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Factors influencing accounting information system usage by oil companies & performance outcomes

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ABSTRACT

Information systems have greatly enhanced companies' capabilities to record, track, and measure performance. This study examines the factors influencing employees' use of accounting information systems (AISs) in Sudan's top five oil companies and investigates how these systems impact both financial and non-financial performance. Furthermore, it evaluates the effects of top management support, trust, training, technical support, and perceived ease of use on AIS usage, as well as its subsequent impact on company performance. Surveys of 215 employees collected data, and a structural equation model tested the hypotheses. The data supports three hypotheses concerning AIS usage factors. Notably, the study demonstrates that AIS usage significantly enhances both financial and non-financial performance. This article is notable for directly addressing the practical application of AISs and their impact on organisational financial and non-financial performance, highlighting the significant value of AIS implementation in the oil industry. The conclusion summarises the key findings and offers recommendations for future research in this area.

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1. Introduction

The accounting profession is presently undergoing significant changes driven by rapid advancements in information technology (IT) across the global business landscape. Numerous scholarly inquiries have investigated the challenges and opportunities stemming from this technological evolution (Klovienė & Gimzauskiene, 2015; Peña-Miguel & De La Peña, 2018). At the heart of this transformation lies the accounting information system (AIS), which serves as a fundamental tool that enables organisations to leverage data and information for strategic planning, decision-making, and control (Karim, 2011).

AIS comprises a comprehensive framework of interconnected components, including software, databases, procedures, and personnel, aimed at capturing, processing, and reporting financial information (Gelinas et al., 2018). Its key functions entail recording financial transactions, upholding internal controls, and generating financial statements (Turner et al., 2022). AIS plays a vital role not only in guaranteeing the precision and dependability of financial data but also in aiding regulatory adherence and facilitating efficient management of organisational assets (Gelinas et al., 2018). Moreover, AIS has progressed in

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tandem with advancements in information technology, integrating functionalities like automation, data analytics, and interoperability with other business systems to enhance the efficiency and effectiveness of financial reporting and analysis (Nurhidayati et al., 2017).

Top management support, trust, and commitment are critical factors that significantly influence the success and effectiveness of AIS implementation within organisations (Karim, 2011). They are important for a few key reasons: resource allocation and investment (Phuong, 2017)—when top management backs AIS, it makes sure that the right amount of financial, human, and technological resources are invested in it; strategic alignment (Alqudah et al. 2023; Huy & Phuc, 2020)—when top management backs AIS initiatives, it makes sure that they are in line with the organization's overall strategic goals and objectives, making sure that the system directly contributes to the organization's mission and vision.; organizational culture, where trust and commitment from top-level executives foster a culture of data-driven decision-making and accountability within the organization, enabling stakeholders to rely on AIS-generated insights for informed strategic choices (Alathamneh, 2020); change management, where top management support plays a crucial role in change management efforts associated with AIS implementation, facilitating smooth transitions, overcoming resistance to change, and ensuring employee buy-in and participation (Karim, 2011); and system reliability, where trust in the accuracy, reliability, and security of AIS data is paramount, and top management's trust in the system's capabilities encourages its widespread use and acceptance across various organisational functions.

Previous research has underscored the efficacy of AIS in furnishing vital financial insights and enhancing managerial decision-making processes (Alathamneh, 2020; Huy & Phuc, 2020; Phuong, 2017). Nonetheless, despite the growing prevalence of information systems and IT infrastructure within organizations, the overall impact of these systems remains ambiguously quantified (Karim, 2011).

In many developing economies like Sudan, existing literature elucidates significant obstacles hindering the effective implementation of AIS across various sectors (Ismail, 2009; Kwarteng and Aveh, 2018). These challenges often stem from a lack of IT expertise, inadequate information system infrastructure, and limited budget allocations (Ghorbel, 2019). Given the crucial economic significance of the oil industry in Sudan, investigating AIS within this context is particularly important. The various aspects of AIS concerning organizational performance emphasize the need to address technological requirements and key challenges to inform future research aimed at aligning organizational needs with technological advancements, especially concerning AIS support (Budiarto et al., 2019). Discovering novel benefits and potential applications of AIS requires comprehensive research to understand its impact on the essential functions of the accounting domain (Abdo et al., 2021). Enhancing the design and quality of AIS depends on user proficiency and managerial commitment (Ghorbel, 2019).

Therefore, this study aims to examine the factors influencing AIS utilisation and its implications for employee performance in Sudan's top five oil enterprises, specifically exploring potential gaps in AIS implementation and performance across different sectors. The accounting information system combined accounting practices with data, technology, and managerial processes, primarily facilitating the management of financial operations within organisations. It involves the collection, classification, analysis, processing, and dissemination of data relevant to an organisation's financial activities. However, there remains a gap in understanding whether the AIS in these top five oil companies presents unique challenges or opportunities compared to others, potentially addressing a gap in current research on AIS utilisation and performance outcomes. This research aims to fill this gap by investigating the specific nuances and potential problems associated with AIS implementation in these oil enterprises, providing insights into improving AIS effectiveness and employee performance.

Several adoption models and theories explain the determinants influencing end-users' behavior in adopting IT. It is advisable to incorporate factors from diverse theoretical perspectives to gain a comprehensive understanding of IT adoption (Reinking et al., 2015). A nuanced understanding of AIS utilization requires considering factors related to users, technology, and the organization, as they collectively shape utilization patterns (Ismail, 2009; Qudah et al., 2021; Venkatesh et al., 2012). Despite the abundance of literature on factors influencing AIS utilization, little attention is paid to the performance outcomes associated with its usage, particularly in the oil industry context.

The previous discussion highlights that while many studies explore factors influencing AIS utilization, few delve into its performance outcomes. Moreover, the utilization of AIS in developing countries remains largely

unexplored, presenting unique challenges such as organizational support, user competencies, and technological requirements. Hence, researching this in a developing country like Sudan holds significant empirical value.

The proposed study aims to address this gap by investigating how factors like top management support, training, and user perception impact AIS usage and subsequently, organizational performance. By conducting this research in Sudan, where specific challenges may arise, the study aims to contribute to understanding AIS implementation in developing country contexts.

The proposed research model aims to deepen our understanding of AIS utilisation in Sudan's top five oil enterprises. The model enhances the Technology Acceptance Model (TAM) by examining specific elements, particularly the impact of organisational and user-related factors on AIS usage. Additionally, it explores the relationship between AIS utilisation and performance outcomes, encompassing both financial and non-financial activities often overlooked in discussions on performance management systems. Empirically, the decision to evaluate both financial and non-financial performance dimensions is based on research indicating that organisational success transcends financial metrics alone. Aspects like customer satisfaction, employee morale, and operational efficiency are vital contributors to overall organisational performance. Thus, by exploring both dimensions, the study aims to offer a comprehensive understanding of AIS usage's impact on various aspects of organisational performance.

By integrating both factors and performance outcomes within a unified model, this research enables scholars and practitioners to systematically analyse the structural interrelationships among factors, performance outcomes, and AIS from a multifaceted perspective. The following section outlines the research model, associated hypotheses, research methodology, study findings, discussion, implications, limitations, and a concluding summary.

2. Research model and hypotheses

The Technology Acceptance Model (TAM), introduced by Davis in 1986, aims to understand and predict users' acceptance of new technology. It suggests that perceived usefulness and perceived ease of use are the primary factors influencing users' behavioural intentions to use a technology, which subsequently affects their actual usage behaviour. Extensive empirical studies have validated TAM across various technological contexts, highlighting its robustness and applicability. Research consistently shows that perceived usefulness significantly impacts users' intention to use technology, which in turn influences their actual usage behaviour (Bailard, 2014; Qudah et al., 2021). Furthermore, perceived ease of use indirectly affects usage behaviour by influencing perceived usefulness, indicating that users are more likely to find a technology useful if it is easy to use. Due to the fundamental importance of perceived usefulness in TAM and its strong empirical support, it is often a focal point in research (Al-Adwan, 2020). Perceived usefulness is the degree to which users believe that a technology will improve their performance or productivity. It is considered a key driver of technology acceptance because users are more likely to adopt and continue using technology they perceive as beneficial to their tasks or goals (Abu Huson et al., 2024). As a result, this study aims to investigate the factors influencing AIS usage and its impact on oil companies' organizational performance, as illustrated in Figure 1.

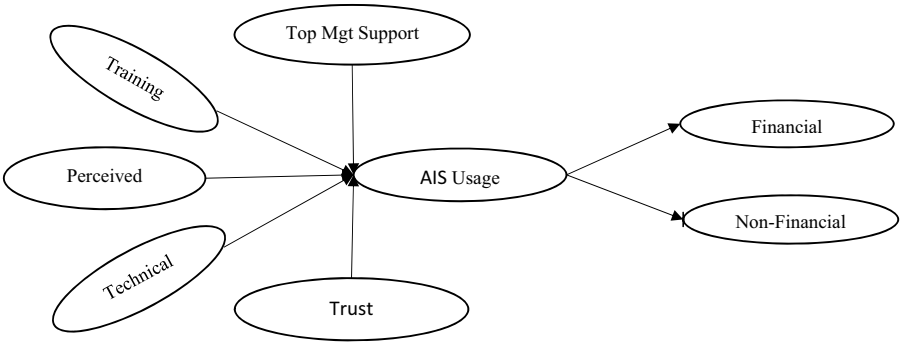

Figure 1. Research model.

2.1. Top management support

Top management support refers to the endorsement and active involvement of senior executives in the implementation and use of information systems within an organization (Dwivedi et al., 2015). This support is crucial as it sets the tone for the organization's approach towards adopting new technologies. When top management is committed to the implementation of an information system such as an Accounting Information System (AIS), it signals to employees that the system is a priority and that resources will be allocated appropriately to ensure its success (Carolina & Susanto, 2017; Tilahun, 2019).

Neglecting top management support can have several negative consequences. One of the most significant impacts is the likelihood of insufficient budget allocation for the implementation and maintenance of the AIS (Shafi et al., 2019). Without adequate financial resources, the AIS may not be properly implemented or supported, leading to suboptimal performance and reduced effectiveness in supporting organizational activities (Al-Raggad et al., 2024; Nguyen et al., 2021).

Several studies have highlighted the importance of AIS within organizations. AIS is not just a tool for financial record-keeping but also serves as a critical component in decision-making processes, strategic planning, and control mechanisms (Hosain, 2019). Therefore, the support of top management is essential to ensure that the AIS is effectively utilized to achieve organizational objectives.

Research by Tan and Teo (2000) and Lutfi et al. (2016) has shown that top management support significantly influences the usage of AIS among employees. When employees perceive strong support from senior management, they are more likely to embrace and utilize the AIS in their daily activities. This support can manifest in various forms, including providing necessary resources, setting clear expectations, and actively promoting the use of the AIS across the organization. Therefore, Hypothesis (1) is formulated as follows:

H1. Top management support positively influences the use of AIS among employees of oil companies in Sudan.

2.2. Training

Training is a pivotal aspect in equipping individuals with the necessary skills, knowledge, and competencies required to effectively execute their job responsibilities (Hussain & Soomro, 2018). As defined by Gibb (1997), training encompasses the process of acquiring information, attitudes, habits, and skills essential for managing various business tasks proficiently. Organizations recognize the importance of investing in comprehensive training programs, both internal and external, aimed at enhancing employee performance and productivity levels (Medina et al., 2014).

In the context of technology adoption, training assumes even greater significance. Employees need to be proficient in utilizing technological tools and systems effectively to carry out their duties efficiently (Momani, et al. 2023; Sutrisno et al., 2023). Therefore, organizations often provide training sessions focused on technology use, including specific software applications such as AIS. These training programs aim to familiarize employees with the functionalities of the system, enhance their technical skills, and ensure that they can leverage the system to its full potential (Jones et al., 2019).

Moreover, research suggests that training positively influences individuals' understanding and awareness of a particular system. Through training, employees accumulate knowledge about the system's features, capabilities, and functionalities, thereby enhancing their ability to utilize it effectively in their daily tasks (Marshall et al., 2008).

Several studies have explicitly demonstrated the positive impact of training on information system implementation and usage. For instance, research by Sharma and Yetton (2007) and Fitrios (2016) has highlighted the significant influence of training programs on improving employees' proficiency in utilizing information systems within organizations. Therefore, Hypothesis (2) is formulated as follows:

H2. Training positively influences AIS usage among employees of oil companies in Sudan.

2.3. Perceived usefulness

In 1989, Davis introduced the concept of perceived usefulness, a crucial component of the Technology Acceptance Model (TAM) that assesses individuals' acceptance of new technology. Davis defines

perceived usefulness as the degree to which a person believes that using a particular system will improve their job performance. In the context of accounting information systems (AIS), perceived usefulness pertains to users' perceptions of how the system can enhance their efficiency in performing accounting tasks, such as financial reporting, data analysis, and decision-making (Andarwati et al., 2020).

When users perceive AIS as beneficial, they are more likely to adopt and utilize it in their work. This perception is based on the belief that AIS will streamline their tasks, improve processes, and help achieve organisational goals. Research over several decades has consistently highlighted the importance of perceived usefulness in technology adoption (Abu Huson et al., 2024). Studies by Igbaria et al. (1997) and Al-Muharfi (2014) have demonstrated a positive correlation between perceived usefulness and the intention to adopt information systems.

Furthermore, researchers acknowledge perceived usefulness and perceived ease of use as key predictors of technology adoption behavior. Perceived ease of use refers to the extent to which users believe that using the system will be effortless (Abdullah et al., 2016). Although both perceived ease of use and perceived usefulness affect technology adoption, perceived utility often plays a more significant role in driving users' intentions to adopt a system. Users are more likely to adopt technology if they perceive it as useful, even if they expect some difficulties in its use (Caffaro et al., 2020).

Researchers have found that perceived usefulness significantly influences users' decisions in the context of AIS adoption. Studies by Tilahun (2019) and Alqudah et al. (2023) have emphasised the importance of perceived usefulness in explaining AIS adoption behavior. For instance, users are more inclined to embrace AIS if they believe it will enhance the accuracy and timeliness of financial reporting, improve decision-making processes, and facilitate information sharing within the organization. Yaghoubi et al., (2010) conducted a study specifically examining the relationship between perceived usefulness and AIS usage. The findings showed a positive association, further highlighting the significance of perceived usefulness in influencing users' actual use of AIS. Consequently, we formulate Hypothesis (3) as follows:

H3. Perceived usefulness positively influences AIS usage among employees of oil companies in Sudan.

2.4. Technical support

Technical support, often referred to as information center support or IT services, is a crucial aspect of ensuring the effective utilization of information systems within organizations (Qudah et al., 2024). This concept has been extensively discussed in the existing literature, highlighting its importance in facilitating technology adoption and usage (Abu Huson et al., 2024; Venkatesh et al., 2012).

Information center support plays a critical role in assisting end-users with information system technology. It encompasses various forms of assistance, including troubleshooting technical issues, providing guidance on system functionalities, and offering training to users (Al-Qudah et al., 2022; Sharma & Yetton, 2007). Effective technical support ensures that users can overcome any challenges or obstacles encountered while using the system, thereby enhancing their confidence and proficiency in utilizing it.

Mahmood et al. (2001) emphasize that technical support is a crucial factor influencing technology usage. Organizations that provide robust technical support mechanisms are more likely to experience higher levels of system adoption and usage among employees (Jo & Park, 2023). When users have access to timely and reliable technical assistance, they are more inclined to engage with the system and leverage its capabilities to perform their tasks efficiently (Veiga et al., 2014).

Furthermore, the collaboration between IT staff and business managers is essential for ensuring the smooth operation of information systems (Fu et al., 2022). Both parties need to harmonize their administrative and technical practices to promote technology adoption and utilization effectively (Abu Huson et al., 2024; Onita & Dhaliwal, 2011; Qudah et al., 2023). IT staff play a key role in maintaining system functionality and addressing technical issues, while business managers provide insights into how the system can best support organizational goals and processes.

Research by Taiwo and Edwin (2016) provides empirical evidence of the positive impact of IT services on AIS usage. Their findings demonstrate that organizations that invest in robust technical support mechanisms experience higher levels of AIS adoption and utilization among employees. Based on these insights and empirical evidence, Hypothesis (4) is formulated as follows:

H4. Technical support positively influences AIS usage among employees of oil companies in Sudan.

2.5. Trust

Trust, a concept extensively studied in the realm of technology acceptance, plays a pivotal role in influencing individuals' willingness to adopt and utilize information systems effectively (Lai & Joao, 2022). Research spanning various disciplines, including information systems and psychology, has delved into the multifaceted nature of trust and its implications for technology adoption (Kassim et al., 2012; Söllner et al., 2016).

In the context of information systems, trust can be defined as the level of confidence that users have in the system's ethicality, credibility, legality, and security. Users are more likely to adopt and utilize information systems if they perceive them as trustworthy and reliable, with assurances regarding data security, privacy protection, and system integrity.

Empirical evidence from research in technology acceptance consistently highlights the fundamental role of trust in fostering the adoption and utilization of information systems (Söllner et al., 2016). Users who trust the system are more inclined to engage with it, share sensitive information, and rely on its outputs to support their decision-making processes (Albalawee et al., 2024). Trust acts as a catalyst for building positive attitudes towards the system, mitigating perceived risks, and enhancing users' overall satisfaction and acceptance. Therefore, Hypothesis (4) is as follows:

H5. AIS usage among employees of oil companies in Sudan is positively influenced by trust.

2.6. Accounting information system & performance

Numerous studies have identified the utilisation of AIS as a key determinant of organisational performance. As with earlier research (Huy & Phuc, 2020; Khairuddin et al., 2010), Dibrell et al. (2008) show how important technology investment is in shaping how innovative a company is and how well it does overall. They stress how important AIS is for putting organisational strategies into action and making the company more flexible.

Empirical evidence indicates that adopting and effectively using AIS contributes to improved company performance indicators and productivity (Pérez et al., 2011). By enabling more efficient financial reporting, data analysis, and decision-making processes, AIS allows organisations to make informed strategic decisions and allocate resources more effectively. Therefore, studies have linked AIS usage to improved financial performance outcomes.

Additionally, beyond financial metrics, numerous studies have underscored the relationship between AIS usage and non-financial performance indicators. For example, research by Tuanmat & Smith (2011), Trigo et al. (2014), and Budiarto et al. (2018) has shown the positive impact of AIS utilisation on non-financial aspects such as operational efficiency, customer satisfaction, and employee productivity.

Therefore, we formulate the following hypotheses (6a) and (6b) based on the existing literature and empirical evidence:

H6a. AIS usage positively impacts financial performance.

H6b. AIS usage positively impacts the non-financial performance.

3. Methodology

This study employs a survey methodology to explore the subtleties of AIS usage in Sudan's top oil companies. We carefully selected these companies based on empirical data that demonstrated their substantial control over Sudan's oil sector, accounting for approximately 70% of the market share (Ministry of Power in Sudan, 2023). Reliable sources, such as Sudan's Ministry of Power, reported their dominant position in production volumes and significant influence on the country's oil industry, which served as the basis for this selection. This deliberate choice ensures that the study's findings reflect the broader industry landscape, offering relevant and applicable insights.

Furthermore, we have methodically approached the operationalization of variables in this study to ensure clarity and mitigate biases, particularly in the measurement of financial performance. Specific

indicators have operationalized each variable, including top management support, trust, perceived ease of use, training, technical support, performance, and AIS usage (Davis, 1986, 1989; Igbaria et al., 1995; Teo & Choo, 2001; Le Cornu & Luckett, 2000).

The survey methodology employed a random sampling technique to select participants from each of the big five oil companies, ensuring representation from various departments. The study tested seven hypotheses, examining factors and performance outcomes related to AIS usage in a developing-country context. At the individual level, employees in departments actively engaged with AIS, such as accountants, auditors, and financial managers, served as the unit of analysis. This focused approach enables a detailed investigation into the factors influencing AIS usage and its impact on organisational performance.

The questionnaire adoption process underwent rigorous steps, including survey item development, pre-testing procedures, and adjustments based on feedback during the pre-testing phase. The study used a 4-part questionnaire with a 5-point Likert scale to make sure it got a full picture. Hair et al. (2010) decided that 215 completed questionnaires were sufficient for statistical analysis using structural equation modelling (SEM). Clarifying the sampling technique, questionnaire adoption process, and measurement approach enhanced the transparency and rigour of the research methodology, further solidifying the study's credibility and validity.

4. Results

The distribution of 325 questionnaires yielded 215 valid responses, indicating a 61% response rate. The demographic breakdown of the respondents indicates that 73% were middle-level employees, 17.6% were junior employees, and 9.3% were top-level employees from various departments, primarily consisting of middle-level management. In terms of AIS usage, 2.3% had used it for less than 1 year, 41.6% for 1–3 years, 39.7% for 3–5 years, and 16.4% for more than 5 years, indicating extensive experience with it among the majority.

Furthermore, 83.3% confirmed generating reports using AIS twice a day, and 61% spent between 3 and 5 h working within AIS. The demographic characteristics of the 215 respondents show a predominantly male group (60.5%), with most working in accounting (34.9%), finance (27.9%), or auditing (20.9%) departments. The educational background varied, with 55.8% holding bachelor's degrees, 37.2% having master's degrees, and 7% having doctorates. Age-wise, the largest group was 31–40 years old (41.9%), followed by 20–30 years (27.9%), 41–50 years (23.3%), and 51+ years (7%). Employee levels were primarily middle (73%), followed by junior (17.60%) and top (9.30%).

Experience with AIS was mainly between 1–3 years (41.60%) and 3–5 years (39.70%). Report generation occurred twice a day for 83.30% of respondents, and 61% spent 3–5 h in AIS. These statistics reflect a diverse yet experienced pool of respondents, particularly in terms of AIS usage and their roles within their respective departments (Abdo et al., 2021; Abu Huson et al., 2024; Alba-lawee et al., 2024; Alqudah et al., 2023; Al-Qudah et al., 2022; Al-Raggad et al., 2024) (Table 1).

We assessed the model's credibility using various fit indices (see Table 2). We found the Comparative Fit Index (CFI) to be 0.923, above the acceptable threshold of 0.90, indicating an acceptable fit (Abdullah et al., 2016; Al-Adwan, 2020). Similarly, the Tucker-Lewis Index (TLI) scored 0.912, also surpassing the 0.90 threshold, signifying an acceptable fit (Al-Muharfi, 2014; Alqudah, et al. 2024). The standardised root mean square residual (SRMR) was 0.045, which is less than the 0.08 threshold, reflecting a good fit (Ali et al., 2016; Almutairi, 2007). Additionally, the root mean square error of approximation (RMSEA) was 0.037, falling below the 0.06 threshold, further confirming a good fit (Budiarto et al., 2018).

4.1. Assessment of the measurement model

The next step involves testing for discriminant validity. Discriminant validity assesses the degree to which a construct's measures are distinct from those of other constructs. Low correlations between the measures of the construct of interest and those of other constructs indicate good discriminant validity. One

Table 1. Demographic Characteristics of Respondents.

Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Male	130	60.50
	Female	85	39.50
Department	Accounting	75	34.90
	Auditing	45	20.90
	Finance	60	27.90
	Other	35	16.30
Education Level	Bachelor's Degree	120	55.80
	Master's Degree	80	37.20
	Doctorate	15	7
Age Group	20–30 years	60	27.90
	31–40 years	90	41.90
	41–50 years	50	23.30
	51+ years	15	7
Employee Level	Middle-Level	157	73
	Junior-Level	38	17.60
	Top-Level	20	9.30
Experience with AIS	Less than 1 year	5	2.30
	1–3 years	89	41.60
	3–5 years	85	39.70
	More than 5 years	36	16.40
Frequency of Report Generation	Twice a day	179	83.30
Hours Spent in AIS	3–5 h	131	61

Table 2. Model's credibility.

Model Fit Indices	Value	Threshold	Comment
CFI	0.923	>0.90	Acceptable fit
TLI	0.912	>0.90	Acceptable fit
SRMR	0.045	<0.08	Good fit
RMSEA	0.037	<0.06	Good fit

Table 3. Average variable explained, composite reliability of the model variables.

Variables	CR	AVE	Factor loading	MaxR(H)
Top Management Support	0.731	0.660	0.823	0.715
Training	0.789	0.625	0.798	0.790
Perceived Usefulness	0.754	0.629	0.796	0.638
Technical Support	0.893	0.615	0.891	0.801
User Trust	0.875	0.667	0.874	0.827
AIS USAGE	0.874	0.628	0.847	0.724
Financial	0.769	0.590	0.770	0.710
Nonfinancial	0.799	0.594	0.717	0.702

way to check for discriminant validity is to look at the average variance extracted (AVE) for each construct and the squared correlations between the constructs (Fornell & Larcker, 1981). As shown in Table 3, the squared correlations of each construct are lower than the AVE of the indicators measuring it, indicating acceptable discriminant validity. In summary, the measurement model demonstrates both acceptable discriminant validity and convergent validity.

Hair et al. (2010) recommend evaluating convergent validity using extracted composite reliability, factor loadings, and average variance. In Table 4, all item loadings surpass the suggested value of 0.5, indicating strong convergent validity.

Hair et al. (2014) also suggest that composite reliability values, which show the degree to which the indicators of a construct reflect the underlying latent construct, range between 0.754 and 0.893, exceeding the recommended threshold of 0.7. Furthermore, the extracted average variance, which represents the total variance explained by the indicators in the latent construct, falls between 0.590 and 0.667, exceeding the suggested value of 0.5. This demonstrates strong convergent validity.

As shown in Table 5, all hypotheses are supported, except for H2 and H4. Structural model analysis is required to examine the hypotheses related to AIS usage. The findings reveal that the factors of top management support (H1) ($\beta = 0.150$, $p = 0.003 < 0.05$, accepted), perceived usefulness (H3) ($\beta = 0.464$, $p = 0.004 < 0.05$, accepted), and trust (H5) ($\beta = 0.517$, $p = 0.000 < 0.05$, accepted) have significant effects on AIS usage. However, training (H2) ($\beta = -0.19$, $p = 0.577 > 0.05$, rejected) and technical support (H4) ($\beta = -0.19$, $p = 0.654 > 0.05$, rejected) are not significant.

Table 4. Fornell & Larcker criterion.

Top Management Support	0.558							
Training	−0.124	0.654						
Perceived Usefulness	0.079	0.885***	0.437					
Technical Support	−0.023	0.680***	0.138	0.527				
User Trust	0.053	0.595***	0.707***	0.329***	0.564			
AIS USAGE	0.403**	0.539***	0.841***	0.370***	0.902***	0.447		
Financial	0.05	0.172†	0.623***	−0.005	0.758***	1.087***	0.44	
Nonfinancial	−0.219	0.206	0.576**	0.062	0.101	0.613**	1.111**	0.294

Table 5. Regression weights: (group number 1-default model).

			Estimate	S.E	C.R	*p*	Comment
AIS_USAGE	<---	Top Management Support	.150	.053	2.807	0.003	Sig
AIS_USAGE	<---	Training	−.019	.034	−.558	0.577	Not Sig
AIS_USAGE	<---	Perceived Usefulness	.464	.160	2.909	0.004	Sig
AIS_USAGE	<---	Technical Support	−.019	.042	−.449	0.654	Not Sig
AIS_USAGE	<---	User Trust	.517	.082	6.296	***	Sig
Financial	<---	AIS_USAGE	.827	.107	7.757	***	Sig
Nonfinancial	<---	AIS_USAGE	.449	.107	4.213	***	Sig

Furthermore, the results indicate that subsequent IS usage significantly impacts financial performance (H6) ($\beta = 0.679$, $p = 0.000 < 0.05$, accepted) and non-financial performance (H7) ($\beta = 0.739$, $p = 0.000 < 0.05$, accepted). Figure 1 illustrates the findings of the research model.

5. Discussion

The oil industry has conducted a study using structural equation modelling (SEM) to investigate the factors influencing the use of accounting information systems (AIS) and the impact of AIS usage on performance. The study also used structural equation modelling (SEM) to look at the connections between these factors and AIS use, which gave the empirical investigation a strong statistical base. The empirical analysis revealed several key insights. First, the real-world evidence supported the idea that strong support from upper management (H1) makes people more likely to use AIS, which is in line with what Almutairi (2007) and Lutfi et al. (2016) found. This empirical validation underscores the critical role of management buy-in in fostering a technological culture conducive to AIS integration (Carolina & Susanto, 2017).

Secondly, the study's findings regarding training (H2) contradicted initial expectations but resonated with Medina et al.'s (2014) observations on the limitations of conventional training methods. This real-world contradiction makes us think that to really improve AIS use, we need training programmes that are more tailored to each situation (Hussain & Soomro, 2018; Medina et al., 2014). Third, the evidence that perceived usefulness (H3) has a positive effect on AIS use is in line with what other studies have found (Tilahun, 2019). This underscores the critical importance of aligning AIS functionalities with user needs and organisational objectives for optimal adoption and utilisation.

Additionally, the study's findings regarding trust (H5) align with previous research (Lin & Ho, 2008), emphasising the multifaceted nature of technology adoption. Addressing both technical support and social aspects, such as building trust in the system, is crucial for successful AIS adoption and utilization. The study also found empirically supported positive associations between AIS usage and both financial (H6a) and non-financial performance (H6b). This aligns with previous studies (Budiarto et al., 2019; Ironkwe & Nwai-wu, 2018; Isa, 2017) and underlines the importance of AIS in enhancing various aspects of performance within the oil industry. By leveraging AIS capabilities, organisations can improve decision-making, operational efficiency, and overall performance objectives (Raymond & St-Pierre, 2005).

In conclusion, the empirical findings of this study provide valuable insights into the factors influencing AIS adoption and its consequential impact on organisational performance within the oil industry. These insights, supported by a robust statistical analysis using SEM, offer practical implications for managers

and policymakers seeking to optimise their accounting information systems across various sectors. The findings suggest that fostering top management support, providing tailored training, ensuring perceived usefulness, and offering technical support can all contribute to successful AIS adoption. Additionally, leveraging AIS capabilities can lead to improved financial and non-financial performance. These insights can be valuable not only for the oil industry but also for organisations in other sectors looking to optimise their accounting information systems.

5.1. Research implications

Given the research objectives, this study aims to deepen our understanding of AIS usage in oil companies by proposing a model that connects three key constructs: AIS usage factors (Set 1), AIS usage, and performance outcomes (Set 3). Figure 1 illustrates this model, with Set 1 encompassing factors such as top management support, training, perceived usefulness, technical support, and user trust. Set 3 comprises performance outcomes, including both financial and non-financial aspects.

The AIS usage model, as tested in this study, highlights the importance of top management support and user trust in the adopted technologies. This research contributes to our understanding of the factors and performance outcomes of AIS usage. Additionally, it showcases the value of applying technology acceptance models and frameworks in conjunction with SEM analysis within the context of a developing country, such as Sudan. This article enriches the existing literature by modifying the TAM model, which has received significant attention in the realm of technology adoption (Siyal et al., 2019).

Overall, this study supports the applicability of the TAM in elucidating the factors influencing AIS usage and its impact on performance outcomes. Despite the extensive literature on information system applications, there is a notable gap in research that combines the examination of usage, related factors, and performance outcomes within a single model in the AIS field.

This article makes significant contributions to the AIS literature on the factors and performance outcomes of AIS usage. First, the study develops and validates a set of constructs that effectively capture AIS usage. It identifies three out of five factors that significantly influence AIS usage and establishes a significant relationship between AIS usage and both financial and nonfinancial performance constructs.

Second, the study delves deeper into the relationship between AIS usage and performance by examining key selected factors. The findings confirm a positive association between AIS usage and top management support, indicating that managers recognise the importance of technology and allocate adequate budgets to promote AIS usage in oil companies in Sudan. Additionally, adopting AIS technologies requires investments in employee development and training to ensure that they can effectively and efficiently use these technologies.

In addition to its academic implications, the study provides practical insights for financial managers, auditors, and accountants. Managers are advised to carefully select AIS vendors with experience and a deep understanding of the unique characteristics of the oil industry. Employees should receive training to comprehend information systems and implement effective AIS in the corporation, despite the fact that the data does not support training as an antecedent of AIS usage. Oil companies in Sudan should leverage their AIS usage to identify opportunities from information system investments and prioritise initiatives that enhance accounting, auditing, and financial transactions. Understanding the antecedents and performance outcomes allows managers to adopt a holistic view of AIS usage.

The utilisation of information systems, especially accounting information systems (AIS), is of paramount importance for oil companies operating in Sudan. These companies operate in a highly competitive environment within the oil industry, and AIS provides them with the necessary resources and capabilities to effectively meet these challenges. To encourage and support the adoption of information systems, the Sudanese government should implement targeted technology initiatives that assist companies in utilising AIS to its full potential.

The study's results further demonstrate that oil companies are indeed using AIS to enhance both their financial and nonfinancial performance.

5.2. Limitations & future directions

Given the limitations of this study, it is critical to highlight potential factors that could enhance the depth and breadth of future research on AIS usage and performance outcomes. Firstly, although the current study explores factors influencing AIS usage in the oil industry, we could explore additional aspects to deepen our understanding. Organisational culture is one such factor. Research has shown that organisational culture plays a significant role in shaping attitudes towards technology adoption and usage. For instance, studies by Venkatesh et al. (2003) and Rogers emphasise how organisational values, norms, and beliefs regarding technology influence employees' acceptance and utilisation of technological systems like AIS. Therefore, investigating the impact of organisational culture on AIS usage and its subsequent performance outcomes could provide valuable insights into the nuances of technology adoption within different organisational contexts.

Secondly, the study's sample size, limited to five major oil companies in Sudan, raises questions about the generalizability of the findings. To address this concern and gain a more comprehensive understanding, future research should consider incorporating a larger and more diverse sample that encompasses various sectors beyond the oil industry. Moreover, exploring the regulatory environment could offer valuable perspectives on the interplay between external regulatory factors and AIS usage. Research by Davis (1989) and Venkatesh et al. (2003) highlights the influence of regulatory requirements and industry-specific regulations on technology adoption and usage patterns. Therefore, examining how the regulatory landscape shapes AIS implementation and performance outcomes could contribute significantly to the existing body of knowledge.

Additionally, the quantitative approach employed in this study, while valuable for statistical analysis, may not capture the dynamic nature of technology adoption and usage over time. To address this limitation, future research could benefit from a longitudinal study design. Longitudinal studies enable researchers to track changes in technology usage patterns, perceptions, and performance outcomes across multiple time points. This approach aligns with recommendations from scholars like Rogers and Davis (1989), who emphasise the importance of longitudinal research in understanding the evolution of technology adoption within organisations.

Finally, taking into account the real-world reasons for these suggestions, the existing research backs up the idea that organisational culture, the regulatory environment, and longitudinal study designs can affect how people adopt and use technology. Studies by Venkatesh et al. (2003), Rogers, Davis (1989), and other scholars in the field of technology adoption and organisational behaviour offer valuable insights into these factors' impact on AIS implementation and performance. Integrating these factors into future research endeavours would not only address the current study's limitations but also contribute significantly to advancing our understanding of AIS dynamics and their implications for organisational performance across diverse industries.

6. Conclusion

This paper introduces and validates a model that elucidates the structural relationships between various factors and performance outcomes of AIS usage among individual employees in the five major oil companies in Sudan. The study aims to examine these relationships as AIS usage has gained increasing importance in reflecting the strategic roles of information systems within organizations. Additionally, the use of AIS offers several opportunities for companies to carry out accounting functions more efficiently and effectively.

The results from the statistical analysis indicate that AIS is relatively well-accepted within the oil companies in Sudan, marking a shift from traditional accounting methods to computer-based applications. Given the evolving landscape of AIS technologies, software versions, and the challenges associated with organisational restructuring, particularly in the oil industry, it is crucial to consider the successful implementation and usage of AIS.

Based on the empirical evidence, this research provides a fresh perspective on AIS usage in the big five oil companies, along with the factors and performance outcomes associated with such usage. The findings suggest that these companies need to adapt to change, taking into account global

environmental concerns and the promotion of user-friendly production. However, investments in AIS applications alone do not guarantee improved performance outcomes unless they are aligned with the rapidly evolving technological landscape. In this context, the oil companies in Sudan must enhance their capabilities in managing information systems effectively to support strategic usage beyond conventional applications.

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Informed consent

Consent to participate was obtained in written form from all participants prior to their inclusion in the study.

Ethical approval

This study was conducted in accordance with ethical principles and guidelines for research involving human participants. Ethics approval was obtained from the Ethics Committee of Applied Science Private University. All participants provided informed consent before participating in the study, and their anonymity and confidentiality were strictly maintained throughout the research process.

Author contributions

All authors contributed significantly to this research. Ibrahim Magboul and Fekri Shawtri, as Assistant Professors in the Department of Business Administration & Computer Science at the Community College of Qatar, played integral roles in designing the study, collecting and analyzing data, and contributing to the conceptualization of the research model. Mohammad Jebreel, the corresponding author and Assistant Professor in the Accounting Department at the Faculty of Business, Applied Science Private University, Middle East University, Amman, Jordan, provided substantial input in developing the research model and guiding the empirical analysis. Majed Qabajeh, also an Assistant Professor in the Accounting Department at the same institution, contributed significantly to the literature review, data interpretation, and the refinement of hypotheses. Dr. Ayman Al-Shanti, Associate Professor, Department of Accounting and Accounting Information Systems, Amman University College, Al-Balqa Applied University in Jordan, enriched the discussion section. Yazan Abu Huson, a Ph.D. student at the University of Valencia, Spain, made proofreading and valuable contributions to the literature review and provided insights into the global perspective of the study. All authors participated in drafting and revising the manuscript, ensuring its intellectual coherence and academic rigor.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Data availability statement

The data gathered for this study was generated using a questionnaire. Data will be shared upon reasonable request following the Share upon reasonable request data sharing policy.

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