Contents lists available at Science-Gate

International Journal of Advanced and Applied Sciences

Journal homepage: http://www.science-gate.com/IJAAS.html

The impact of technical skills on the efficiency of administrative performance: Evidence from Saudi Arabia

Bader Abdulaziz Almarshad [1], Ebrahim Mohammed Al-Matari [2, *]

[1]*Executive Master of Business Administration Program, College of Business, Jouf University, Sakakah, Saudi Arabia*
[2]*Department of Accounting, College of Business, Jouf University, Sakakah, Saudi Arabia*

ARTICLE INFO

Article history:
Received 25 November 2024
Received in revised form
28 March 2025
Accepted 4 June 2025

Keywords:
Technical skills
Administrative performance
Structural equation modeling
Educational organizations
Efficiency improvement

ABSTRACT

This study aims to investigate how technical skills affect the efficiency of administrative performance among workers in Saudi Arabia. To achieve this, a descriptive-analytical method will be used to examine the relationship between the independent variable (technical skills) and the dependent variable (administrative performance efficiency). The research sample includes workers from various sectors in Saudi Arabia. Structural Equation Modeling (SEM) and statistical software were used to analyze the relationship between technical skills and administrative performance efficiency. The results show that Programs of Educational Organizations (PEO) have the most significant positive impact on the Efficiency of Management Performance (EMP), followed by Programs and Systems (PS) and Electronic Configuration (EC). However, Support and Development (SD) does not have a significant effect on EMP. The study also discusses several practical implications, which are further explained in the conclusion.

1. Introduction

The world has become aware that information technology has entered all areas of daily life and business of countries, organizations, and individuals to the extent that it has formed a self-contained society, different from the traditional environment in which we live, as millions of computers and devices around the world rely on millions of network connections, and countless amounts of information are exchanged in it, so that information is the cornerstone and important resource for the performance of activities and practices of various organizations, and then the information society, as information and communication technology, has helped to process a huge amount of data to produce information, which has benefited several functions in institutions (Shakir et al., 2024). Keeping pace with information and communication technology is the refuge of every institution that seeks to ensure its survival by working to develop and invest in its human competencies, as well as controlling them as an inevitable necessity and a necessity more than a desire, to keep pace with the changes of that world based on information that believes in the necessity of developing and valuing human capabilities and competencies (Wahyoedi et al., 2023). Based on the idea of "whoever has the information has the power," considering that information is the main nerve in all administrative work at the level of organizations and the source of all decisions in the institution, regardless of their nature, not to mention organizing it with complete transparency, as well as processing it and performing all calculations and monitoring it automatically in response to the developments of the era, especially after it became clear that the knowledge economy is the advanced economic model, which programs all its work within an information plan, the most important components of which are networks and the Internet, and exploiting it in various aspects of economic activity, based strongly on creativity, knowledge and technological development. Technical skills are of great importance and role in the survival and continuity of organizations in light of the changing and complex environment, which must be consistent with the requirements of the different organizational levels, starting from the needs of the operational levels and ending with the requirements of senior management. This makes it an essential and vital element that helps facilitate the work of organizations and develop their capabilities to achieve sustainable competitive advantage, if used with high efficiency. Technical skills in various fields

* Corresponding Author.
Email Address: emalamtri@ju.edu.sa (E. M. Al-Matari)
https://doi.org/10.21833/ijaas.2025.06.023
Corresponding author's ORCID profile:
https://orcid.org/0000-0001-9247-2766

play an important fundamental role in improving the productivity of public and private administrative organizations. We find that there is a debate among leaders regarding how to use technology in a way that achieves the desired goals. The tremendous developments that have occurred have contributed to creating unprecedented opportunities in several areas, such as raising the level of job performance, improving administrative decisions, simplifying and facilitating procedures, and making the best use of the workforce. They have also contributed to changing the financial systems (Fournier-Tombs, 2023). This technological revolution and the accompanying change in information patterns have contributed to creating an unlimited capacity to process, distribute, and retrieve data in the form of information to benefit from it as an important resource, which in turn has been reflected in liberating the working individual from many of the restrictions and obstacles that accompany routine work in his performance, and opening up broad horizons for him to be developed, benefit, and rely on the environment, and the means, methods, and tools provided in this field (Bogler and Somech, 2023). Technical skills help departments determine the degree to which organizations can adapt and respond to determinants, set goals, and determine strategies and resources to achieve these goals. Hence, this study aims to analyze the dimensions of technical skills (programs and systems, support and development, educational organizations' programs, and electronic training) and their impact on improving the efficiency of administrative performance among employees in the Al-Jouf Region Secretariat.

The implementation of technical skills across various departments faces challenges that necessitate their development for efficient task performance. Numerous studies have confirmed these obstacles, including the lack of adequate infrastructure. For instance, the study by Rosendal et al. (2023) concluded that entering the information technology field requires a comprehensive and robust infrastructure, both material and human, along with guidelines for maximizing the benefits of technical skills and information technology. Additionally, Wahyoedi et al. (2023) highlighted that computer software used in Jordanian government departments urgently needs further development and upgrades to meet current departmental requirements. Some departments also experience difficulties in utilizing their technical skills. The mere presence of technological devices does not guarantee changes in administrative practice. A study by Hamidi (2024) identified a gap between the need for technology in institutions and its actual use, citing the lack of employee training courses and insufficient programs and equipment as major obstacles to its effective implementation.

Given these circumstances, this study aims to elucidate the role of technical skills that can be introduced into the administrative system to enhance performance efficiency. It explores how these skills can be optimally invested and utilized. Furthermore, the study highlights the primary obstacles that may restrict the investment and activation of technology and investigates how employees interact with these skills. The ultimate goal is to improve administrative performance efficiency in a manner that achieves the set objectives and enhances the effectiveness of workers' tasks.

Ultimately, this study is divided into numerous stages, with Section 2 emphasizing the development of hypotheses and the literature review. Section 3 provides the methodology and research design. Section 4 presents the Data Analysis and Findings. Finally, Section 5 presents the discussion, conclusions, and implications of the study.

2. Literature review and hypothesis development

Technical skills occupy a prominent place in everyone's interests due to their importance in increasing their ability to build and develop; in this sense, they represent the most important thing that can be offered to a human being who makes life and development, and they are only comparable to food and education. Although they reflect a human necessity, they also represent an economic necessity to build a society capable of performing better in the fields of economic and social development. Technical skills appeared in a simple way at the beginning of the twentieth century AD, when computers began to be introduced into administrative work, and then they appeared and were strongly concentrated in the seventies and eighties when computer technologies were employed to serve administrative processes in institutions as a result of the computer's superior capabilities in dealing with data. We can say that the beginnings of electronic administrations came from the beginning of the year 1960 in the automation of books, when IBM invented the term processor for the activities of its electric printers. The reason for launching this term was to draw the attention of management in libraries to the production of these printers when they were connected to the computer. Technical skills have undergone development at a number of administrative levels, as technical skills are an extension of business management, and their concept has developed based on the development of administrative schools in the mid-nineties of the twentieth century AD. Electronic management is an extension of technological development, communication, and changes in management tasks. This is a result of the development of data as a guest field in the field of broad electronic business, with the widespread use of the Internet, whether through the network with all Internet users in the world, the transition of human-machine and electronic interactions that extends organizationally, geographically, and temporally has led to the Internet making communication applicable everywhere with high reliability and the least possible noise, regardless of the distance, and then the interaction becomes computer-based.

Many business owners have talented employees with high skills and the ability to move quickly; however, most employers want to increase the efficiency of their employees to reach new horizons and raise the overall level of their companies. The simplest and most important strategies that help increase employee efficiency depend on making employees happy, appreciating their efforts, and giving them financial rewards for their achievements. The following are the most effective strategies to motivate employees and increase their level of efficiency: Most definitions of efficiency are a link between inputs and outputs, and some may confuse the concept of efficiency with effectiveness, but it can be said that the difference between efficiency and effectiveness is that the efficiency of any individual, economic unit, institution, or project can be defined and measured in terms of the ability of this individual, unit, institution, or project to achieve the required results using a specific cost of the resources used to produce the outputs. Effectiveness: Doing the right things to achieve the organization's goals. The organization may be effective but not efficient, meaning that it achieves its goals, but at a high cost. The term efficiency has become common in the study of McClelland (1973), and Russo (2016) believed that in the business environment, which is characterized by extended structural dimensions and organizational complexity, it is often difficult to define and specify the competencies of people involved in business processes; it is also difficult to express these competencies in a common language. They believed that each competency must be linked and linked to specific processes carried out by the company and to the individuals who are the owners of these competencies, as these competencies have an important impact on improving the overall quality of the final product and, thus, customer satisfaction. Through the previous concepts, we understand the efficiency of administrative performance as an administrative process designed to link the goals of the individual in a way that can ensure that the goals of the individual and the goals of the institution are unified as much as possible. Furthermore, research has emphasized the significant correlation between technical skills and the effectiveness of training programs. It is evident that ongoing training in this domain enhances administrative capabilities and improves decision-making abilities. Hence, comprehending the significance of technical abilities in administrative performance is crucial for enhancing firm efficiency and increasing employee happiness. Based on this, we highlight many previous empirical studies as follows.

Al-Dmour et al. (2024) aimed to identify the importance of using information technology in industrial companies and its impact on organizational creativity to determine the level of organizational creativity in these companies. They found that the use of information technology has a positive effect on administrative creativity and effective methods of applying creativity in companies. Moreover, they found a positive relationship between information and communication technology and reciprocal leadership. López et al. (2025) investigated the demand for qualified personnel in Spain's hospitality sector and identified key gaps in operational, multilingual, and digital skills among graduates, supporting a more specialized approach to education. Furthermore, Zhang et al. (2023) demonstrated via a Stackelberg supply chain model that reductions in marketing and services costs—enabled by digital technologies—can directly shape demand elasticity when supply elasticity stays constant. Lastly, long-run cost strategies, as discussed by Shen et al. (2019), use life-cycle cost frameworks to evaluate the efficient allocation of production resources in the long term.

Alfawaire and Atan (2021) aimed to test the role of technical human resource practices—specifically electronic recruitment, electronic performance management, and electronic training—in achieving institutional competitiveness. This study was conducted at several Jordanian universities using a descriptive-analytic approach. Data were gathered from 227 faculty and administrative staff via structured questionnaires. The results indicated that these HR practices are being implemented, but not always with equal emphasis. Additionally, it demonstrated a positive impact of technical HR competencies on institutional competitiveness, with no statistically significant differences attributed to demographic variables. In addition, the study of DeLone and McLean (2003) aimed to reveal the impact of recruitment policies and the use of technology in e-management on the creativity of recruitment companies and universities in Norway. The study sample consisted of 14 universities, higher education institutions, and recruitment companies, randomly selected from different regions in Norway during the period from 2016-2019 AD, collected by Statistics Norway, and to achieve the study objective, a questionnaire and interview were used in the data collection process. The results of the study showed that the recruitment policies used by companies based on cooperation between the company and universities and higher education institutions work to increase the level of innovation and creativity in Norwegian companies through their use of e-management. The results also indicate that the recruitment policy based on attracting and appointing qualified individuals constitutes a competitive advantage for the company.

Aljehani et al. (2024) examined the role of big data analytics in Bangladesh's telecommunications industry, surveying 384 management-level employees using a structured questionnaire and analyzing the responses with PLS-SEM statistical techniques. Their study revealed high levels of managerial awareness and implementation of data-driven skill policies. It also identified several operational factors influencing policy effectiveness. Based on these findings, the authors recommended establishing transparent qualification standards,

involving experts in designing testing procedures, and pre-planning personnel placement to optimize technical skill deployment and policy outcomes, mirroring key aspects of the Libyan Telecommunications Company case. Furthermore, Lopes et al. (2023) examined the role of digital skills in enhancing service delivery within public sector organizations. Their study surveyed 573 public-sector workers, analyzing how digital competencies—and associated training—affect institutional efficiency and service quality. Findings revealed notably low levels of digital literacy and limited participation in recent digital training (72% had not engaged in such training over the previous two years), yet a strong willingness among staff to pursue training in areas such as data management, cybersecurity, and communication systems. The study confirmed a positive relationship between digital skill levels and improved service delivery and underscored the need for structured training programs to elevate employee competence and boost organizational performance.

According to Oubibi et al. (2024), the use of information and communication technology (ICT) and e-learning tools plays a significant role in enhancing the professional growth of teachers in African educational settings. Their systematic review highlighted that these technologies positively influence teachers' development by supporting innovative teaching practices and continuous learning. However, the study also noted that the level of e-learning adoption remains moderate, primarily due to challenges such as limited electronic infrastructure and inadequate digital resources in many schools. Koçyiğit and Akkaya (2020) aimed to identify the impact of the administrative requirements necessary to apply technical skills (human resources, information technology, organizational structure, regulations, systems, and laws) and their impact on the quality of services provided by Jordanian civil service agencies from the workers' point of view (reliability, responsiveness, security, and trust). The most important results reached by the study are as follows: the level of awareness of employees in civil service agencies towards the availability of qualified human resources with technical skills and the availability of the administrative requirements necessary to apply technical skills is at an average level, the level of awareness of employees in civil service agencies towards the type of service provided is at a high level, and the availability of qualified human resources with technical skills plays a role in improving the type of service provided in civil service agencies.

From another perspective, Liu et al. (2017) aimed to test the impact of human resource systems directed towards activating human resource expertise, systems directed towards human resource maintenance, and performance-oriented human resource creativity and organizational innovation. The study concluded that human resource systems based on enhancing the expertise and performance of resources and human resource maintenance systems enhance their creative capabilities, which ultimately leads to maximizing the innovative capabilities of organizations. The study by Almarabeh and AbuAli (2010) aimed to understand the reality of the use of human resources information systems in small organizations, and the relationship between the size of the organization, measured by the number of employees, and the use of the system was studied. The relationship between the length of the period of use of the human resources information system and the use of the system and whether this system is used for administrative control purposes or is used for analytical purposes, and for how long technology is used in areas such as performance evaluation and training, the most prominent results of the study showed that there is a direct relationship between the size of the business organization represented by the number of employees in it and the organization's need to employ an information system specific to human resources management. Finally, Alyahamdi and Alsinani (2023) aimed to identify the extent to which general and basic education teachers in the interior region of the Sultanate of Oman possess the basic means and skills of information and communication technology and the extent to which they use it for personal purposes and teaching, as well as the obstacles that limit their use. The results showed that the sample members do not possess the basic means and skills of information and communication technology sufficiently, and therefore, their use in teaching is low.

This study differs from the previous studies. Previous studies differed in terms of their objectives, as there are studies that aimed to identify obstacles to applying technical skills without applying e-management, including Koçyiğit and Akkaya (2020), DeLone and McLean (2003), and other studies that dealt with the reality of school principals' use of school technical skills. Some studies have focused on identifying the requirements for applying technical skills. However, previous research has differed in the selection of study samples. For example, Alfawaire and Atan (2021) explored this topic using one type of sample, while Lopes et al. (2023) conducted the study on employees in public institutions. Other studies have selected school principals or administrative staff as participants. In the study by Oubibi et al. (2024), the sample included both male and female teachers. The current study was applied to a sector of high importance to Saudi society in the Al-Jouf region, as Al-Jouf Municipality is keen to provide male and female employees with technical skills to raise the quality of its administrative work. By comparing the current study with previous studies, it is distinguished by its treatment of the degree of possibility of applying administrators, in addition to its treatment of the development of workers in the Al-Jouf Municipality, as well as the study sample. Therefore, this study is expected to have an impact on the development of workers, as well as to have a place among previous studies, and a

launch for other studies in this field, which enhances the application of the role of technical skills in raising the efficiency of administrative performance of workers in the Al-Jouf Region Municipality. This study was also used to prepare the study tool and formulate its paragraphs in a manner consistent with its objectives, which contributed to enriching the scientific and applied aspect in terms of its treatment of an important topic, which is the application of technical skills in raising the efficiency of administrative performance of workers in the Al-Jouf Region Municipality.

Based on the study's problem, questions, and objectives, this study proposes the following hypotheses:

H1: There is a positive relationship between programs and systems and the efficiency of the administrative performance of employees.
H2: There is a positive relationship between support and development and the efficiency of the administrative performance of employees.
H3: There is a positive relationship between educational organizational programs and the efficiency of employees' administrative performance.
H4: There is a positive relationship between electronic training and the efficiency of employees' administrative performance.

3. Methodology and research design

The study population consists of all administrative employees in the Al-Jouf Region Secretariat, totaling 3,560 individuals. A random sample was selected from this population, and the unit of analysis is the administrative employee. The study used primary data collected through a structured questionnaire. The aim of the study is to ensure the dataset fairly represents all relevant groups. If some groups are underrepresented, strategies such as oversampling or data augmentation may be used to achieve balance. The data collection process included individuals from diverse backgrounds to enhance the fairness and accuracy of data analysis and model evaluation. This inclusive approach also helps reduce potential biases and ensures that different perspectives are considered. A total of 377 questionnaires were distributed to administrative employees across different levels in the Al-Jouf Region Secretariat, located in the Kingdom of Saudi Arabia. Of these, 70% were returned and usable for analysis. The sampling and analysis unit throughout the study remained the administrative employee.

4. Data analysis and findings

4.1. Sample characteristics and demographic profile

The study's sample of 264 participants paints a picture of a workforce that is strikingly homogeneous in some aspects, yet diverse in others. The most prominent feature was the overwhelming gender imbalance, as shown in Table 1, with men presumably making up 96.6% of the participants. This male-dominated environment likely shapes the workplace dynamics significantly. Age-wise, we see a mature workforce, with the vast majority falling between 30 and 50 years of age. Nearly half of the participants were in their 40s, suggesting a wealth of life experiences. However, the scarcity of employees aged less than 30 years and those aged over 50 years might indicate challenges in attracting fresh talent and retaining seasoned professionals.

Education levels among the participants were impressively high. Most hold tertiary qualifications, with bachelor's degrees being the most common, followed by diplomas and master's degrees. This well-educated workforce likely brings a high level of skills and knowledge to their roles. Regarding work experience, the sample showed a balanced mix of veteran professionals and newcomers. The largest group has 10-15 years of experience, but there is also a substantial portion of over two decades in the field. This blend of experience levels could foster a rich environment for knowledge-sharing and mentorship.

Geographically, the sample is heavily concentrated in the Municipality of Dumat Al-Jandal Governorate, which accounts for over half of the participants. The Municipality of Sawir is the second most represented area, with the remaining participants spread thinly across various other municipalities. This geographical skew is noteworthy and may limit the ability of the study to draw broader regional conclusions. In essence, the sample represents a predominantly male, middle-aged, well-educated workforce with a good spread of experience levels, but limited geographical diversity. These characteristics provide a crucial context for interpreting the findings of this study and understanding their potential implications and limitations.

4.2. Measurement model assessment

Measurement model assessment evaluates the reliability and validity of the constructs used in this study (Hair et al., 2017) as shown in Fig. 1. We examined indicator reliability, internal consistency reliability, convergent validity, discriminant validity, and multicollinearity.

4.2.1. Indicator reliability

Indicator reliability was assessed through the outer loadings of each item on its respective construct (Hair et al., 2019). Indicator reliability analysis shows that most indicators have outer loadings above the recommended threshold of 0.7, indicating good reliability (Hair et al., 2017). A few indicators (EMP7, PS2, PS4) have loadings between 0.5 and 0.7, as shown in Table 2, which are

acceptable if the Average Variance Extracted (AVE) is above 0.5 (Hair et al., 2019).

4.2.2. Internal consistency reliability

Internal consistency reliability was assessed using Cronbach's Alpha and Composite Reliability (Fornell and Larcker, 1981; Hair et al., 2017). All constructs demonstrate good internal consistency reliability, as shown in Table 3, with Cronbach's Alpha and Composite Reliability values exceeding the recommended threshold of 0.7 (Nunnally and Bernstein, 1994). Convergent validity is supported with all AVE values above the recommended threshold of 0.5 (Fornell and Larcker, 1981).

Table 1: Demographic characteristics

Characteristic	Category	Frequency	Percent
Gender	1 (assumed male)	255	96.6
	2 (assumed female)	9	3.4
Age	20 to <30 years	21	8.0
	30 to <40 years	99	37.5
	40 to <50 years	126	47.7
	50 years and older	18	6.8
Educational level	High school	42	15.9
	Diploma	75	28.4
	Bachelor	87	33.0
	Master	57	21.6
	PhD	3	1.1
Work experience	Less than 5 years	18	6.8
	5 to <10 years	42	15.9
	10 to <15 years	78	29.5
	15 to <20 years	60	22.7
	20 years and above	66	25.0
Workplace	Municipality of Dumat Al-Jandal Governorate	141	53.4
	Municipality of Sawir	45	17.0
	Municipality of Central Sakaka	15	5.7
	Municipality of Qurayyat Governorate	15	5.7
	North Sakaka Municipality	12	4.5
	Municipality of Abu Ajram	9	3.4
	Municipality of Issawiya	9	3.4
	Municipality of South Sakaka - Kara	6	2.3
	Municipality of Tabarjal	6	2.3
	Municipality of Haditha	3	1.1
	Municipality of Zalloum	3	1.1

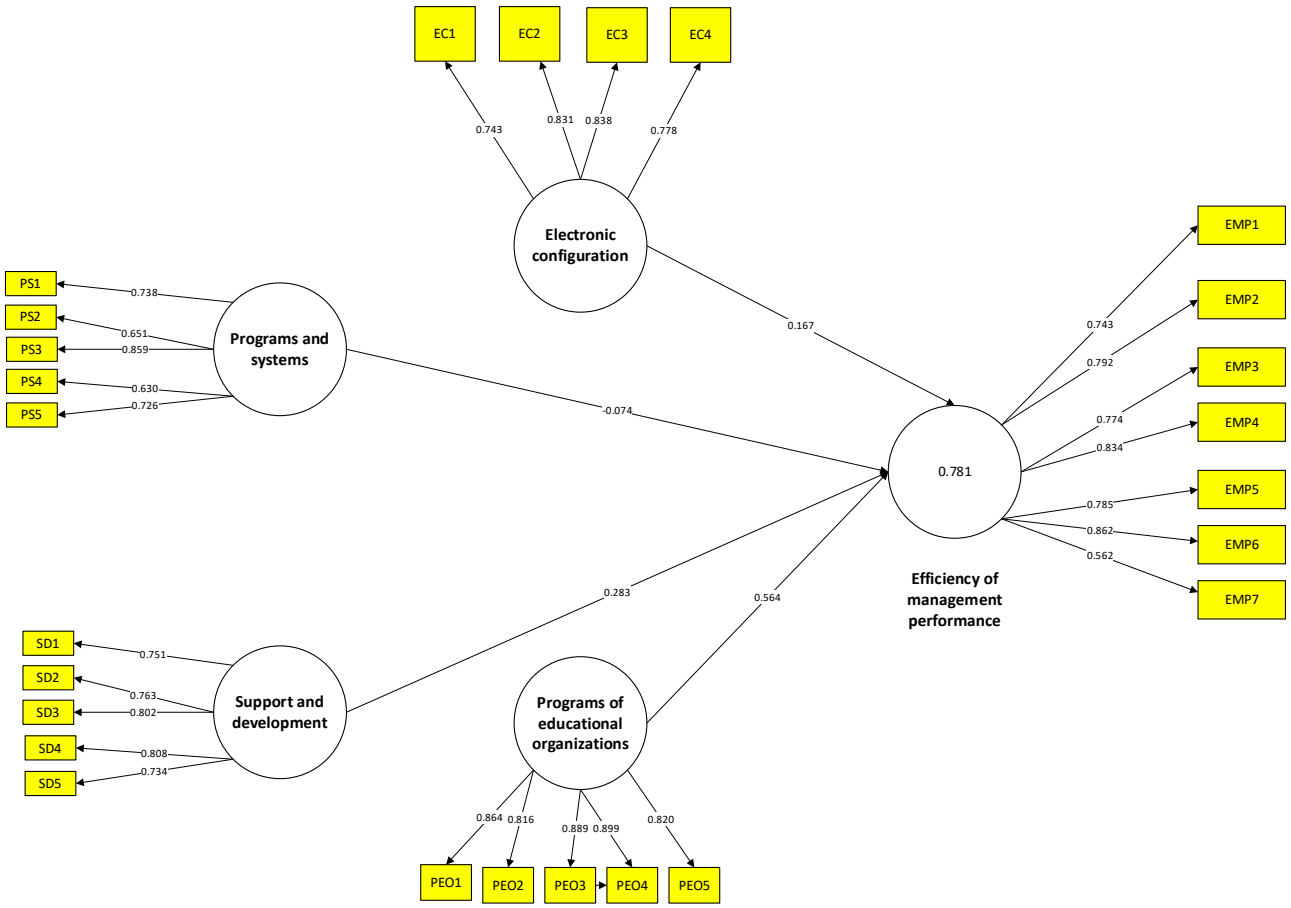

Fig. 1: Measurement model assessment

Table 2: Outer loadings

Construct	Indicator	Outer loading
Efficiency of management performance	EMP1	0.743
	EMP2	0.792
	EMP3	0.774
	EMP4	0.834
	EMP5	0.785
	EMP6	0.862
	EMP7	0.562
Electronic configuration	EC1	0.743
	EC2	0.831
	EC3	0.838
	EC4	0.778
Programs and systems	PS1	0.738
	PS2	0.651
	PS3	0.859
	PS4	0.630
	PS5	0.726
Programs of educational organizations	PEO1	0.864
	PEO2	0.816
	PEO3	0.889
	PEO4	0.899
	PEO5	0.820
Support and development	SD1	0.751
	SD2	0.763
	SD3	0.802
	SD4	0.808
	SD5	0.734

Table 3: Internal consistency, reliability, and convergent validity

Construct	Cronbach's alpha	rho_A	Composite reliability	AVE
Efficiency of management performance	0.883	0.894	0.910	0.593
Electronic configuration	0.810	0.814	0.875	0.638
Programs and systems	0.830	0.833	0.881	0.596
Programs of educational organizations	0.910	0.913	0.933	0.737
Support and development	0.772	0.793	0.846	0.526

4.2.3. Discriminant validity

Discriminant validity was assessed using the Fornell-Larcker criterion and the Heterotrait-Monotrait Ratio (HTMT) (Fornell and Larcker, 1981; Henseler et al., 2015). The Fornell-Larcker criterion is met for most constructs, with the square root of the AVE (diagonal elements) exceeding correlations with other constructs (Fornell and Larcker, 1981). However, the high correlation between EMP and PEO (0.858) raises concerns about their discriminant validity, as shown in Table 4. The HTMT analysis (Table 5) shows some ratios exceeding the conservative threshold of 0.85 (Henseler et al., 2015), particularly between EMP and PEO (0.944), EMP and PS (0.865), and EMP and EC (0.854), as shown in Table 5. This finding suggests potential discriminant validity issues between these constructs.

4.2.4. Multicollinearity

Multicollinearity was assessed using the Variance Inflation Factor (VIF) for all indicators (Hair et al., 2019). All VIF values are below the critical threshold of five, as shown in Table 6, indicating no severe multicollinearity issues at the indicator level (Hair et al., 2011).

4.3. Structural model assessment

We evaluate the structural model shown in Fig. 2 in this section. The relationships among the variables in the study are shown in this model, which also shows how independent factors affect dependent variables via a series of pathways. An in-depth analysis of the structural model is provided below.

Table 4: Fornell-Larcker criterion

Construct	EMP	EC	PS	PEO	SD
EMP	0.770				
EC	0.720	0.798			
PS	0.745	0.597	0.772		
PEO	0.858	0.740	0.726	0.858	
SD	0.463	0.465	0.655	0.485	0.725

Table 5: Heterotrait-Monotrait ratio (HTMT)

Construct	EMP	EC	PS	PEO
EC	0.854			
PS	0.865	0.728		
PEO	0.944	0.862	0.837	
SD	0.548	0.600	0.808	0.573

Table 6: VIF values-as previously presented

Indicator	VIF	Indicator	VIF	Indicator	VIF
EC1	1.510	PEO1	2.636	SD1	1.923
EC2	1.985	PEO2	2.097	SD2	1.797
EC3	2.005	PEO3	3.238	SD3	1.914
EC4	1.534	PEO4	3.260	SD4	2.370
EMP1	2.155	PEO5	2.204	SD5	1.936
EMP2	2.456	PS1	1.632		
EMP3	2.194	PS2	1.539		
EMP4	2.581	PS3	2.444		
EMP5	2.326	PS4	1.527		
EMP6	3.015	PS5	1.708		
EMP7	1.512				

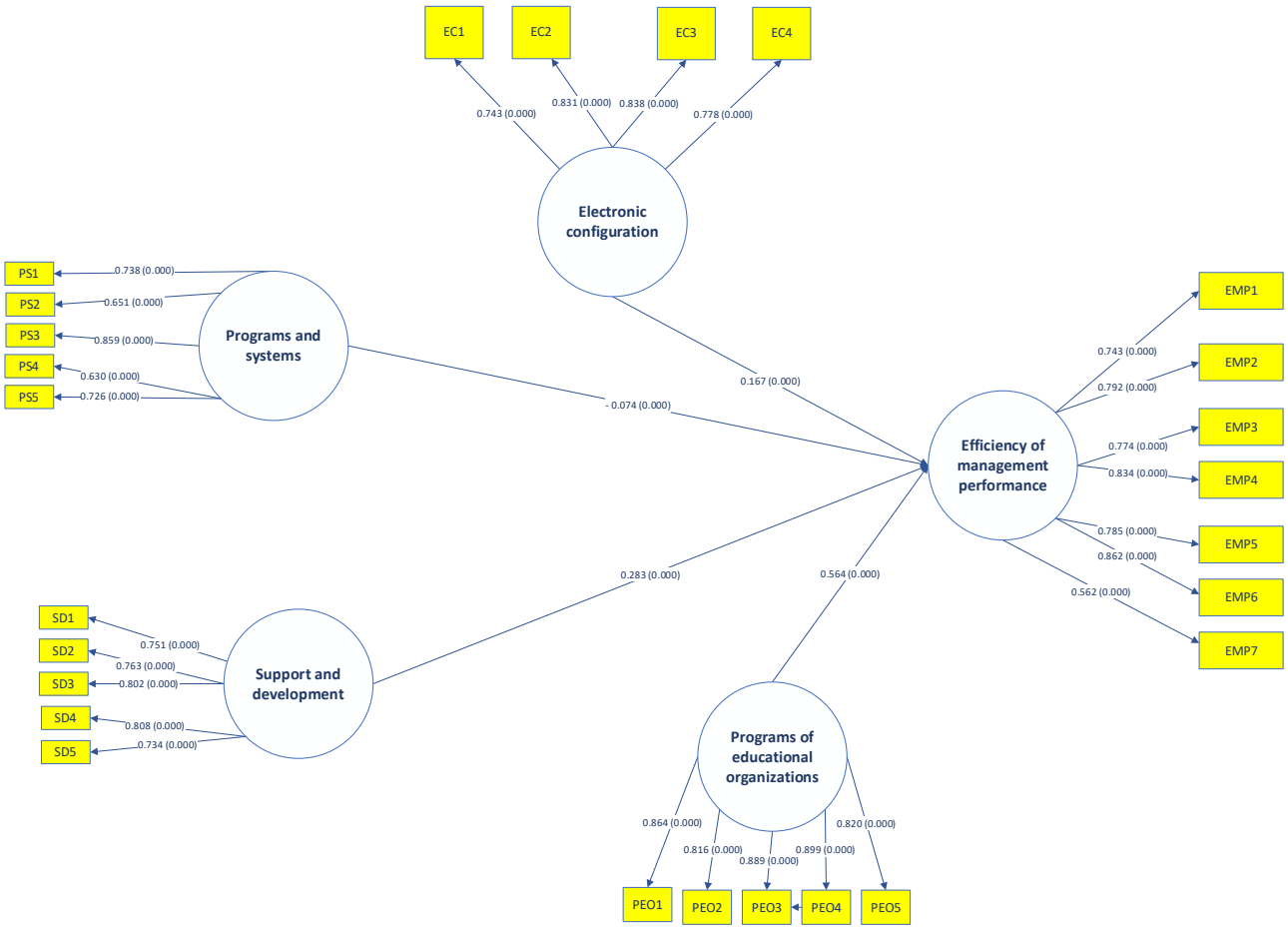

Fig. 2: Structural model assessment

4.3.1. Path coefficients and significance

The results show in Table 7 that Programs of educational organizations (PEO) have the strongest positive influence on Efficiency of management performance (EMP), followed by Programs and systems (PS) and Electronic configuration (EC). Support and development (SD) does not have a significant effect on EMP (Hair et al., 2017).

Table 7: Structural model results

Relationship	Path coefficient (β)	T-statistics	P-values	95% CI lower	95% CI upper
EC -> EMP	0.167	2.431	0.015	0.043	0.318
PS -> EMP	0.283	4.136	0.000	0.152	0.421
PEO -> EMP	0.564	8.066	0.000	0.415	0.686
SD -> EMP	-0.074	1.470	0.143	-0.171	0.024

4.3.2. Coefficient of determination (R^2)

The R^2 value, as shown in Table 8, indicates that the model explains 78.1% of the variance in the efficiency of management performance, which is considered substantial (Hair et al., 2011).

Table 8: R^2 values for endogenous constructs

Construct	R^2 value	R^2 adjusted
EMP	0.781	0.778

R^2 values of 0.75, 0.50, and 0.25 are considered substantial, moderate, and weak, respectively

4.3.3. Predictive relevance (Q^2)

A Q^2 value of 0.455 for EMP, as shown in Table 9, indicates that the model has a large predictive relevance for this construct (Hair et al., 2019).

4.3.4. PLS prediction

The PLS prediction analysis, as shown in Table 10, shows that the model generally has good out-of-sample predictive power for EMP indicators, with positive Q^2_predicted values for all indicators (Shmueli et al., 2019).

The PLS prediction analysis shows that the model generally has good out-of-sample predictive power for EMP indicators, with positive Q^2_predicted values for all indicators (Shmueli et al., 2019).

5. Discussion, conclusion, implication of study and implications of the study

Based on what was presented in the theoretical framework and the studies referred to in previous studies, the researchers reached several conclusions, which are as follows.

There is a significant relationship between the role of technical skills in raising the efficiency of the administrative performance of employees in the Al-Jouf Region Secretariat. Employees' technical skills improve the efficiency of interaction with customers and provide them with better services. Employees' mastery of programs and systems leads to increased job satisfaction and motivates them to work by acquiring technical skills and knowledge that benefit them in improving opportunities for promotion and professional development.

There is a significant relationship between programs and systems and the efficiency of the administrative performance of employees in the Al-Jouf Region Secretariat. The provision of continuous support and consultation by the concerned department for information technology support. The support and development of programs help correct errors in the field of work of employees in the secretariat.

There is a significant relationship between support and development and the efficiency of the administrative performance of employees in the Al-Jouf Region Secretariat. The necessary educational materials must be provided, and attention must be given to development by professors specializing in this field and experienced to raise the capabilities of employees. There is a significant relationship between the programs of educational organizations and the efficiency of administrative performance of employees in the Secretariat of Al-Jouf Region. Providing continuous support and consultation, such as using specialized institutes to provide training courses on programs and the use of modern technology for programs, or establishing a center specific to the Secretariat that provides courses in the use of technology to develop the professional and technical capabilities of individuals to increase their efficiency and effectiveness in programs related to their jobs. There is a significant relationship between electronic training and the efficiency of the administrative performance of employees in the Secretariat of Al-Jouf Region. This is done by providing all modern means and methods of electronic communication to motivate employees to improve their knowledge and technological capabilities to achieve the goals of the Secretariat.

Table 9: Q^2 values for endogenous constructs

Construct	SSO	SSE	Q^2 (=1-SSE/SSO)
EMP	1848.000	1007.567	0.455

Table 10: PLS prediction results for key indicators

Indicator	PLS RMSE	LM RMSE	PLS MAE	LM MAE	PLS MAPE	LM MAPE	PLS Q^2_predict	LM Q^2_predict
EMP1	0.804	0.636	0.543	0.452	19.062	14.798	0.437	0.648
EMP2	0.836	0.763	0.546	0.528	20.396	18.356	0.463	0.552
EMP3	0.764	0.780	0.506	0.505	19.718	18.652	0.567	0.549
EMP4	0.895	0.805	0.563	0.568	24.422	22.845	0.550	0.636
EMP5	1.059	0.981	0.729	0.692	31.845	29.118	0.409	0.493
EMP6	0.905	0.880	0.570	0.591	23.537	24.523	0.513	0.540
EMP7	0.895	0.870	0.665	0.644	22.245	20.704	0.186	0.230

Q^2_predict values > 0 indicate that the prediction error of the PLS model is less than the prediction error of simply using the mean values; Lower values of RMSE, MAE, and MAPE indicate better predictive accuracy; Higher Q^2_predict values indicate better predictive power

This study aims to investigate the influence of technical skills on improving the effectiveness of administrative performance among employees in Saudi Arabia. To accomplish this goal, a descriptive analytical approach is used as a methodology to introduce the independent variable of technical skills function and the dependent variable in improving administrative performance efficiency. The study sample consisted of individuals from the Royal Kingdom of Saudi Arabia. This study utilized structural equation modeling (SEM) and statistical software to investigate the relationship between technical competency and the effectiveness of administrative performance among employees. The results of this study suggest that the Programs of Educational Organizations (PEO) have the greatest beneficial influence on the Efficiency of Management Performance (EMP). Applications and Systems (PS) and electronic configurations (EC) closely trail behind in terms of importance. Statistical analysis indicated that support and development (SD) did not significantly affect EMP. Finally, our work demonstrates various Implications of the Study, which are further explained in the conclusion of this

research. Based on the expected results, theoretical framework, and previous studies, the researchers proposed several recommendations that could benefit the Secretariat and Al-Jouf regions. These suggestions suggest that the Al-Jouf Region Secretariat must emphasize the importance of technical skills in transactions, considering their widespread use in government organizations. The secretariat and its supporting departments should offer training programs and workshops to provide employees with the necessary scientific foundations for these skills. This is crucial because of the frequent application of these skills in the current era and the secretariat's significant role in promoting growth and development. Employees should also focus on enhancing their relationship with technical skill development, as this offers substantial advantages for the secretariat, contributing to its success and sustainability. Furthermore, establishing centers that provide technical skills courses allows the Al-Jouf Region Secretariat to determine employee needs and preferences more accurately. This, in turn, facilitates scientific advancement and, ultimately, positively impacts the administrative performance of the organization's employees. The researchers also recommend that those interested in technical skills conduct more comprehensive studies on the topic, given the widespread proliferation of governmental organizations and institutions, as well as Saudi Arabia's strong emphasis on technical skills across all sectors. Finally, improving the digital infrastructure to support technical skill development leads to faster progress, reduced risks, and a more streamlined network of information and communications technology.

Finally, this study has some practical implications. For example, the Secretariat may guarantee that staff members are knowledgeable about modern technology and are ready to adjust to new technologies by offering ongoing training, which would improve operations and service quality. Second, empowering staff to link technical skill enhancement to the secretariat's expansion promotes an innovative, proactive, and resilient culture inside the company. Finally, improving digital systems will facilitate smooth learning, teamwork, and effective data management, which will reduce operational inefficiencies and allow for better decision making.

List of abbreviations

SEM	Structural equation modeling
PEO	Programs of educational organizations
EMP	Efficiency of management performance
PS	Programs and systems
EC	Electronic configuration
SD	Support and development
AVE	Average variance extracted
VIF	Variance inflation factor
RMSE	Root mean square error
MAE	Mean absolute error
MAPE	Mean absolute percentage error
Q^2_predict	Predictive relevance score (PLS predict)
PLS	Partial least squares
LM	Linear model
HTMT	Heterotrait-Monotrait ratio
CI	Confidence interval
R^2	Coefficient of determination
SSO	Sum of squares observed
SSE	Sum of squares error

Acknowledgment

The authors would like to thank the Deanship of Graduate Studies and Scientific Research at Jouf University for funding and supporting this research through the initiative of DGSR Graduate Studies Research Support (GSR) at Jouf University, Saudi Arabia.

Compliance with ethical standards

Ethical considerations

This study was conducted in accordance with the ethical standards of the institutional and national research committees. Informed consent was obtained from all participants. Participation was voluntary, and confidentiality of responses was maintained. No personally identifiable information was collected.

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

Al-Dmour R, Al-Dmour H, and Al-Dmour A (2024). The role of marketing mix and social media strategies in influencing international students' university choices in Jordan. Journal of International Students, 14(4): 642-663. https://doi.org/10.32674/jis.v14i4.6407

Alfawaire F and Atan T (2021). The effect of strategic human resource and knowledge management on sustainable competitive advantages at Jordanian universities: The mediating role of organizational innovation. Sustainability, 13(15): 8445. https://doi.org/10.3390/su13158445

Aljehani SB, Abdo KW, Nurul Alam M, and Aloufi EM (2024). Big data analytics and organizational performance: Mediating roles of green innovation and knowledge management in telecommunications. Sustainability, 16(18): 7887. https://doi.org/10.3390/su16187887

Almarabeh T and AbuAli A (2010). A general framework for e-government: Definition maturity challenges, opportunities, and success. European Journal of Scientific Research, 39(1): 29-42.

Alyahamdi H and Alsinani N (2023). The role of knowledge management in achieving organizational loyalty among teachers of basic education schools in North Al Batinah Governorate in the Sultanate of Oman from their point of view. Journal of Research in Curriculum Instruction and Educational Technology, 9(2): 145-192. https://doi.org/10.21608/jrciet.2023.311224

Bogler R and Somech A (2023). Organizational citizenship behavior (OCB) above and beyond: Teachers' OCB during COVID-19. Teaching and Teacher Education, 130: 104183.

https://doi.org/10.1016/j.tate.2023.104183
PMid:37223776 PMCid:PMC10160530

DeLone WH and McLean ER (2003). The DeLone and McLean model of information systems success: A ten-year update. Journal of Management Information Systems, 19(4): 9-30. https://doi.org/10.1080/07421222.2003.11045748

Fornell C and Larcker DF (1981). Evaluating structural equation models with unobservable variables and measurement error. Journal of Marketing Research, 18(1): 39-50. https://doi.org/10.1177/002224378101800104

Fournier-Tombs E (2023). Local transplantation, adaptation, and creation of AI models for public health policy. Frontiers in Artificial Intelligence, 6: 1085671. https://doi.org/10.3389/frai.2023.1085671
PMid:37664076 PMCid:PMC10469302

Hair JF, Hult GTM, Ringle CM, and Sarstedt M (2017). A primer on partial least squares structural equation modeling (PLS-SEM). 2nd Edition, SAGE Publications Inc., Thousand Oaks, USA.

Hair JF, Ringle CM, and Sarstedt M (2011). PLS-SEM: Indeed a silver bullet. Journal of Marketing Theory and Practice, 19(2): 139-152. https://doi.org/10.2753/MTP1069-6679190202

Hair JF, Risher JJ, Sarstedt M, and Ringle CM (2019). When to use and how to report the results of PLS-SEM. European Business Review, 31(1): 2-24. https://doi.org/10.1108/EBR-11-2018-0203

Hamidi B (2024). Exploring the impact of adopting a web-based instructional model in Algerian universities. Journal of Language and Linguistic Studies, 19(4): 256-266.

Henseler J, Ringle CM, and Sarstedt M (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. Journal of the Academy of Marketing Science, 43: 115-135. https://doi.org/10.1007/s11747-014-0403-8

Koçyiğit Y and Akkaya B (2020). The role of organizational flexibility in organizational agility: A research on SMEs. Business Management and Strategy, 11(1): 110-123. https://doi.org/10.5296/bms.v11i1.16867

Liu D, Gong Y, Zhou J, and Huang JC (2017). Human resource systems, employee creativity, and firm innovation: The moderating role of firm ownership. Academy of Management Journal, 60(3): 1164-1188. https://doi.org/10.5465/amj.2015.0230

Lopes AS, Sargento A, and Farto J (2023). Training in digital skills—The perspective of workers in public sector. Sustainability, 15(13): 10577. https://doi.org/10.3390/su151310577

López SM, Guerra IR, and Barreal J (2025). Theoretical framework and preliminary evaluation of a model for analysing the qualified personnel needing's in the hotel accommodation sector. Tourism and Hospitality, 6(1): 21. https://doi.org/10.3390/tourhosp6010021

McClelland DC (1973). Testing for competence rather than for "intelligence." American Psychologist, 28(1): 1-14. https://doi.org/10.1037/h0034092 **PMid:4684069**

Nunnally JC and Bernstein IH (1994). Psychometric theory. 3rd Edition, McGraw-Hill, New York, USA.

Oubibi M, Fute A, Kangwa D, Alcardo AB, and Adarkwah MA (2024). Interactive technologies in online teacher education in Africa: A systematic review 2014–2024. Education Sciences, 14(11): 1188. https://doi.org/10.3390/educsci14111188

Rosendal AA, Sloth SB, Rölfing JD, Bie M, and Jensen RD (2023). Technical, non-technical, or both? A scoping review of skills in simulation-based surgical training. Journal of Surgical Education, 80(5): 731-749. https://doi.org/10.1016/j.jsurg.2023.02.011
PMid:36906398

Russo D (2016). Competency measurement model. In the Proceedings of the European Conference on Quality in Official Statistics, Madrid, Spain.

Shakir M, Al Farsi MJ, Al-Shamsi IR, Shannaq B, and Taufiq-Hail GA (2024). The influence of mobile information systems implementation on enhancing human resource performance skills: An applied study in a small organization. International Journal of Interactive Mobile Technologies (iJIM), 18(13): 37–68. https://doi.org/10.3991/ijim.v18i13.47027

Shen CW, Peng YT, and Tu CS (2019). Considering product life cycle cost purchasing strategy for solving vendor selection problems. Sustainability, 11(13): 3739. https://doi.org/10.3390/su11133739

Shmueli G, Sarstedt M, Hair JF, Cheah JH, Ting H, Vaithilingam S, and Ringle CM (2019). Predictive model assessment in PLS-SEM: Guidelines for using PLSpredict. European Journal of Marketing, 53(11): 2322-2347. https://doi.org/10.1108/EJM-02-2019-0189

Wahyoedi S, Suherlan S, Rijal S, Azzaakiyyah HK, and Ausat AM (2023). Implementation of information technology in human resource management. Al-Buhuts, 19(1): 300-318.

Zhang X, Xu Y, Chen X, and Liang J (2023). Pricing decision models of manufacturer-led dual-channel supply chain with free-rider problem. Sustainability, 15(5): 4087. https://doi.org/10.3390/su15054087