms of leadership, organizational culture, and strategic orientation (Vera & Crossan, 2004; Donate & De Pablo, 2014), of particular significance in the material-poor settings of Nepalese HEIs where learning capacity can compensate for material deficiencies (Bhusal, 2023; Parajuli et al., 2022; Khanal, 2017). However, OL capabilities are strong predictors of performance outcomes despite structural constraints (Duressa & Kidane, 2024; Rehman et al., 2021), substantiating the conceptualization that OL impacts on organizational performance. Thus, the following hypothesis is conceptualized:

H3: There is a significant positive impact of OL on OP.

Organizational learning in the KM-OP relationship

OL is one of the central mediating variables between KM and OP, since it renders institutions capable of assimilating, interpreting, and applying knowledge in a bid to convert intangibles into adoptable strategies and improved results (García-Morales et al., 2011; Zheng et al., 2009; Alavi & Leidner, 2001). While KM serves as the basis to knowledge capture, storage, and transfer through technology and organizational structures (Gold et al., 2001; Davenport & Prusak, 1998), OL enables effective conversion of knowledge into organizational processes and thus enhances quality of decision-making, innovation capability, and responsive response to environmental change (Crossan et al., 1999; Fiol & Lyles, 1985; Cohen & Levinthal, 1990). Studies have established that OL partly or entirely mediates the KM-OP relationship via more intense knowledge conversion and utilization processes (Obeso et al., 2020; Liao & Wu, 2009; Leal-Rodríguez et al., 2013; Kordab et al., 2020; Rawashdeh et al., 2021). It is particularly crucial in situations of restricted resources, where OL processes can determine the degree to which KM influence the tangible changes in performance in terms of structural risks and scarcity of resources (Parajuli et al., 2022; Bhusal, 2023; Khanal, 2017; Adhikari, 2010). In addition, in HEIs specifically settles that OL is the mediator for KM practices and several dimensions of performance like academic quality, operational performance, and innovative performance (Rehman et al., 2021; Nafei, 2014; Duressa & Kidane, 2024), revealing the need for the development of learning capabilities for the best return on investment of knowledge management in HEIs as a whole. Hence, following hypothesis has been presumed.

H4: OL has a significant positive mediating effect in the KM-OP relationship.

Relationship between variables across types of campuses

There are significant variations in KM and OL deployment in constituent and affiliated HEIs in Nepal, resulting in differing OP due to fundamental differences in governance structures, degrees of autonomy, and resource availability (Adhikari & Shrestha, 2022). Constituent campus being state-funded and centrally administered most often operate in formalized bureaucratic systems that emphasize conformity and rule-based processes, which can build systemic OL but usually encumber KM flexibility and innovation possibilities (Adhikari, 2010; Parajuli et al., 2022; Bhusal, 2023). Conversely, those campuses allied are commonly privately or community-held and more independent in strategically applying KM tools and manifest higher market responsiveness, even with challenges of maintaining OL owing to the high staff turnover and capacity constraints (Khanal, 2017; Khanal & Mathur, 2020; Gautam, 2025). Though affiliated HEIs are more likely to demonstrate direct KM-OP congruence with effective knowledge application, constituent colleges are likely to have more entrenched OL processes with more efficacious knowledge preservation mechanisms, although with sluggish adapting capacities (Subedi, 2025; Paudel, 2023; Chalise & Adhikari, 2024). These varying structures and operations suggest varying mechanistic processes through which KM and OL impact OP within each kind of institution, making comparative analysis necessary to resolve. Based on these differences, the following hypothesis is developed:

H5: The structural relationships among KM, OL, and OP differ significantly between constituent and affiliated HEI campuses in Gandaki Province

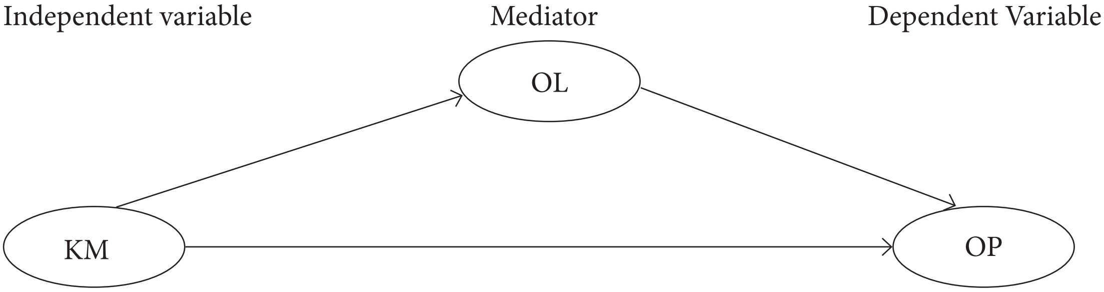
Conceptual Framework

This study draws on KBV (Grant, 1996; Nonaka & Takeuchi, 1995; Barney, 1991) and OLT (Argyris & Schön, 1978; Senge, 1991). KBV views knowledge as a competitive asset that, when appropriately created, disseminated, stored, and applied, creates lasting competitive advantage (Gold et al., 2001; López-Cabrales et al., 2009). OLT bridges this gap in describing how institutions transform knowledge through adaptive and generative learning, translating intangible resources to tangible performance (Crossan et al., 1999; García-Morales et al., 2011). The two perspectives complement each other in providing that OP is not just the function of knowledge assets but also of learning processes engaged with transforming them into outcomes.

The proposed model extends from previous ones (Liao & Wu, 2009; Ngah et al., 2016; Obeso et al., 2020; Rawashdeh et al., 2021; Rehman et al., 2019; Imran et al., 2017). These indicated KM–OP relationships being mediated by OL but primarily in corporate or non-educational settings. This model advances this stream of inquest in three ways: (a) it merges KBV and OLT as the theoretical basis, whereas most previous studies applied single one; (b) it positions the KM–OL–OP connection within Nepali HEIs' structural heterogeneity by considering affiliated and constituent campuses; and (c) it empirically tests mediation and group differences through PLS-SEM and PLS-MGA, adding methodological rigor. Thus, this framework operationalizes long-established theoretical assumptions and aligns them to the governance and resource ecosystem of Nepalese HEIs, contributing both theoretically and practically to the literature on intangible resources and performance.

Figure 1

Conceptual Framework



Adopted from Liao and Wu (2009), Ngah et al. (2016), Obeso et al. (2020), Rawashdeh et al. (2021), Rehman et al. (2019), and Imran et al. (2017).

Methodology

This study adopted a critical realist ontology (Fletcher, 2016), acknowledging that constructs such as KM, OL, and OP exist independently of human perception yet are socially embedded and institutionally interpreted. A post-positivist epistemology guided the descriptive and causal-comparative cross-sectional survey design, applying PLS-SEM with MGA to examine relationships among KM, OL, and OP across institutional types (Hair et al., 2019; Sarstedt et al., 2019).

From 114 HEIs listed by TU Regional Examination Controller's Office (April 2, 2025), 21 were purposively selected. They had 1,567 staff (1,242 teaching, 325 administrative), data verified through telephone interview. The stratified random sampling ensuring proportional representation across institutions types was employed. Based on power analysis, a minimum sample of 341 was required at 95% confidence and 5% margin of error, while a priori analysis using G*Power ($f^2 = 0.15$, $\alpha = 0.05$, power = 0.95, four predictors) confirmed adequacy with 129 cases per group. To account for non-response, 487 questionnaires were distributed and obtained (234 to constituent and 253 to affiliated campus staff), resulting in a valid sample balanced across institution types.

Data collection employed a bilingual (English/Nepali) structured self-administered questionnaire using 5-point Likert scales via field survey, with reliability established through pilot testing (N = 70), yielding Cronbach's alpha (CA) values between .774 and .860 and overall reliability of α = .857, surpassing recommended thresholds (Nunnally, 1978). KM was measured as a second-order construct with three reflective dimensions: knowledge creation and acquisition (7 items), knowledge transfer and storage (7 items), and knowledge application and use (10 items) (García-Fernández, 2015). OL was operationalized as a second-order construct with adaptive (7 items) and generative learning (7 items) dimensions (Nafei, 2014), while OP was conceptualized with five reflective dimensions: financial performance (6 items), student satisfaction (5 items), internal business process (4 items), learning and growth (5 items), and research and publication (5 items) (Khalique et al., 2015; Poudel, 2021).

The respondent profile (N = 487) included 52% from affiliated and 48% from constituent campuses, with a majority male (84.8%) and teaching staff (85.8%); nearly half held a Master's degree (49.7%), and most were mid-career professionals with 0-5 years of experience (43.7%). Data screening addressed missing values, outliers, multicollinearity, and normality and the measurement model was validated through CA, composite reliability (CR ≥ .70), convergent validity (AVE ≥ .50), and HTMT ratios (Henseler et al., 2015). To reduce bias, non-response analysis revealed no significant differences between early and late respondents ($p > .05$), while Harman's one-factor test exhibited that a single factor explained only 22.10% of the variance, below the 50% threshold, confirming common method bias was not a concern. Structural relationships were analyzed using PLS-SEM with bootstrapping (5,000 resamples) for mediation (Preacher & Leonardelli, 2010), MGA for institutional comparisons, and PLS-Predict with k-fold cross-validation for predictive validity (Shmueli et al., 2019) conducted in SPSS v27 and SmartPLS 4.

Results

Measurement Model

Measurement model was assessed to check the reliability and validity of the latent constructs as per the guidelines of PLS-SEM. Indicator reliability was ensured with outer loadings above 0.70, and internal consistency reliability was ensured by composite reliability values greater than 0.70 (Hair et al., 2019). Convergent validity was also supported by AVE scores greater than 0.50, indicating that the constructs tapped sufficient variance from their indicators (Fornell & Larcker, 1981). Discriminant validity was also tested with HTMT ratio, with all values being within the threshold, thus establishing that the constructs were empirically distinct (Henseler et al., 2015).

Factor Loadings

The standardized factor loadings of the measurement items for reliability were assessed and loadings of ≥.70 were acceptable as per Hair et al. (2019). All the items with high loadings (.7105 to .8460) than the threshold were retained and items AOL 4, AOL 7, FP 7, KA 4, KT 1, KT 6, KT 7, and SS 4 were eliminated due to loadings below .70 in complete as well as group datasets.

Reliability Assessment

In this study, reliability was evaluated using indicator reliability and internal consistency measures. Indicator reliability was examined to ensure that each variable consistently measured the intended construct, while internal consistency was assessed to confirm the coherence of items within the scale, ensuring robust and dependable results.

Indicator Reliability

Indicator reliability, i.e., to what degree certain indicators measure their latent constructs in PLS-SEM, is assessed through outer loadings, in which ≥.70 is high reliability and less than .40, which must be dropped (Hair et al., 2019). Loadings between .40 and .70 can be retained when they enhance construct reliability indicators like CA and AVE (Hair et al., 2019). In this study, most of the indicators for constructs such as Knowledge Creation and Acquisition (KC), Learning and Growth Perspective (LGP), and Adaptive Organizational Learning (AOL) exhibited high loadings of more than .70, supporting high indicator reliability. However, items AOL 4, AOL 7, FP 7, KA 4, KT1, KT6, KT7, and SS 4 were removed due to poor loadings, increasing internal consistency, construct validity, and reliability measures (CA, CR, and AVE). This adjustment fortified the measurement model to enable reliable structural analysis.

Internal Consistency

Internal consistency reliability was assessed using CA, composite reliability (CR, measured as ρ_a and ρ c), and AVE, following the recommendations by Hair et al. (2019). A CA value above .70 is considered acceptable, and a value above .80 indicates good reliability (Nunnally & Bernstein, 1994). Across the full sample, all constructs exceeded the .79 threshold for CA, with values ranging from .7905 (SS) to .9032 (KA), suggesting that the scale items for each construct are consistently measuring the underlying latent variable. Similarly, CR values (ρ c) were all above .86, with the highest value reported for KA (.9207), confirming convergent internal consistency (Hair et al., 2017).

Table 1

Internal Consistency Reliability for All Constructs (Full Sample and Subgroups

Complete	Cronbach's alpha	(rho a)	rho c	AVE)
AOL	.8354	.8372	.8835	.6026
FP	.8268	.8288	.8782	.5907
GOL	.8761	.8777	.9040	.5739
IBP	.8113	.8230	.8755	.6376
KA	.9032	.9064	.9207	.5635
KC	.8876	.8948	.9120	.5972
KT	.7898	.7940	.8637	.6132
LGP	.8543	.8624	.8951	.6309
RP	.8503	.8584	.8923	.6238
SS	.7905	.7911	.8641	.6140
Affiliated				
AOL	.8272	.8343	.8782	.5908
FP	.8179	.8237	.8726	.5784
GOL	.8693	.8761	.8987	.5593
IBP	.8121	.8193	.8762	.6393
KA	.8979	.9008	.9168	.5506
KC	.8948	.9040	.9171	.6129
KT	.7930	.8030	.8653	.6169
LGP	.8531	.8614	.8948	.6305
RP	.8628	.8719	.9006	.6445
SS	.8027	.8039	.8712	.6286
Constituent				
AOL	.8438	.8475	.8889	.6157
FP	.8359	.8360	.8839	.6037
GOL	.8831	.8857	.9089	.5878
IBP	.8105	.8444	.8726	.6316
KA	.9087	.9148	.9249	.5782
KC	.8794	.8888	.9060	.5798
KT	.7863	.7900	.8616	.6091
LGP	.8555	.8693	.8954	.6315
RP	.8358	.8506	.8823	.6001
SS	.7765	.7946	.8552	.5968

Validity Assessment

In this study, validity was evaluated through multiple approaches to ensure the accuracy and relevance of the measurement instruments. Convergent validity was assessed to verify that related constructs correlated strongly, while discriminant validity was confirmed using the HTMT ratio to ensure distinct constructs were adequately differentiated.

Convergent Validity

Convergent validity was assessed by calculating the AVE for each latent variable as presented in Table 1. With all AVE values exceeding the .50 threshold recommended by Fornell and Larcker (1981), convergent validity is confirmed for all constructs in this study.

Discriminant Validity

The degree to which a construct empirically differs from other constructs is ensured by discriminant validity (Hair et al., 2019). This study employed the HTMT ratio of correlations technique to ensure discriminant validity.

Heterotrait-Monotrait Ratio

Discriminant validity was assessed using the HTMT, a robust method widely recommended in variance-based structural equation modelling (Henseler et al., 2015). All HTMT values in the complete and group dataset were below the conservative threshold of 0.85, indicating strong evidence of discriminant validity between constructs (Hair et al., 2019).

Table 2

Heterotrait-Monotrait (HTMT) Matrix for Discriminant Validity

Complete	AOL	FP	GOL	IBP	KA	KC	KT	LGP	RP	SS
AOL										
FP	0.2372									
GOL	0.1895	0.2625								
IBP	0.3449	0.1972	0.2194							
KA	0.3073	0.3158	0.1986	0.2738						
KC	0.2884	0.3079	0.3102	0.2835	0.3702					
KT	0.2197	0.2177	0.2327	0.2540	0.3357	0.3033				
LGP	0.2568	0.1768	0.2644	0.2660	0.2693	0.2568	0.2212			
RP	0.2319	0.2535	0.2782	0.2002	0.2615	0.2273	0.2564	0.3316		
SS	0.2212	0.1921	0.3015	0.2709	0.2411	0.2834	0.2971	0.3180	0.2937	

Affiliated	AOL	FP	GOL	IBP	KA	KC	KT	LGP	RP	SS
AOL										
FP	0.1812									
GOL	0.0849	0.2621								
IBP	0.4069	0.1529	0.1316							
KA	0.3427	0.3695	0.2096	0.3296						
KC	0.2481	0.3141	0.3226	0.3405	0.3477					
KT	0.2117	0.1514	0.1873	0.2807	0.4002	0.3164				
LGP	0.2947	0.2297	0.2572	0.2973	0.3242	0.2789	0.1922			
RP	0.2629	0.2549	0.2706	0.2232	0.2304	0.2718	0.2102	0.4055		
SS	0.2731	0.1658	0.2482	0.2534	0.2717	0.3684	0.2836	0.3473	0.2585	
Constituent	AOL	FP	GOL	IBP	KA	KC	KT	LGP	RP	SS
AOL										
FP	0.3090									
GOL	0.3255	0.2628								
IBP	0.2797	0.2458	0.3441							
KA	0.2712	0.2612	0.1883	0.2179						
KC	0.3325	0.3016	0.2972	0.2195	0.3951					
KT	0.2316	0.2884	0.2854	0.2248	0.2675	0.2886				
LGP	0.2173	0.1383	0.2719	0.2322	0.2183	0.2323	0.2528			
RP	0.1982	0.2525	0.2870	0.1740	0.2961	0.1765	0.3094	0.2483		
SS	0.1652	0.2359	0.3601	0.2909	0.2081	0.1841	0.3125	0.2852	0.3354	

Model Quality

The quality of the measurement model was evaluated using several model fit indices in line with the guidelines for PLS-SEM. The SRMR values for both the saturated (0.040) and estimated models (0.059) fall below the commonly accepted threshold of 0.08, indicating a good fit between the observed and predicted correlations (Henseler et al., 2015). The d ULS and d G values are relatively low, suggesting minimal discrepancy between the empirical and model-implied correlation matrices. Additionally, the Chi-square values for the saturated (1992.94) and estimated models (2121.23) are within acceptable ranges for large sample sizes, although in PLS-SEM this index is less emphasized due to its sensitivity to sample size (Hair et al., 2019). The NFI values of 0.835 (saturated) and 0.825 (estimated) exceed the recommended minimum of 0.80 (Bentler & Bonett, 1980), further supporting acceptable model fit. Collectively, these indices demonstrate that the proposed model achieves a satisfactory level of fit, supporting the adequacy of the structural paths for hypothesis testing.

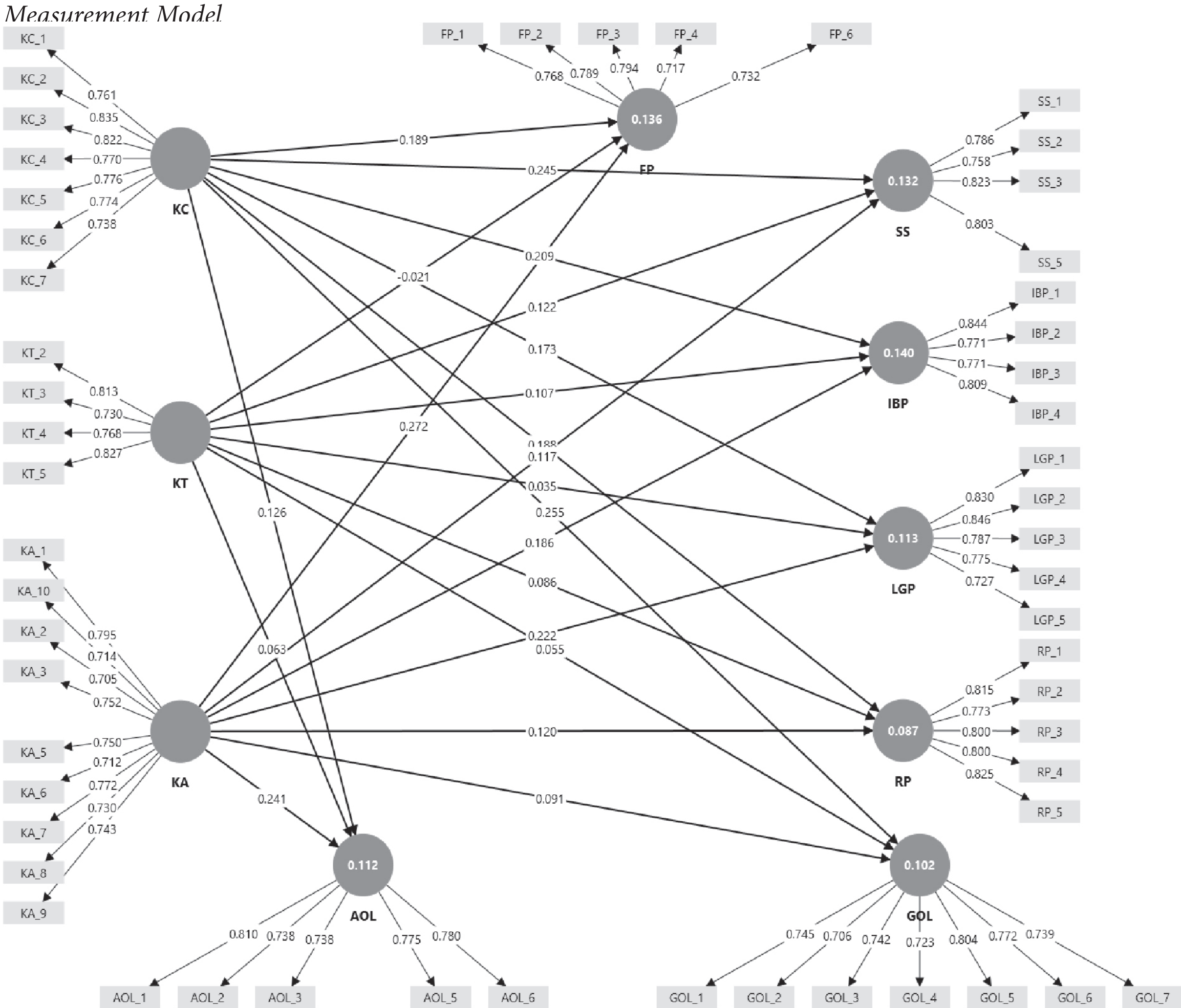
Table 3

Model Fit Indices for Saturated and Estimated Models

Complete	Saturated model	Estimated model
SRMR	0.040	0.059
d ULS	2.501	5.360
d G	0.707	0.762
Chi-square	1992.935	2121.229
NFI	0.835	0.825

Figure 2

Measurement Model



Structural Model

The next step in structural equation modeling is assessment of the hypothesized relationship to substantiate the proposed hypotheses (Figure 3).

Hypotheses Testing

H1 presumed that KM significantly improves OP. The standardized path coefficient for KM -> OP in the entire sample was β =.371 (t = 9.48, p <.001), suggesting a moderate-to-strong impact. Organizations that have better organized procedures for producing, preserving, and using knowledge typically see improvements in financial indicators, student contentment, and research output. Both affiliated (β =.411, t = 7.14, p <.001) and constituent campuses (β =.322, t = 5.80, p <.001) corroborated the stability of this relationship, highlighting the generalizability of KM's direct advantages on institutional development.

H2 postulated that KM had a beneficial impact on OL. The path coefficient KM -> OL was β =.389 (t = 9.85, p <.001), indicating that adaptive and generative learning behaviors are significantly fostered in HEIs by effective knowledge processes. Continuous development depends on these learning habits, which include open communication, shared vision, and experimentation (Senge, 1991). Reiterating this association, group analyzing displayed that KM efforts consistently increase OL across affiliated (β =.402, t = 6.13, p <.001); and constituent (β =.373, t = 6.49, p <.001).

H3 assumes that OL has a beneficial impact on OP. The findings demonstrated OL -> OP with β =.324 (t = 8.52, p <.001), indicating that an OP is directly impacted by how much learning it does. Learning-driven enhancements that result in measurable results, such process innovation, staff skill development, and information sharing, strengthen OL's mediating function. This mediation route demonstrated that OL consistently promotes performance increases and was present in both campus types (affiliated: β =.291, t = 4.57, p <.001; constituent: β =.358, t = 6.45, p <.001).

Table 4

PLS-SEM Path Coefficients and Significance

Complete	Hypothesis	O	M	SD	T	P values	Remarks
km -> OL	H1	0.3893	0.3897	0.0395	9.8480	<.001	Supported
km -> OP	H2	0.3705	0.3701	0.0391	9.4823	<.001	Supported
OL -> OP	H3	0.3239	0.3248	0.0380	8.5162	<.001	Supported
Affiliated							
km -> OL	H1	0.4023	0.4002	0.0656	6.1319	<.001	Supported
km -> OP	H2	0.4110	0.4127	0.0576	7.1353	<.001	Supported
OL -> OP	H3	0.2907	0.2881	0.0636	4.5674	<.001	Supported
Constituent							
km -> OL	H1	0.3729	0.3763	0.0575	6.4903	<.001	Supported
km -> OP	H2	0.3218	0.3217	0.0554	5.8035	<.001	Supported
OL -> OP	H3	0.3579	0.3600	0.0555	6.4541	<.001	Supported

Mediation Analysis

A mediation analysis was conducted with PLS-SEM and bootstrapping to examine if OL mediates the impact of KM on OP. The results revealed partial mediation to be significant, the indirect effect of KM on OP through OL being significant for the entire sample (β = 0.126), affiliated (β = 0.117), and constituent (β = 0.133) groups, as evidenced by percentile bootstrap confidence intervals. Its direct influence on OP was also significant (complete sample: β = 0.623; affiliated: β = 0.645; constituent: β = 0.588), indicating that while KM has a very high direct influence on OP, some of its influence is also mediated indirectly through its positive influence on OL. What is especially interesting is the fact that the constituent group exerted the highest indirect effect, suggesting the mediating effect of OL is highest here. Hence, the presumed hypothesis OL has a significant positive mediating effect in the KM-OP relationship is partially supported.

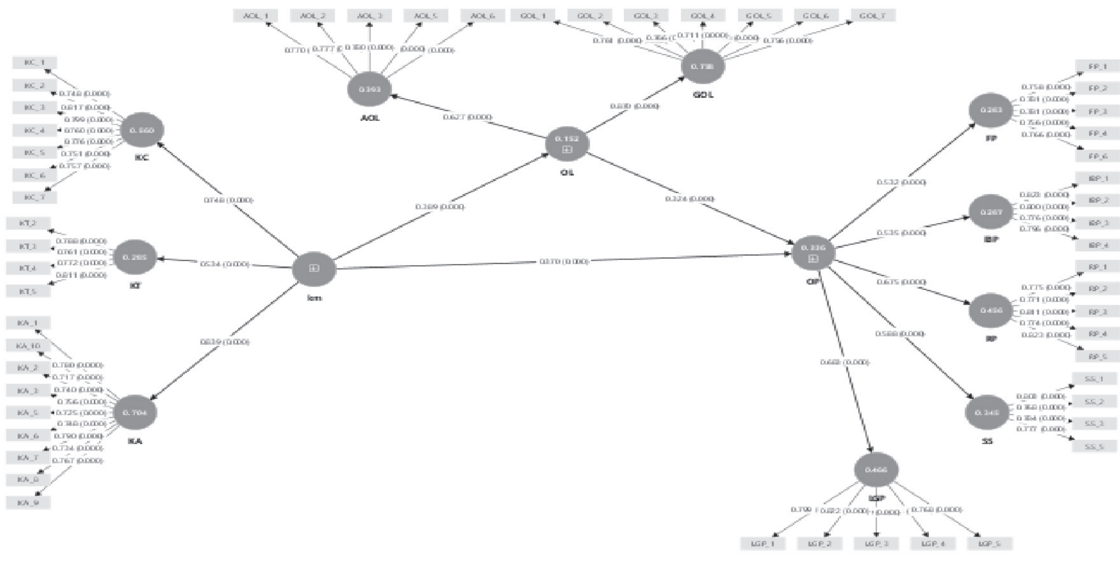
Table 5

Mediation Results: Direct Effect, Indirect Effect, and Total Effects of KM on OP via OL

Group	Direct Effect (β)	Indirect Effect (β)	Total Effect (β)
Complete	0.497	0.126	0.623
Affiliated	0.528	0.117	0.645
Constituent	0.455	0.133	0.588

Figure 3

Structural Model of Complete Data



Model Quality

Out-of-sample predictive capacity through PLS-Predict with tenfold cross-validation corroborated strong predictive validity since all Q^2predict values performed better than zero (Hair et al., 2019). In the overall sample, KA showed the highest predictive accuracy (Q^2predict = .703), followed by KC (Q^2predict =

.557), while OP demonstrated sufficient accuracy (Q^2predict = .242). Subgroup analyses revealed similar patterns, with KA demonstrating the highest predictive importance consistently across constituent (Q^2predict = .717) and affiliated campuses (Q^2predict = .688). Further, comparison of predictive models showed that PLS-SEM outperformed the linear model (LM) in out-of-sample prediction error reduction as quantified by lower mean squared error values for the majority of constructs, including AOL, FP, GOL, and SS (all $p < .01$) (Shmueli et al., 2019). Subgroup results upheld PLS-SEM superiority, with both constituent ($\Delta M = 0.162$, $p < .001$) and affiliated campuses ($\Delta M = 0.146$, $p < .001$) possessing greater predictive accuracy, thereby consolidating PLS-SEM as the more stable model.

PLS SEM multi group analysis

PPLS-MGA was used via the MICOM procedure to examine measurement invariance between associated and constituent campuses (Henseler et al., 2016; Sarstedt et al., 2011). Step 2 established compositional invariance on all constructs, Step 3a established equality of composite means ($p = 1.000$), and Step 3b established variance invariance for the majority of constructs but detected statistically significant differences in variance (original difference = −0.2293, $p = .023$) for OL indicating heteroscedasticity. Accordingly, conventional parametric PLS-MGA was used for entirely invariant constructs, while OL paths were contrasted using Welch–Satterthwaite adjusted t tests (Welch, 1947; Satterthwaite, 1946). A hybrid MGA approach involving bootstrapped parametric tests and Welch–Satterthwaite adjustments also examined differences between groups in structural relations. The results revealed no statistically significant group differences in affiliated versus constituent campuses for direct, specific indirect, or total indirect effects. For instance, KM-> OP (parametric: $t = 1.115$, $p = .133$; Welch–Satterthwaite: $t = 1.119$, $p = .132$), KM-> OL (parametric: $t = 0.336$, $p = .369$; Welch–Satterthwaite: $t = 0.338$, $p = .368$), OL-> OP (parametric: $t = 0.793$, $p = .214$; Welch–Satterthwaite: $t = 0.798$, $p = .213$), and indirect effect KM-> OL-> OP (parametric: $\beta = -0.017$, $t = 0.373$, $p = .355$; Welch–Satterthwaite: $t = 0.375$, $p = .354$) all were insignificant. Collectively, these findings demonstrate that multi-group comparisons are reliable and valid, and structural relationships are largely the same across campuses although partial variance invariance does exist in OL. Hence, H4, the structural relationships among KM, OL, and OP differ significantly between constituent and affiliated HEIs in Gandaki, is not supported.

Table 6

Multi-Group Analysis of Direct, Indirect, and Total Indirect Effects Using Parametric and Welch-Satterthwaite Tests

Path	Test Type	β Difference	t Value	p Value	Significant
Direct Effects					
km -> OL	Parametric	0.02942	0.336	.369	No
	Welch-Satterthwaite	0.02942	0.338	.368	No
km -> OP	Parametric	0.08925	1.115	.133	No
	Welch-Satterthwaite	0.08925	1.119	.132	No
OL -> OP	Parametric	-0.06722	0.793	.214	No
	Welch-Satterthwaite	-0.06722	0.798	.213	No
Specific Indirect Effect					
km -> OL -> OP	Parametric	-0.01651	0.373	.355	No
	Welch-Satterthwaite	-0.01651	0.375	.354	No
Total Indirect Effect					
km -> OP (indirect total)	Parametric	-0.01651	0.373	.355	No
	Welch-Satterthwaite	-0.01651	0.375	.354	No

Discussion

PLS-SEM and PLS-MGA results indicate that KM has a direct significant positive effect on OP in HEIs, particularly with very high effects in affiliated campuses. This indicates that institutional autonomy and operational flexibility enable affiliated campuses to leverage more the use of KM practices in innovation, responsiveness, and efficiency (Adhikari, 2020; Namdarian et al., 2020; Suparwadi et al., 2024). These findings were supported as decentralized organizations enable KM success by reducing bureaucratic pressures and promoting greater experimentation (Al-Hakim & Hassan, 2013; Imam & Jagodič, 2021; Abou-Moghli, 2025). The impact of KM is larger in knowledge-intensive and adaptable organizations compared to highly formalized organizations (Kianto et al., 2017; Donate & Sánchez de Pablo, 2020). Constituent campuses, however, being bureaucratically controlled and centrally governed, exhibit weaker direct KM–OP links, consistent with evidence that rigid governance is likely to hinder KM responsiveness (Chawla & Joshi, 2011; Liao & Wu, 2009; Fugate et al., 2008). These differences emphasize that decisional autonomy and governance systems affect how knowledge processes are reconfigured as OP.

Meanwhile, OL is significantly influenced by KM, further augmenting OP, and it becomes more apparent in constituent campuses. This emphasizes the importance of embedded learning practices, cultural process, and capacity-building programs in more bureaucratic ones where direct application of KM may be constrained (Bhusal, 2023; Parajuli et al., 2022). The result follows OLT's emphasis on adaptive and generative learning as core processes for translating knowledge into effective practices (Crossan et al., 1999; Fiol & Lyles, 1985; Senge, 1991). Formal training, cross-departmental collaboration, and sharing knowledge can counteract hierarchical rigidity and hence sustain performance improvements (Devakota & Bhattarai, 2025; Meher & Mishra, 2021; Iqbal et al., 2025). As organizational settings are very formalized, OL provides the structural and cultural support that catalyses KM outcomes (Inthavong et al., 2023; Alneyadi & Cherian, 2025). In these restricted contexts, therefore, OL acts as a significant mediator in bridging the gap between KM practices and performance outcomes.

The mediation analysis displays that OL mediates partially between KM and OP, corroborating that KM is best utilized when framed in institutionalized learning cultures (García-Morales et al., 2011; Obeso et al., 2020; Andreeva & Kianto, 2011; Hui et al., 2013). This is echoed by Nepalese studies that emphasize OL as a driver making KM contribute more to innovation, service quality, and competitiveness (Parajuli, 2025; Bhandari, 2021; Maharjan, 2020). Partial, rather than full, mediation means that OL strengthens but does not substitute KM, while direct KM activities such as knowledge codification, storage, and utilization independently contribute to OP. Such findings concur with others with mixed results, where OL supports only in some contexts (Ngah et al., 2016; Rehman et al., 2019; Sahibzada et al., 2020). This is in agreement with the contention that KM and OL should be designed jointly as complementary instead of sequential sources.

These results advance the KBV by indicating knowledge integration is a strategic resource that boost OP directly and indirectly (Grant, 1996; Nonaka & Takeuchi, 1995; Spender, 1996). Similarly, findings magnify OLT as learning processes are vibrant capabilities for transforming knowledge into innovation and sustainable outcomes (Crossan et al., 1999; Fiol & Lyles, 1985). Particularly, the contingent nature of KM–OL–OP relationships: constituent campuses require strong OL mechanisms to compensate for rigidity in governance, while affiliated campuses heavily rely on KM's direct flexibility. Such contextual rationalization aligns with studies favouring structural heterogeneity and governance as key drivers of knowledge outcomes (Khanal, 2017; Adhikari, 2010; Bhusal, 2025; Gautam et al., 2024). Policy-wise, this study suggests differentiated strategies like establishing OL infrastructures such as digital repositories, training in research, and collaborative platforms within constituent campuses, while affiliated campuses must spread KM practices that benefit from their autonomy and market responsiveness. Such tailored strategies can optimize the synergistic possibilities of KM and OL towards enhancing OP across HEIs contexts.

Conclusion

This study verifies that OL and KM contribute significantly to OP in HEIs in Gandaki Province, Nepal. The direct impact of KM on OP is robust in affiliated campuses, where greater autonomy provides for easy dissemination and use of knowledge through reachable systems and freestanding networks, promoting innovation, responsiveness to stakeholder needs, and operating effectiveness. Conversely, bureaucratic inefficiencies in constituent campuses limit the adaptability of knowledge processes, resulting in weaker direct impacts on performance outcomes such as financial stability and academic excellence. OL strengthens the KM–OP connection by embedding knowledge into practices with ongoing training, reflective conversation, and experimentation, albeit more in constituent campuses where formal learning compensates for stringent governance. Partial mediation ensures that knowledge is translated into experiential strategies, enhancing pedagogy quality, operation processes, and institution resilience. The dynamic interplay of adaptive and generative learning mechanisms highlights KM's effects by developing a culture of error adjustment and innovative problem-solving, critical in environments lacking resources. The absence of significant differences among campus types, as evidenced by PLS-MGA, demonstrates the robustness of the KM–OL–OP framework with diverse governance environments, grounded in the KBV and OLT. This study concludes that to optimize OP in all dimensions, HEIs need to invest in digital platforms for frictionless knowledge transfer, cultivate an experimentation and continuous learning culture, and transform strategies to campus-specific governance, leveraging agility in affiliated campuses for rapid application of knowledge and embedding learning processes in constituent campuses to bridge structure-related boundaries.

Implications and Limitations

This study validates the applicability of the KBV and OLT in Nepalese HEIs, demonstrating that KM has a positive effect on OP directly while OL moderates this effect partially. Adaptive learning enables converting knowledge into outcomes even in constrained contexts, and autonomy of institutions enhances these effects. The study recommends investment in tech-enabled KM, human resource building, collaborative research, and participatory communication to promote innovation, research productivity, student satisfaction, and efficiency. Nonetheless, limitations include the cross-sectional study design, self-reporting, and population concentration of HEIs in Gandaki Province, confining generalizability. Exclusion of stakeholders like students and external collaborators, as well as overlooking contextual variables like technology and leadership, further constrains insights. Future research should apply longitudinal and mixed-method designs, large samples, and other variables such as leadership style, learning culture, level of autonomy, technology adaptation to be able to have fuller richness of theoretical and practical contribution of KBV and OLT in higher education.

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