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Effect of Knowledge Management on Organizational Performance: The Mediating Role of Organizational Learning in Amhara Region Agricultural Research Institute

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ABSTRACT

This paper attempted to examine how knowledge management affects organizational performance and the mediation role of organizational learning with a focus on the Amhara Region Agricultural Research Institute. That is aiming to contribute and allow managers and technical researchers to concentrate on the study's main effects. The study employed an explanatory research design. From the survey method, 216 responses were collected and analyzed using the structural equation model (SEM). Using Amos 23.0 software, confirmatory factor analysis was utilized to test the measurement model, and structural equation modeling was employed to measure the conceptualized hypotheses. The direct and indirect effects of knowledge management on organizational performance were quantified through a quantitative approach. The results demonstrate that knowledge management has a direct effect that improves the Amhara Region Agricultural Research Institute in part through organizational learning and organizational learning has also a significant direct effect on organizational performance. From the extension bootstrapped value, organizational learning has also a positively significant partial complementary mediation effect in the connection between knowledge management and organizational performance. The study has also contributed additional empirical evidence of the importance of improving organizational performance through valuable knowledge. Thus, future studies in the Amhara Region Agricultural Research Institute should adopt a knowledge management strategy and broaden competency-based management through Information Technology, looking into other likely mediating and moderating factors.

KEY WORDS

Amhara Region Agricultural Research Institute, Knowledge management, Organizational learning, Organizational performance

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1. Introduction

In today's fast-paced world, innovation plays a critical role in fostering a thriving business environment. This highlights the importance of knowledge as a key competitive resource, driving organizational performance and effectiveness (Souza et al., 2016). Knowledge management serves as the engine for advancements and innovation within organizations (Torabi & El-Den, 2017; Abebaw, 2022). This shift from the 20th century's production-based economy to the present day's knowledge economy emphasizes the crucial role of knowledge workers and their productivity (Drucker, 1994). Therefore, a key management challenge in the 21st century lies in optimizing knowledge worker productivity through effective knowledge management practices (Kokkaew et al., 2022).

This study aims to explore how knowledge management impacts organizational performance and whether organizational learning plays a mediating role. Knowledge management encompasses various approaches, from technology-driven methods to social processes, cultural shifts, and individual development strategies (Hislop et al., 2018). Ultimately, it seeks to improve competitiveness through continuous innovation (Kavalić et al., 2021). Though traditionally implemented in developed countries, knowledge management is gaining traction in developing nations, highlighting its growing global significance (Meher & Mishra, 2019). Knowledge management, according to research, promotes improved commercialization, quicker and more effective innovation, better coordination, improved adaptability to change, and higher levels of productivity, flexibility, and efficiency. (Good et al., 2001; Miković et al., 2020; Matveeva et al., 2021). Its effectiveness has been demonstrated across various sectors, including public service (Corfield et al., 2013), NGOs (Oluikpe, 2012), banking (Palte et al., 2011), and human and professional services (Ferguson et al., 2013).

Organizations are increasingly recognizing the importance of knowledge management (KM) in driving both organizational learning and overall performance. Studies have confirmed that effective KM practices significantly influence how well organizations learn and ultimately perform (Nafei, 2014; Imran et al., 2017). This is why many businesses are turning to KM as a key strategy for achieving their goals (Kokkaew et al., 2022). In simpler terms, KM helps organizations learn from their experiences and apply that knowledge to improve their effectiveness in achieving their desired outcomes (Tavana et al., 2016).

Researchers haven't quite agreed on how knowledge management (KM), organizational learning (OL), and organizational performance intertwine. Some argue that organizational learning comes first, triggering KM activities (Jain & Moreno, 2015). Others see organizational learning as a mediator, where KM practices drive learning, which then boosts performance (Liao & Wu, 2010). Still others view them as distinct yet complementary: KM builds and uses knowledge, while OL manages the learning process (Karkoulian et al., 2013; Mishra & Bhaskar, 2011). Evidence leans towards KM directly influencing performance through the lens of OL. Without active KM, companies struggle to learn individually or collectively (Su et al., 2004). Similarly, strong KM practices (KMPs) pave the way for effective OL (Ngah et al., 2016). Though the exact choreography remains debated, one thing's clear: the interplay between knowledge, learning, and performance is crucial for organizational success.

Many studies in developed nations (Good et al., 2001; Miković et al., 2020; Matveeva et al., 2021) have confirmed that knowledge management boosts organizational performance through enhanced learning (Obeso et al., 2020; Nafei, 2014). However, despite the growing investment in knowledge management, some researchers find weak evidence for its performance impact (Nafei, 2014; Jain & Moreno, 2015), especially in developing countries. Furthermore, studies exploring the mediating role of organizational learning in knowledge-based organizations of these countries are scarce (Rawashdeh et al., 2021). Notably, in developing countries, knowledge transfer, which is essential to the success of an organization, remains a major and difficult problem (Rechberg & Syed, 2013).

As for the research institute in particular the Amhara Region Agricultural Research Institute, there are no studies investigating the link between KM, OL and OP. The three constructs (KM, OL, and OP) in this study are latent variables that cannot be measured directly. On the other hand, they can also be observed through other variables that are referred to as indicators, measured variables, or simply observed variables. Consequently, the study's findings may help the Amhara Region Agricultural Research Institute, which focuses on knowledge implementation, make better use on its KM and OL in order to become more competitive in the future. This lack of research, particularly in resource-

constrained Ethiopia (Dendir, 2016; Abebaw, 2022), highlights the need for further investigation.

In aspects of organizational performance, some argue that non-financial measures better reflect an organization's long-term health, which is less susceptible to short-term fluctuations, and focus more on overall success than financial measures (Jafari et al., 2010; Kokkaew et al., 2022). While there's no one-size-fits-all approach to measuring performance, researchers like Ghalomi et al. (2013) have identified relevant dimensions by considering the organization's specific context (Hussain, 2004).

2. Objectives of the study

This paper aims to bridge conceptual and empirical gaps by addressing the following objectives:

1. Examine the effect of knowledge management on the Amhara Region Agricultural Research Institute's performance.
2. Measure the mediating effect of organizational learning in the relationship between knowledge management and the Amhara Region Agricultural Research Institute's performance.

3. Significance of the study

This study endeavors to investigate the current knowledge management practice and its effect on the Amhara Region Agricultural Research Institute (ARARI) and strategically design in managing knowledge in the organization. Hence, the ARARI management team and the technical staffs can make use of the output of the study. First, it helps to alleviate the challenges faced in the organization through transferring, creating and utilizing the knowledge to bring institution's long term performance through organizational learning. Second, the study's research merits are most advantageous to university academics. It will also offer a comprehensive foundation for future studies into the possibility of knowledge management to enhance institutional performance, given the dearth of research in the field. This is because among the first studies to investigate the antecedents and outcomes in a context of ARARI, which has never been studied.

Third, it recognizes the importance of breadth of knowledge and skills; it will contribute to knowledge by formalizing a framework that determines the required conditions to enhance the organization's performance. Finally, the study entails the theoretical, practical and managerial implications of knowledge management and organizational learning for enhancing the Amhara Region Agricultural Research Institute. It will also make room for more research in the field.

4. Study hypotheses

Hypothesis1: Knowledge management has a positive significant effect on organizational performance.

Hypothesis2: Knowledge management has a positive and significant effect on organizational learning.

Hypothesis3: Organizational learning has a positive and significant effect on organizational performance.

Hypothesis4: Organizational learning has a significant mediating effect in the link between knowledge management and organizational performance.

5. Foundation and Concepts of Knowledge management

In today's global and competitive market economy, the concept of knowledge management is relatively new in research. From a theoretical perspective, knowledge management is the standard practice for measuring organizational effectiveness universally (Pham et al., 2021). It is a management discipline that refers to the systematic acquisition, creation, storage, sharing, and use of knowledge in an organization, aiming to improve the competitiveness of enterprises through continuous and rapid innovation (Kavalić et al., 2021). One of the pioneering studies that measured the influence of knowledge management on various aspects of the performance of an organization was Gold et al. (2001), and it showed that strong knowledge management practices can lead to better performance in many areas of a company.

Knowledge management and organizational performance

Effective knowledge management (KM) is crucial for fostering firm development, competitive advantage, and enhanced productivity (Kavalić et al., 2021). Its role in organizations is vital as it facilitates the creation and efficient transfer of knowledge (Reich, Gemion, & Sauer, 2014). Recognizing this, many organizations are increasingly adopting KM practices

to achieve superior organizational performance (Kokkaew et al., 2022).

There are various dimensions of knowledge management conducted by different scholars in the past, but in this study, the researcher takes knowledge of acquisition, creation, transfer, application (Gold et al., 2001; Meher & Mishra, 2019). In most studies, knowledge management had a significant effect on organizational performance (Chopra 2020; Rawashdeh et al., 2021; Kokkaew et al., 2022). According to a study carried out by Kavalić et al., (2021), the execution of knowledge management directly impacts the enhancement of a company's performance. More so, the empirical studies were sought from a number of databases, such as Science Direct, Scopus, JStor, Springer, and Emerald Insight.

Knowledge Management and Organizational Learning

Many organizations accept knowledge management as a paradigm shift, and hence it is a new orientation. Various ways have been shown to conceptualize the relationship between knowledge management and organizational learning. King (2009) considers organizational learning to focus on the process and knowledge management to focus on the content of the knowledge that an organization acquires, creates, processes, and eventually uses. Studies argue that knowledge management practice has an effect on organizational performance through organizational learning, and knowledge seeks to be embedded in organizations to improve performance (Durst and Edvardsson, 2012). This embedding is achieved through organizational learning (Al Mulhim, 2020). For its development, knowledge management enables organizational learning through workers in order to achieve higher organizational performance (Karkoulian et al., 2013).

Moreover, knowledge management is vital to the success of organizational learning so that organizations can enhance and achieve their competitive advantage (Obeso et al., 2020). Hence, learning ability is developed through knowledge management.

Organizational Learning and organizational performance

Various studies have shown us the significance of organizational learning to business performance (Obeso et al., 2020; Mutea, 2021; Rawashdeh et al., 2021). According to them, knowledge management is an input, organizational learning is a mechanism, and performance is an output. Scientific research proposes that adopting excellent policies may lead organizations to obtain long-run supernormal profits (Liao & Wu, 2009).

Mediation of organizational learning

In light of organizational learning, studies have shown its dynamic process that integrates the applicability of knowledge management with the performance of the firm and it is a strategic means of achieving long-term organizational success (Mishra & Upadhyay, 2021). According to Mishra and Upadhyay (2021), Knowledge management, organizational learning, and organizational performance are the intrinsic, interdependent, and inseparable constructs of any organization. Moreover, in modern trends, there is a need to understand knowledge management and its influence in the context of developing countries to enhance the development of organizations' performance (Obeidat & Rabay'a, 2016). Empirical studies have depicted that there is a significant effect of organizational learning on the interaction of Knowledge management with business performance (Imran et al., 2017). To this end, knowledge management is an ingredient input, organizational learning (OL) is a leading mechanism, and organizational performance is a critical output. Thus, both knowledge management and organizational learning are strategic tools (Naz & Ayub, 2019).

Conceptual Framework

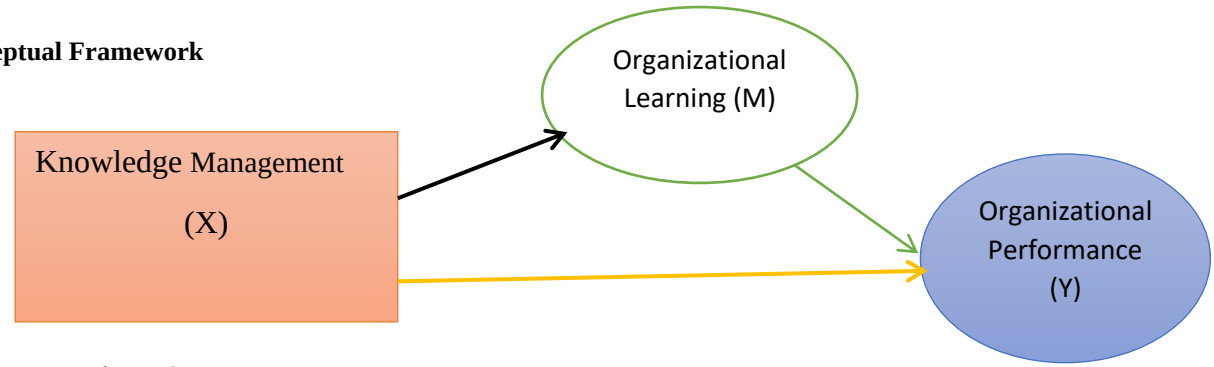


Fig. 1: *Researcher's Own construction*

Methodology

Research Design and Approach

The study employed an explanatory research design. According to George & Merkus (2023), explanatory research seeks to explain and account for descriptive information and looks for causes and reasons that provide evidence to support or refute an explanation or prediction. To explore the effect of knowledge management on organizational performance, the researcher utilized a cross-sectional quantitative research approach. A quantitative approach entails deductive reasoning, by which it establishes the theory and falls into the confirmation of reality (Bryman, 2006). The study entirely focused on the Amhara Region Agricultural Research Institute (ARARI), found in Amhara, Ethiopia. To get holistic, tangible, and reliable information by measuring the firms' performance level and the applicability of knowledge management, seven research centers were identified. This is because the professional experts working in these seven research centers are considered the representatives of the main study, and in the case area, knowledge management is considered to be implemented through the adoption and adaptation of different technologies to enhance firms' performance.

Sample Size and Sampling technique

According to Lance and Hattori (2016), the sample is a subset containing the characteristics of a larger population. It denotes the number of components from a specific sample frame that must be picked, and it must also satisfy the requirements of competence, representativeness, flexibility, and consistency (Kothari, 2004). Since the population of the study area is known, Yamane's (1967) simplified formula is executed to determine the respondents as follows:

$n = \frac{N}{1+N(e)^2}$; Where n is the required sample size, e is the error term, which is true at 0.05, and N is the total population of the study.

Thus, $n = \frac{513}{1+513(0.05)^2}$=**224**

Moreover, 10% of the technical researcher sample, i.e., 23 respondents, is added to the calculated nth value to reduce measurement errors and compensate for the unreturned questionnaires. Thus, the total sample size is 247 respondents, and the techniques used for this study are simple random sampling.

Data source and Collection tools

To conduct the study, the researcher utilized primary sources of data collection. The data was collected using structured survey questions because a questionnaire is considered a key tool for collecting data and is widely used in social research (Kothari, 1985; Bird, 2009). Each statement was rated on a five-point (1 to 5) Likert scale; with high scores approached to 5 indicating strongly agree with that statement. The reliability of the questionnaires for this study was evaluated by Cronbach's alpha, which measures the internal consistency of all constructs. Most researchers use 0.70 as a threshold acceptable level of coefficient Alpha. Based on that, knowledge management comprises four dimensions, and the scale developed by Gold, Malhotra, and Segars (2001) was used to measure them. For organizational learning, the scale developed by Jerez-Gomez et al. (2005) was employed. Finally, the dependent variable organizational performance, non-financial aspects, the scale developed by Dyer & Reeves (1995); Leei et al. (2005); Wiklund and Shepherd (2003); and Maltz, Shenhar, and Reilly (2003) were employed to measure.

Data Analysis Technique

Past researchers used different methods to analyze data depending on its nature, the research question(s), and many other factors (Marshall & Rossman, 2014). As long as the variables of these three constructs displayed the direct and indirect effects of the theorized and hypothesized model, the researcher utilized structural equation modeling.

This study examines the influence of knowledge management on organizational performance via organizational learning in the Amhara Region Agricultural Research Institute using a partial disaggregation approach for SEM, as suggested by Bagozzi and Heatherington (1994). SEM is one of the most valuable models to depict the causal link between various observed variables aiming to provide a quantitative test (Shumacker, Lomax, 2010). Moreover, SEM displays the hypothesized sets of constructs in various studies and how the items explain the constructs. The observed variables in knowledge management in this case are four (i.e. acquisition, creation, transfer, and application), organizational performance comprises in aspects of four observed variables productivity, service giving, the human development and research and development and the organizational learning comprises of managerial commitment, system

perspective and openness. To this end, CFA employed to insure the factor structure of observed variables and SEM is used to test the four hypotheses *(i.e., H_1, H_2, H_3 and H_4)*.

Measurement Constructs

Principal component factor analysis, and KMO and Bartlett's were employed to cross-check whether the items were adequately sufficient or not. In addition, confirmatory factor analysis (CFA) was performed to validate the measurement constructs in aspects of validity, reliability, and variable uni-dimensionality. Thus, items with factor loadings above 0.5 are considered for the analysis. Hence, 27 items for knowledge management, 14 items for organizational learning, and 15 items for organizational performance were employed. The threshold to judge the significance of factor loading values of 0.50 and above was developed by Ten Berge (1996).

Results and Discussion

For the study, 247 questionnaires were distributed to the professional experts of ARARI, and the respondents were given a substantial time frame from July 4, 2023, to the end of August 2023. Among the distributed data, 216 were returned which indicates an outstanding response rate of 87%. As presented in Table 1, the mean, standard deviation, skewness and kurtosis, and correlation among the three main variables were articulated: knowledge management and its proxies, the mediating variable organizational learning, and the endogenous variable organizational performance. In light of that, the independent variable knowledge management accounts for the mean score value of 3.75, standard deviation. = 0.607; the mediating variable, organizational learning, makes up the mean score value of 3.94, standard deviation =0.583; and the endogenous variable, organizational performance, is represented by the mean value of 3.81, standard deviation. = 0.633. Zaidaton & Bagheri (2009) state that a mean score of less than 3.39 was deemed low, a mean score of 3.40 to 3.79 was deemed moderate, and a mean score of more than 3.8 was deemed high, as shown in Table 1. Thus, the study's mean value for the KM process was moderate, whereas the mean values of the OL and OP were deemed high. The implication is that there is a startup knowledge applicability of the Amhara Region Agricultural Research Institute to enhance the entire performance. In each pair of constructs, the Pearson correlation coefficient was used to compute all pairs of variables. For this case, KM-OP, KM-OL, and OL-OP, respectively, were positively correlated with the values of $r = 0.668$, $p<0.05$; $r = 0.661$, $p<0.05$; and $r = 0.737$, $p< 0.05$. (See Table 1)

Table 1 Mean, standard deviation, skewness, kurtosis, and correlation coefficients (N=216)

	Mean	SD	Skewness	Kurtosis	KMgt	OL	OP
KMgt	3.75	.607	-1.044	.915	1.00		
OL	3.94	. 583	-1.068	1.834	.661**	1.00	
OP	3.81	.633	-.762	.463	.668**	.737**	1.00

***Source**: Own Survey (2023)* KMgt=knowledge management, OL=organizational learning, OP=organizational performance

Exploratory Factor Analysis

The validity of constructs and their measurement were tested by running factor analysis (principle component analysis and exploratory factor analysis) with the help of SPSS version 25.0. In this instance, the principal axis factoring extraction method with a varimax rotation was used to define whether the questionnaire items represent the defined model. Goursand et al. (2013) and Shrestha (2021) stated that factor analysis requires a minimum of commonalities to retain items in the scale after extraction, with a cut-off point of 0.4. This performs the principal factor analysis to determine whether items measure the construct or not.

Table 2 Summary of exploratory factor analysis results to examine Sample Adequacy

Tests	Knowledge management	Organizational learning	Organizational performance
KMO	0.929	0.866	0.878
Bartlett's test chi-square	1411.433	950.469	662.605
Df	136	55	36
Significance	.000	.000	.000

***Source**: Own Survey (2023)*

In Table 2, the Kaiser-Meyer-Olkin sampling adequacy value was 0.929, 0.866, and 0.878 for knowledge management, organizational learning, and organizational performance, respectively, i.e., higher than the minimum threshold value of 0.70. The KMO values of 0.8 to 1.0 confirm the sample is adequate to make further analysis (Guttman, 1954). This implies that each one of the latent variables was explained by a sufficient number of items. Moreover, when the researcher tests the results of KMO and Bartlett's, it is observed that the data from the questionnaire were conducive to confirmatory factor analysis. Finally, a confirmatory factor analysis was also made. Based on that, twelve items from knowledge management, five items from organizational learning, and seven items from organizational performance were reduced. Therefore, in the confirmatory factor analysis, the remaining 32 items were employed.

Measurement model result

Table 3 Construct Validity and Reliability (N=216)

Knowledge Management				**Organizational Learning**				**Organizational Performance**			
Items	**Loading**	***α-value***	**CR**	**Items**	**Loading**	***α-value***	**CR**	**Items**	**Loading**	***α- value***	**CR**
KAc1	0.623***			MC4	0.596***			Pr3	0.612***		
KAc2	0.537***	**0.904**	**0.904**	SP3	0.698***	**0.870**	**0.862**	Pr4	0.680***	**0.852**	**0.850**
KAc3	0.626***			SP4	0.738***			Pr5	0.713***		
KAc4	0.732 ***			SP5	0.746***			pr6	0.720***		
KAc5	0.648 ***			OPe1	0.591***			Se1	0.619***		
KC2	0.661***			OPe2	0.609***			Se2	0.595***		
KC3	0.726***			OPe3	0.623***			Se3	0.582***		
KC4	0.632***			OPe4	0.548***			HD1	0.631***		
KC6	0.615***			OPe5	0.602***						
KC7	0.639***										
KC8	0.578***										
KC9	0.629***										
KT1	0.514***										

KAp4	0.534***
KAp5	0.607***

Note: *** $p < 0.001$.

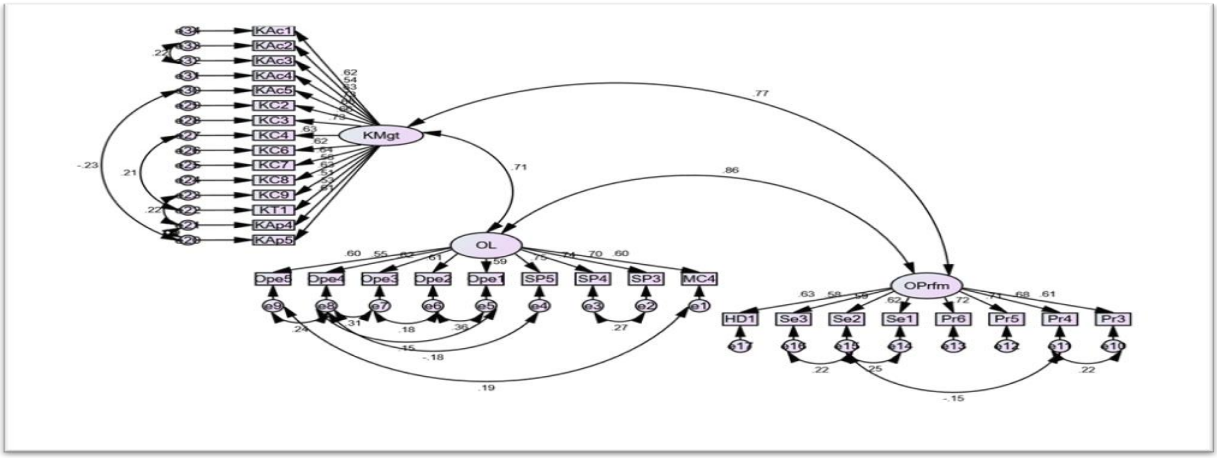
***Source**: Own Survey (2023)*

The most often used metrics for internal consistency are Cronbach's alpha and composite reliability, which measures reliability based on the interactions of the observed item variables. In this study, Cronbach's alpha and composite reliability were extracted since they are the true measurement of internal consistency (Nunnally and Bernstein, 1994; Netemeyer, 2003); factor loading, composite reliability (CR) and AVE were calculated to determine convergent validity (Hair et al., 2014). As displayed in Table 3, the internal reliability depicts the consistency of the data across tests. As suggested by Hajjar (2018), reliability is a technique that portrays the relationships of factors in a test with other factors. As declared by Sideridis et al. (2018) and Nunnally and Bernstein (1994), the recommended value for measuring internal consistency using Cronbach's alpha is equal to or greater than 0.70. As shown in Table 3, the Cronbach's alpha values of all the constructs were greater than the threshold value of 0.70. In the case of CR, the recommended value is at least 0.70. A value of CR ≥ 0.7 is required to achieve construct reliability (Hair et al., 2017; Tentama & Anindita, 2020). Thus, the CR value of each construct was within the range of 0.850 and 0.904, which were higher than the recommended threshold value of 0.70 suggested by Nunnally et al. (1967). This indicated that the shared variance among the observed variables was used as an indicator of the latent construct. (Knowledge management affects organizational performance via organizational learning and would be examined using identical methods, procedures, and data types).

Concerning validity, the constructs of convergent validity and discriminant validity were tested. Fornell and Larcker (1981) state that the construct's convergent validity is adequate if the average variance extracted (AVE)≥ 0.50 or if the AVE is less than 0.5 and the composite reliability is greater than 0.6. In this case, the value of composite reliability is above 0.6. Therefore, the finding meets the minimum value to satisfy convergent validity (See Table 3). Finally, discriminant validity was tested. It evaluates the degree of correlation between two variables Gallagher, Ting and Palmer (2008). A correlation coefficient for each pair of constructs of 0.85 or lower is a cut-off for testing discriminant validity (Kline, 2015). All except one pairs of the construct had a correlation coefficient below 0.85, whereas one pair of the construct (organizational learning and organizational performance) had a correlation coefficient of 0.86, which is higher than the threshold (See Fig. 2). Kaline, (2015) pointed out that a result greater than 0.85 suggests that the two constructs may overlap and discriminant validity between the two constructs can't be claimed. Therefore, discriminant validity is fulfilled.

CFA to measure Discriminant validity

Fig. 2 CFA Model



Confirmatory factor analysis Result

Table 4 Model fit indices (N=216)

Fit Index	Score	Recommended Value
Absolute fit index		
X^{2}/df	**1.408**	**<3**
Incremental fit measures		
CFI	**0.938**	**≥0.90**
TLI	**0.931**	**≥0.90**
Other measures		
GFI	**0.852**	**≥0.85**
RMSEA	**0.044**	**≤0.08**
PCLOSE	**0.912**	**≥0.05**

***Source**: Own Survey (2023);* Byrne, Hair et al., Bagozzi and Yi, Bentler, Schumacker and Lomax; Hu and Bentler (1999); Gaskin and Lim, (2016)

As shown in Table 4, the lowest X^{2}/df means there is a little difference between what was observed and what would be expected. Among the above tools of model fit, the foremost significant measure of model fit is *CFI*, with the recommended value which is equal to or is greater than 0.90 (Baumgartner and Hombur, 1996).

Moreover, the hypothesized model *RMSEA* is 0.05, with a 95% confidence interval for the test of closeness. One of the advantages of the *RMSEA* is that its capability to estimate a confidence interval that is close to its value (MacCallum et al., 1996). The values of these indices are presented in Table 4, and it can be displayed that they fall in the recommended range, providing the appropriate model fit and a high level of precision. It can be concluded that the model that was initially proposed fits the data well.

Model Comparison

Table 5 Results of Model Comparisons

Structural model	$\chi 2$	**Df**	**Δ** $\chi 2$	**GFI**	**TLI**	**CFI**	**RMSEA**
Hypothesized model-Full	625.347	444	-	0.852	0.931	0.938	0.044(***)
Alternative mode_1: Direct effect only	640.299	446	14.952	0.848	0.927	0.934	0.045(***)
Alternative model_2: Mediation only	650.955	445	10.656	0.847	0.922	0.930	0.046(***)

All models are compared to the hypothesized model, ***p<0.001

***Source**: Own Survey (2023)*

Apart from the general goodness of fit test, the researcher oversees the model's robustness; the hypothesized full model was compared with two alternative models. In light of that, the first alternative model-1 infers the direct effect model that has shown little difference from the original (full model), and this was made by setting zero in the indirect relationship between knowledge

management and organizational performance through organizational learning. Thus, the result of the descriptive fit indices has slight differences, i.e., GFI = 0.004, TLI = 0.004, CFI = 0.004; it shows us a comparative low fit ($\Delta\chi2$ =14.952, Δdf = 1) as the criteria of fit indices displayed in Table 5. The second comparison of the models goes to the mediation-only model (alternative model-2). In this case, the indirect effect, i.e., knowledge management, on organizational performance through organizational learning was tested while controlling other relationships. Based on that, the significance difference obtained from the descriptive fit indices (GFI = 0.001, TLI = 0.005, CFI = 0.004, and the value of RMSEA = 0.044) is simultaneously decreased. Because the model was found to be less accurate than the original as well as the alternative model 1 ($\Delta\chi2$=10.656, Δdf=2). Hence, from the result of the analysis, it is observed that the original (full) model is worth fit indices and comparably good fit, and it is more parsimonious than the two alternative models shown in Table 5.

When we come across the overall results of the structural model analysis shown in Table 5, the structural model is well fitted in that the chi-square index value was lower than 3 (CMIN/DF = 1.408) with a p-value of 0.000, and the rest of the fit indices (GFI = 0.852; TLI = 0.931; CFI = 0.938; RMSEA (CLOSE) =0.044 (***)) can be utilized to determine the model fitness. Therefore, all the model fit indices are above the required level in that the structural model has an acceptable goodness of fit (GoF) to the sample (Byrne, 2010; Bagozzi & Yi, 1988; Bentler, 1990).

Structural model: Hypothesis testing

Table 6: SEM analysis results

Hypotheses	Relationship	Anticipated impact	Standardized. Regression Weight	P-value	Decision
H1	KM →OP	Positive	0.32***	P<0.001	Supported
H2	KM →OL	Positive	0.71***	P<0.001	Supported
H3	OL→OP	Positive	0.64***	P<0.001	Supported

*** For significance at p<0.001

Table 7 Mediation Effect

H4	Directwithout mediation	Directß mediation	Indirectß	P-Value	Bootstrapped Indirect Effect		Mediation type
					BootLLCI	*BootULCI*	
KMgt→OL→OP	ß =0.71***	ß =0.64	ß =0.454	0.001	0.2267	*0.*4755	Partial mediation

*(p<0.001)

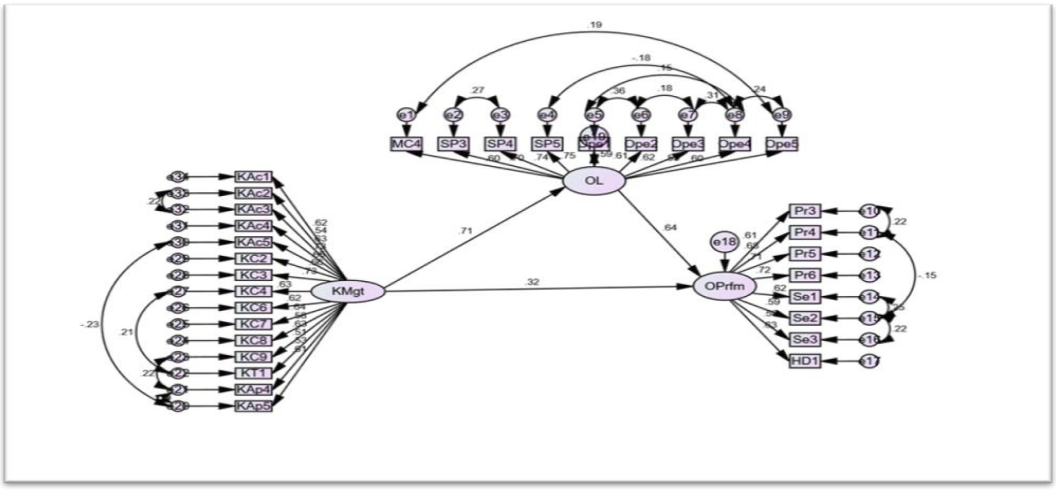
***Source**: Own Survey (2023)*

The standardized direct beta between knowledge management and organizational learning is 0.71***, while the standardized beta between organizational learning and organizational performance is 0.64 (Table 6 and Fig. 3). The maximum likelihood technique and bootstrapping were executed to build up the model (Byrne, 2010). In this case, bootstrapping permits showing the correlation between non-normal data and can enhance the statistical power for investigating the mediation effect (Wood, Goodman, Beckmann, & Cook, 2008). Therefore, the researcher has investigated and decided on the type of mediation that has been tested and obtained through the running matrix procedure of Preacher and Hayes (2008) to determine the mediation effect of organizational learning.

According to Baron and Kenny (1986), there should be only one requirement to prove mediation: that the indirect effect a*b is significant, and the strength of mediation should be measured by the size of the indirect effect, not by others and b must be significant to claim mediation. In this instance, the researcher has bootstrapped results for indirect effects from the output window, and the 95% confidence interval value falls in between (BootLLCI=0.2267 and BootULCI=*0.*4755) (See Table 7). Hence, if the confidence interval does not include 0, the indirect effect a*b is significant, and thus, mediation is established. According to Preacher and Hayes (2008), if a*b is significant, and c is significant it takes the left side of the mediation type, in which case there is a mediation effect. To this end, in all three cases on the left the data support the hypothesized mediation story.

Thus, the results of the mediation effect (a*b) and direct effect (c) both exist and point in the same direction, which has a complementary partial mediation effect. For this reason, the product of the two is ß =0.454 (0.71*0.64, p< 0.001). This indicates that organizational learning has a partial complementary mediation effect between knowledge management and organizational performance in the study area.

Fig. 3 Path diagram of the conceptualized model



Findings

The structural model fit assessment was carried out to measure whether the given data support the estimated relationships in the conceptualization model. As shown in the result indicated in Fig. 3, the independent variable knowledge management explains 71% of the variance in the mediating variable organizational learning; 32% of the variance of knowledge management can explain organizational performance; and organizational learning also explains 64% of the variance in the dependent variable organizational performance. All three aspects of the model fit assessment are verified the hypothesized model. As a result, the usual estimation of maximum likelihood was employed to test the covariance matrix, which is an important instrument for confirmatory factor analysis and path analysis. The results of the confirmatory factor analysis demonstrated with the C.R. A value greater than 1.96 implies that the association between each factor and the indicated variable is significant. Thus, these items can conveniently explain the variables under consideration.

The study immensely investigates the effect of knowledge management on organizational performance and whether organizational learning mediates the relationship between knowledge management and organizational performance. In this study, knowledge management has a positive and significant direct effect on organizational performance. According to the study, the regression weight is ß =0.32(p< 0.001). This finding is supported by Payal, Ahmed, & Debnath (2019); Mahdi, Nassar, & Almsafir (2019); Fitria (2020); Jemal, & Zewdie, (2021) and Kokkaew et al., (2022). From these, knowledge of creation and knowledge acquisition had the highest coefficient scores, followed by and knowledge application, whereas

knowledge transfer had the least coefficient values to predict organizational performance. (See Fig. 3). To explain more, knowledge transfer in this study hasn't also given more emphasis on providing the required knowledge to the end users, i.e., farmers. This has to be the major problem that hinders the total performance of the institution. Managers and their followers who implement knowledge management processes and infrastructural aspects in their organizations can have worthwhile performance (Obeso et al., 2020).

Knowledge management also has a strong positive and significant effect on organizational learning. According to these findings, the regression weight is (ß =0.71; p<0.001). Thus, the results displayed that knowledge management has a positive direct impact on both organizational learning and organizational performance, and this finding is consistent with the work of Liao, Wu (2009), Obeso et al. (2020), Mehmood, Ahmad & Saeed (2021), and Rawashdeh et al. (2021). Regarding the results of the mediating effect of organizational learning between knowledge management and organizational performance, the study has shown us there was a complementary mediating effect, i.e., consistent with the research work of Nafei (2014), Obeso et al. (2020), and Rawashdeh et al. (2021).

In light of organizational learning, the study portrayed that there is a strong positive and significant effect on organizational performance. According to these findings, the regression weight is (ß =0.64; p<0.001). This has therefore, supported by the findings of Zhu, Liu & Wang, (2019); Obeso et al. (2020) and Rawashdeh et al. (2021).

The pillar point here is that knowledge management has the strongest impact on organizational learning, by which organizational learning has theoretically been the bridge that integrates knowledge management and organization's performance; thus, organizational learning has a complementary mediation effect between them. This significant investigation was obtained by using the indirect beta value of the Andrews and Hayes extensions bootstrap, i.e., the path passing through organizational learning ß = 0.454 (0.71* 0.64). Moreover, the finding is in line with the previous studies in that they showed us the direct mediation role of organizational learning between knowledge management and organizational performance. Therefore, knowledge management has both a direct and indirect effect on organizational performance.

CONCLUSION AND RECOMMENDATIONS

Conclusion

Knowledge plays the most significant role whenever dynamism, innovation, and growth are being pursued in a complex and competitive way. Theories in the past and empirical evidence pointed out that, there existed a positive and significant relationship between knowledge management and organizational performance, knowledge management and organizational learning, and organizational learning and organizational performance. However, these theories have never been tested at the Amhara Region Agricultural Research Institute (ARARI). From the findings, knowledge acquisition, creation, and application are found to be the most crucial indicators of knowledge management that can enhance the performance of the organization for the long run. From the organizational learning aspects, system perspective is the critical component followed by openness since the highest loading values commonly observed in the analysis. From the findings of the study, it is concluded that the institution is still in the infant stage of storing and transferring knowledge digitally. Moreover, from the result of the analysis, it is observed that the original (full) model is worth fit indices and comparably good fit, and it is more valid than the two alternative models since its $\chi 2$ (chi-square) value is the least.

In the study, the direct effects of knowledge management on organization's performance as well as the impact of organizational learning on endogenous variables were examined. Methodologically, knowledge management has been grasped in different aspects to predict organization's performance, but the researcher executed the most comprehensive measures, i.e., knowledge management process capabilities. Furthermore, the finding of study revealed that four of the hypotheses, i.e., the direct relationship between knowledge management and organizational performance, the effect of knowledge management on organizational learning, the relationship between organizational learning and organizational performance, and the indirect effect (the mediating role of organizational learning in the link between knowledge management and organizational performance), were found to be accepted. In addition, managers need to acquire more knowledge to generate greater organizational performance because it is confirmed that knowledge processes capabilities are the main contributors to organizational learning and the better performance of

the organization. Finally, the integration of knowledge management and organizational learning contributes to the institution's performance aspects, particularly service delivery, productivity, and human development. This research provides managers with valuable insights into the organization's overall competitive advantage and knowledge application. The findings of the study also contribute additional empirical evidence for the betterment of organizational performance through knowledge management and organizational learning.

Recommendations

- The Amhara Region Agricultural Research Institute along with Agricultural Transformation Agency should develop policies that can help to enhance knowledge sharing among experts and increase the applications of knowledge to better meet the objectives of the research institute through launching digital data management system: retrieving information, retaining knowledge, and aligning its applicability with other policies.
- The managers and technical staff in this case worked tirelessly to innovate the institution and offer fast-based services to end users or farmers. This is because the application of knowledge practices as a research institute is essential to the institution's overall performance and can foster and support positive word-of-mouth in the knowledge-intensive field.
- In order to effectively disseminate the knowledge transferability of the institution over time, technical staff must manage and supply accurate information using sufficient knowledge management techniques and pertinent images.
- To substantiate the study more, future studies have better to envisage throughout Ethiopia by incorporating all employees of the institution in all agricultural research sub-centers.
- We suggest that future investigations address the task of augmenting the magnitude of the sample and the number of variables to attain a more comprehensive understanding of the managers and staff members affiliated with the establishment.
- Public organizations in developing countries should take full advantage of the knowledge management concept to maximize the effectiveness of their service.
- The study has also endorsed academic corners, paying more attention to training, seminars, and information sharing by the state to improve the practical implementation of knowledge and learning in the organization.
- The study advocates that the institute should work more to ensure knowledge management practice through the effective commitment of the managers. Moreover, the institute tends to create a knowledge-based system that results in improved overall performance by encouraging a culture of knowledge sharing, developing the necessary procedures, and paying managers and experts the attention they deserve.
- Potential researcher may find some other significant mediating and moderating variables: such as employee engagement, commitment, and others are required to integrate knowledge management and organizational performance to better awareness of the indirect and interaction effects.
- Thus, it is suggested that the Amhara Region Agricultural Research Institute employ strategically enablers of performance since it needs to improve its research and development activities more than ever before.

Limitation of the study

Despite the significant effort to highlight the importance of this investigation, similar to previous studies, this examination also does not escape certain limitations that require attention in future research endeavors. First a study is a one-time cross-sectional data which doesn't show the intervention of the institution's performance in the long run. Second, the study solely focuses on the managers and technical staffs. This leads to a bias in the study endeavor. Third, the research has a limited scope as the data for the study has been collected only from the Amhara Region Agricultural Research Institute; this adversely affects the generalizability of the study. Fourth, only four variables, namely knowledge acquisition (KAqu), knowledge creation (KC), knowledge transfer (KTr), and knowledge application (KApl) and from the organizational learning aspect: managerial commitment (MC), System perspective (Sp), and openness (Ope) have been examined to determine the effect/ mediating of these variables on the institution's performance. Future researchers

would therefore be better off pursuing the study in one of the previously mentioned future research directions, considering these limitations.

Data Availability: Upon reasonable request, the corresponding author will present the datasets used in the current study available.

Author contributions: The corresponding author collected the data in collaboration with the enumerators, and devote in all the analysis of the study. In the final approval of the manuscript stage, both the second and the third authors gave critical comments and editing for the most recent version.

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REFERENCES

Abebaw, S. (2022). The Effect of Knowledge Management Practice On Organizational Performance: A Case Study on Commercial Bank Of Ethiopia, Bahir Dar City Branches (Doctoral dissertation).

AlMulhim, A. (2020). The effect of tacit knowledge and organizational learning on financial performance in service industry. *Management Science Letters*, *10*(10), 2211-2220.

Bagozzi, R. P., & Yi, Y. (1988). On the evaluation of structural equation models. *Journal of the academy of marketing science*, *16*, 74-94.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. Journal of personality and social psychology, 51(6), 1173.

Baumgartner, H., & Homburg, C. (1996). Applications of structural equation modeling in marketing and consumer research: A review. *International journal of Research in Marketing*, *13*(2), 139-161.

Bentler, P. M. (1990). Comparative fit indexes in structural models. Psychological bulletin, 107(2), 238.

Bird, D. K. (2009). The use of questionnaires for acquiring information on public perception of natural hazards and risk mitigation–a review of current knowledge and practice. *Natural hazards and earth system sciences*, *9*(4), 1307-1325.

Bryman, A. (2006). Integrating Quantitative and Qualitative Research: How Is It Done? Qualitative Research, 6, 97-113.

Byrne BM (2010) Structural equation modeling using amos: basic concepts, applications, and programming. Taylor and Francis Group, New York.

Corfield, A., Paton, R., & Little, S. (2013). Does knowledge management work in NGOs? A longitudinal study. *International Journal of Public Administration*, *36*(3), 179-188.

Dendir, S. (2016). An online premium? Characteristics and performance of online versus face-to-face students in Principles of Microeconomics. *Journal of Education for Business*, *91*(2), 59-68.

Drucker, P. (1994). Managing challenges for 21st century. New York: HarperCollins Publishers.

Durst, S., & Runar Edvardsson, I. (2012). Knowledge management in SMEs: a literature review. *Journal of knowledge management*, *16*(6), 879-903.

Dyer, Lee; Reeves, Todd (1995). Human resource strategies and firm performance: what do we know and where do we need to go? The International Journal of Human Resource Management, 6(3), 656–670.

Fitria, A. (2020). The Effect of Knowledge Management Ability on Organizational Performance with Organizational Trust as A Mediation Variables. *Management Analysis Journal*, *9*(4), 383-391.

Fornell, C., and Larcker, D.F., (1981). "Evaluating structural equation models with unobservable variables and measurement error." Journal of Marketing Research, 18(1), 39-50.

Gaskin, J., & Lim, J. (2016). Model fit measures. Gaskination's StatWiki, 37(3), 814-822.

George, T. & Merkus, J. (2023). Explanatory Research | Definition, Guide, & Examples. https://www.scribbr.com/methodology/explanatory-research/

Gold, A. H., Malhotra, A., & Segars, A. H. (2001). Knowledge management: An organizational capabilities perspective. *Journal of management information systems*, *18*(1), 185-214.

Goursand, D., Ferreira, M. C., Pordeus, I. A., Mingoti, S. A., Veiga, R. T., & Paiva, S. M. (2013). Development of a short form of the Brazilian Parental-Caregiver Perceptions Questionnaire using exploratory and confirmatory factor analysis. *Quality of life research*, *22*, 393-402.

Gupta, V., & Chopra, M. (2018). Gauging the impact of knowledge management practices on organizational performance–a balanced scorecard perspective. *VINE Journal of Information and Knowledge Management Systems*.

Guttman, L. (1954). Some necessary conditions for common-factor analysis. *Psychometrika*, *19*(2), 149-161.

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM) (p. 165). Sage.

Hair, J., Hult G.T.M., Ringle, C., Sarstedt, M., (2014). A primer on partial least squares structural equation modeling (PLS-SEM), Sage publications, Los Angeles.

Hair FJ, Black CW, Babin BJ, Anderson ER (2010). Multivariate data analysis. 7th ed.New Jersey, the united states practice Hall.

Hajjar, S. T. (2018). Statistical analysis: Internal-consistency reliability and construct validity. *International Journal of Quantitative and Qualitative Research Methods*, *6*(1), 27-38.

Hislop, D., Bosua, R., & Helms, R. (2018). *Knowledge management in organizations: A critical introduction*. Oxford university press.

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural equation modeling: a multidisciplinary journal, 6(1), 1-55.

Hussain, F., Lucas, C., & Ali, M. (2004). Managing knowledge effectively. *Journal of Knowledge Management Practice*, *5*(1), 1-12.

Imran, M. K., Ilyas, M., & Fatima, T. (2017). Achieving organizational performance through knowledge management capabilities: Mediating role of organizational learning. *Pakistan Journal of Commerce and Social Sciences (PJCSS)*, *11*(1), 106-125.

Ittner, C. D., & Larcker, D. F. (1998). Are nonfinancial measures leading indicators of financial performance? An analysis of customer satisfaction. *Journal of accounting research*, *36*, 1-35.

Jafari, M., Rezaeenour, J., Akhavan, P., & Fesharaki, M. N. (2010). Strategic knowledge management in aerospace industries: a case study. *Aircraft Engineering and Aerospace Technology*.

Jain, A. K., & Moreno, A. (2015). Organizational learning, knowledge management practices and firm's performance: an empirical study of a heavy engineering firm in India. *The Learning Organization*, *22*(1), 14-39.

Jemal, S., & Zewdie, S. (2021). Role of knowledge management on organizational performance, case of Jimma University in Ethiopia. *Journal of International Business and Management*, *4*(5), 1-18.

Jerez-Gomez, P., Céspedes-Lorente, J., & Valle-Cabrera, R. (2005). Organizational learning capability: a proposal of measurement. *Journal of business research*, *58*(6), 715-725.

Karkoulian, S., Canaan Messarra, L., & McCarthy, R. (2013). The intriguing art of knowledge management and its relation to learning organizations. *Journal of Knowledge Management*, *17*(4), 511-526.

Kavalić, M., Nikolić, M., Stanisavljev, S., Đorđević, D., Pečujlija, M., & Stojanović, E. T. (2021). Knowledge management and financial performance in transitional economies: the case of Serbian enterprises. *Journal of Business Economics and Management*, *22*(6), 1436-1455.

Kokkaew, N., Jokkaw, N., Peansupap, V., & Wipulanusat, W. (2022). Impacts of human resource management and knowledge management on non-financial organizational performance: Evidence of Thai infrastructure construction firms. *Ain Shams Engineering Journal*, *13*(6), 101750.

Kothari, C. R. (2004). *Research methodology: Methods and techniques*. New Age International.

Lance, P., & Hattori, A. (2016). Sampling and evaluation. *Web: MEASURE Evaluation*, *6*(8), 62-64.

Lee, K. C., Lee, S., & Kang, I. W. (2005). KMPI: measuring knowledge management performance. Information & Management, 42, 469–482.

Liao, S. H., & Wu, C. C. (2010). System perspective of knowledge management, organizational learning, and organizational innovation. *Expert systems with Applications*, *37*(2), 1096-1103.

Liao, S. H., & Wu, C. C. (2009, December). Knowledge management and innovation: The mediating effects of organizational learning. In *2009 IEEE International Conference on Industrial Engineering and Engineering Management* (pp. 1850-1854). IEEE.

MacCallum, R. C., Browne, M. W., & Sugawara, H. M. (1996). Power analysis and determination of sample size for covariance structure modeling. *Psychological methods*, *1*(2), 130.

Mahdi, O. R., Nassar, I. A., & Almsafir, M. K. (2019). Knowledge management processes and sustainable competitive advantage: An empirical examination in private universities. *Journal of Business Research*, *94*, 320-334.

Mahembe, B., Engelbrecht, A. S., & De Kock, F. S. (2013). A confirmatory factor analytic study of a self-leadership measure in South Africa. *SA Journal of Human Resource Management*, *11*(1), 1-10.

Maltz, A. C., Shenhar, A. J., & Reilly, R. R. (2003). Beyond the balanced scorecard:: Refining the search for organizational success measures. *Long range planning*, *36*(2), 187-204.

Marshall, C., & Rossman, G. B. (2014). *Designing qualitative research*. Sage publications.

Matveeva, N., Sterligov, I., & Yudkevich, M. (2021). The effect of Russian University Excellence Initiative on publications and collaboration patterns. *Journal of Informetrics*, *15*(1), 101110.

Meher, J. R., & Mishra, R. K. (2019). Assessing the influence of knowledge management practices on organizational performance: an ISM approach. *VINE Journal of Information and Knowledge Management Systems*.

Mehmood, N. N., Ahmad, I. I., & Saeed, S. S. (2021). THE EFFECT OF KNOWLEDGE MANAGEMENT INFRASTRUCTURE AND CAPABILITIES ON ORGANIZATIONAL LEARNING IN PAKISTAN. *Journal of Contemporary Studies*, *10*(1), 82-102.

Miković, R., Petrović, D., Mihić, M., Obradović, V., & Todorović, M. (2020). The integration of social capital and knowledge management–The key challenge for international development and cooperation projects of nonprofit organizations. *International Journal of Project Management*, *38*(8), 515-533.

Mishra, A. K., & Upadhyay, R. K. (2021). Effect of organisational learning and knowledge management on organisational performance in HEI, India. *International Journal of Knowledge and Learning*, *14*(2), 101-120.

Mishra, B., & Uday Bhaskar, A. (2011). Knowledge management process in two learning organisations. *Journal of Knowledge Management*, *15*(2), 344-359.

Nafei, W. A. (2014). Assessing employee attitudes towards organizational commitment and change: The case of King Faisal Hospital in Al-Taif Governorate, Kingdom of Saudi Arabia. *J. Mgmt. & Sustainability*, *4*, 204.

Naz, A., & Ayub, M. U. H. A. (2019). Assessing the Role of Knowledge Management in Organizational Performance through Organizational Learning. *Orient Research Journal of Social Sciences (ORJSS)*, *4*(1).

Netemeyer, R.G., Bearden, W.O. and Sharma, S., (2003). Scaling procedures: Issues and applications, Sage Publications, Thousand Oaks, Calif.

Ngah, R., Tai, T., & Bontis, N. (2016). Knowledge management capabilities and organizational performance in roads and transport authority of Dubai: The mediating role of learning organization. *Knowledge and Process Management*, *23*(3), 184-193.

Nunnally J. and Bernstein IH. (1994.). The assessment of reliability. Psychometric Theory: 3:248-92.

Obeidat, S. M., & Rabay'a, S. (2016). The impact of knowledge management dimensions in the learning organiza-tion from the perspective of the Arab American University's (AAU) faculty–Palestine. *Jordan Journal of Business Administration*, *12*(4), 813-840.

Obeso, M., Hernández-Linares, R., López-Fernández, M. C., & Serrano-Bedia, A. M. (2020). Knowledge management processes and organizational performance: the mediating role of organizational learning. *Journal of Knowledge Management*.

Oluikpe, P. (2012). Developing a corporate knowledge management strategy. *Journal of knowledge management*, *16*(6), 862-878.

Palte, R., Hertlein, M., Smolnik, S., & Riempp, G. (2011). The effects of a KM strategy on KM performance in professional services firms. *International Journal of Knowledge Management (IJKM)*, *7*(1), 16-34.

Payal, R., Ahmed, S., & Debnath, R. M. (2019). Impact of knowledge management on organizational performance: An application of structural equation modeling. *VINE Journal of Information and Knowledge Management Systems*, *49*(4), 510-530.

Pham, N. T., Do, A. D., Nguyen, Q. V., Ta, V. L., Dao, T. T. B., Ha, D. L., & Hoang, X. T. (2021). Research on knowledge management models at universities using fuzzy analytic hierarchy process (FAHP). *Sustainability*, *13*(2), 809.

Preacher and Andrew F. Hayes, (2008). "Asymptotic and Resampling Strategies for Assessing and Comparing Indirect Effect in Multiple Mediator Models," Behavior Research Methods, 40 (3), 879-91.

Rawashdeh, A. M., Almasarweh, M. S., Alhyasat, E. B., & Rawashdeh, O. M. (2021). The relationship between the quality knowledge management and organizational performance via the mediating role of organizational learning. *International Journal for Quality Research*, *15*(2), 373.

Rechberg, I., & Syed, J. (2013). Ethical issues in knowledge management: conflict of knowledge ownership. *Journal of Knowledge Management*.

Reich, B. H., Gemino, A., & Sauer, C. (2014). How knowledge management impacts performance in projects: An empirical study. *International Journal of Project Management*, *32*(4), 590-602.

Shrestha, N. (2021). Factor analysis as a tool for survey analysis. *American Journal of Applied Mathematics and Statistics*, *9*(1), 4-11.

Shumacker RE, Lomax RGA. (1996). Beginner's guide to structural equation modeling. 3rd ed. New York, the United States: Routledge: 2010.

Sideridis, G., Saddaawi, A., & Al-Harbi, K. (2018). Internal consistency reliability in measurement: Aggregate and multilevel approaches. *Journal of Modern Applied Statistical Methods*, *17*(1), 15.

Su, K., Huang, L., & Hsieh, H. (2004). The Development of a Knowledge Flow Paradigm in Engineering Education: Empirical Research in Taiwanese Universities. World Transactions on Engineering and Technology Education, 3(1), 125–128.

Tavana, M., Szabat, K., & Puranam, K. (Eds.). (2016). *Organizational productivity and performance measurements using predictive modeling and analytics*. IGI Global.

Ten Berge, J. M. (1996). "The Kaiser, Hunka and Bianchini factor similarity coefficients: a cautionary note." Multivariate Behavioral Research31(1): 1-6.

Tentama, F., & Anindita, W. D. (2020). Employability scale: Construct validity and reliability. *International Journal of Scientific & Technology Research*, *9*(4), 3166-3170.

Torabi, F., & El-Den, J. (2017). The impact of knowledge management on organizational productivity: a case study on Koosar Bank

of Iran. *Procedia Computer Science, 124*, 300-310.

Wiklund, J., & Shepherd, D. (2003). Knowledge-based resources, entrepreneurial orientation, and the performance of small and medium-sized businesses. *Strategic management journal*, *24*(13), 1307-1314.

Wood, R. E., Goodman, J. S., Beckmann, N., & Cook, A. (2008). Mediation testing in management research: A review and proposals. Organizational research methods, 11(2), 270-295.

Yamane, T. (1967). Sample Size Formular. In *The Annual International Conference on Geographic Information Science* (pp. 16-83).

Zaidatol, A. L., & Bagheri, A. (2009). Entrepreneurship as a center choice: An analysis of entrepreneurial self-efficiency and intention of university student. European Journal of social science, 9(2): 338-346.

Zhu, C., Liu, A., & Wang, Y. (2019). Integrating organizational learning with high-performance work system and entrepreneurial orientation: a moderated mediation framework. *Frontiers of business research in China*, *13*(1), 1-24.