




# A model for using knowledge management systems to improve decision-making within the South African energy sector



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**Background:** Organisations in the energy sector play a vital role in ensuring the stability of the national energy supply. Effective knowledge-driven decision-making is of paramount importance to deliver stable energy in the sector. However, many organisations in the energy sector continue to experience low uptake and limited integration of Knowledge Management Systems (KMSs) into operational processes, despite their recognised benefits in supporting evidence-based decision-making and preserving organisational knowledge.

**Objectives:** This research aimed to develop a model for the use of KMSs to improve decision-making within the South African energy sector.

**Method:** This study employed a quantitative research approach, utilising closed-ended questionnaires, to collect data from 150 respondents within an organisation in the South African energy sector, aiming to determine the technological, organisational and environmental factors that influence the use of KMSs. The collected data were then analysed using IBM Statistical Package for Social Sciences (SPSS).

**Results:** The results indicate that self-efficacy, usefulness, motivational culture, performance expectancy and policies and standards are the strongest predictors of behavioural intention to use the KMSs within the South African energy sector. The correlation results further confirmed significant positive associations between perceived usefulness, organisational support and the intention to adopt the system.

**Conclusion:** The developed model highlights the importance of addressing individual confidence, organisational culture and clear governance models to promote effective KMS usage. The model serves as a guide for the implementation and integration of KMSs to improve knowledge-enabled decision-making in the operational processes of organisations in the South African energy sector.

**Contribution:** This study contributes an empirically validated model for supporting KMS usage in the energy sector. The model can inform policy development, training programmes and system design to strengthen knowledge management practices in similar organisational contexts.

**Keywords:** Knowledge Management Systems; decision-making; UTAUT; TOE; energy sector.

## Introduction

In today's increasingly complex and data-driven operating environments, effective decision-making relies not only on individual expertise but also on an organisation's capacity to systematically capture, store and reuse knowledge. Knowledge management needs are particularly crucial in the South African energy sector, where ageing infrastructure, operational inefficiencies and the retirement of skilled personnel have exposed systemic weaknesses in how institutional knowledge is managed and leveraged (Mawere & Mukonza 2025).

Knowledge Management Systems (KMSs) have emerged as powerful tools for addressing these challenges (Dalkir 2023). By enabling the acquisition, storage, retrieval and dissemination of both tacit and explicit knowledge, KMSs support evidence-based decision-making, reduce duplication of effort and improve organisational learning. Preserving expert knowledge and making it accessible across all employees is essential to maintaining service continuity and fostering innovation (Carlucci, Kudryavtsev & Bratianu 2022).

Despite their potential, public and private organisations continue to struggle to implement effective KMSs (Ganapathy, Mansor & Ahmad 2020; Kavalic, Petrova & Hussein 2021). Challenges such as limited employee buy-in, inadequate technological infrastructure and fragmented data sources continue to hinder usage and effective decision-making. As a result, crucial decisions are often made without reference to historical data or shared expertise, contributing to inconsistent service delivery and strategic misalignment.

Research underscores that the successful use of KMSs is shaped by a combination of technological, organisational and human factors (Tornatzky & Fleischer 1990; Venkatesh et al. 2003). However, few empirical studies have examined these dynamics within South Africa's energy sector, representing a significant gap in both academic literature and managerial practice.

To address this, the current study develops a model for KMSs use to improve decision-making in the South African energy sector, adopting the Unified Theory of Acceptance and Use of Technology (UTAUT) model (Venkatesh et al. 2003) and the Technology Organisation and Environment (TOE) model (Tornatzky & Fleischer 1990) to capture the multifaceted nature of KMS adoption and utilisation.

## Problem statement

The South African energy sector is currently undergoing significant structural and operational strain, marked by frequent service disruptions, ageing infrastructure and organisational inefficiencies (International Energy Agency 2023). One of the crucial challenges facing this sector is the loss of organisational knowledge, particularly within the energy sector, where experienced personnel are retiring or exiting without formal mechanisms to retain or transfer their knowledge (Hera, Mokoena & Dlamini 2024).

Although KMSs offer proven value in capturing, storing and sharing both tacit and explicit knowledge, their integration into daily operations in the energy sector remains limited (Okharedia 2019). Many organisations still rely on informal knowledge-sharing practices, scattered documentation or legacy systems that do not support dynamic access to institutional memory. As a result, decision-making is often fragmented, reactive and disconnected from historical data or learned expertise (Okour, Chong & Fattah 2021).

Existing research suggests that the adoption and successful use of KMSs is influenced by several interdependent factors, including technological infrastructure, organisational readiness and user behaviour (Tornatzky & Fleischer 1990; Venkatesh et al. 2003). However, there is a lack of empirical research that specifically investigates these factors within the South African energy sector.

Therefore, this research aims to identify the factors influencing the use of KMSs in improving decision-making within the energy sector. The existing body of knowledge regarding

the practical application of KMSs to enhance decision-making in the South African energy sector is limited (Okour et al. 2021). Hence, the present study aimed to fill this gap by developing a model for using KMSs to improve decision-making within the South African energy sector.

## Research objectives

The primary research objective of this study is to develop a model for utilising KMSs to improve decision-making within the South African energy sector.

To achieve this aim, the study was guided by the following specific research objectives:

- *RO1: To determine the factors that influence the use of KMSs for improved decision-making within the South African energy sector.*
- *RO2: To determine the significance of the identified factors in the use of KMSs for improved decision-making within the South African energy sector.*
- *RO3: To identify the components of a model for using KMSs to improve decision-making within the South African energy sector.*

## Literature review

The effective implementation of KMSs is increasingly recognised as a strategic necessity in knowledge-intensive sectors such as energy (Okharedia 2019). The KMSs support organisations in capturing, storing and disseminating institutional knowledge, improving decision-making, enhancing collaboration and ensuring continuity despite staff turnover or operational disruptions. In South Africa's energy sector, this has become crucial because of ageing infrastructure, operational inefficiencies and the departure of experienced personnel without structured knowledge transfer mechanisms (Okharedia 2019; Salakhedinov & Agyeno 2012).

The literature highlights multiple factors that influence the successful adoption and use of KMSs. These include technological readiness, organisational culture, managerial support and individual user acceptance (Ganapathy et al. 2020). For instance, user-related factors such as perceived usefulness, ease of use and self-efficacy are known to affect attitudes towards system adoption (Venkatesh et al. 2003). Organisational factors like leadership commitment, training and a culture that promotes knowledge sharing further influence adoption success (Kavalic et al. 2021).

However, despite the global recognition of these enablers and barriers, relatively little empirical research has been conducted within South Africa's public utilities, particularly in the energy sector (Dalkir 2023).

Knowledge management in South Africa's energy sector differs from other sectors because of ageing infrastructure, operational inefficiencies, skill shortages and the loss of experienced personnel without formal knowledge transfer

mechanisms (Okharedia 2019; Salakhmetdinov & Agyeno 2012). The sector relies heavily on legacy systems and tacit knowledge (Folly 2021), unlike industries such as customer support and information and communications technology (ICT), which use digital KMSs to enhance innovation and competitiveness (Agrawal, Kumar & Mukti 2021; Reddy, Reddy & Jonnalagadda 2022). Organisational silos, limited technology adoption and weak knowledge-retention strategies further hinder knowledge transfer, leaving knowledge management in the energy sector less mature and more operationally focused than in other South African sectors (Dalkir 2023).

Existing studies focus either on general ICT adoption or on isolated components of knowledge management, without offering a consolidated model that integrates human, technological and organisational dimensions. This study addresses that gap by applying and extending established theoretical models to identify the determinants of KMS usage and impact on decision-making effectiveness within a state-owned energy enterprise.

## Theoretical Foundations

This study is anchored in two interrelated theoretical models, the UTAUT and TOE. Together, these models provide a multidimensional understanding of how individual, organisational and contextual factors influence the adoption and effective use of KMSs in the South African energy sector.

### Technology Organisation and Environment

The TOE model developed by Tornatzky and Fleischer (1990) posits that technology adoption is shaped by three overarching domains: technological, organisational and external environment. In this study, the *technological* environment includes variables such as compatibility and security of KMS tools. The *organisational* environment covers motivational culture, training and internal communication. The *external* environment, although less emphasised in this research, includes broader considerations regarding policy alignment and regulatory expectations.

The TOE provides the rationale for investigating structural readiness and institutional practices, supporting hypotheses such as the influence of motivational culture and policies, as well as standards on behavioural intention. These factors reflect the importance of an enabling organisational climate and governance structure in ensuring successful KMS adoption. The following constructs from TOE informed the conceptual framework and were found relevant for the study:

- Compatibility refers to the extent to which a new system or innovation aligns effectively with existing systems within an organisation (Tornatzky & Fleischer 1990).
- System security relates to the measures and strategies used to safeguard systems against unauthorised access, threats or breaches (Van Zyl, Henning & Van der Poll 2022).

- Usefulness refers to the extent to which a system provides value or benefits in achieving organisational goals or specific tasks (Venkatesh et al. 2003).
- Training involves equipping employees with adequate knowledge and skills to effectively utilise KMSs (Carlucci et al. 2022).
- Motivational culture describes an organisational environment that actively fosters and maintains high levels of employee motivation, engagement and positive attitudes toward knowledge sharing and collaboration (Kmieciak 2021).
- Motivational culture refers to the organisational environment that actively encourages and sustains motivation, collaboration and employee involvement in knowledge sharing (Kmieciak 2021).
- Policy and Standards refer to guidelines and principles that shape decision-making, where specific benchmarks and criteria are used to ensure quality and compliance (Kayikci, Smith & Jones 2022).
- Community of Practice is well defined as a group of employees sharing a common interest or skill and collaborating to learn and improve together (Kayikci et al. 2022).
- Communication involves the processes by which employees exchange knowledge and collaborate (Ganapathy et al. 2020).
- Process refers to the structured sequence of actions or steps followed by an organisation to accomplish defined objectives or tasks (Kayikci et al. 2022).

Both UTAUT and TOE emphasise that technological solutions like KMSs must not be viewed in isolation but rather integrated into organisational workflows and supported by appropriate user training and cultural practices (Tornatzky & Fleischer 1990; Venkatesh et al. 2003). These models helped shape the questionnaire design and construct selection, especially in capturing the operational realities of a large state-owned enterprise with varied user levels. These models informed the design of the questionnaire, the selection of constructs, and the development of the conceptual model, which illustrates how individual (self-efficacy, performance expectancy), organisational (motivation, culture) and structural (policies and standards) factors interact to influence behavioural intention and actual KMS use.

Previous studies have applied these models in other sectors. One study (Tan & Lee 2024) integrated both models to analyse blockchain adoption in the supply chain industry, showing that combining individual and organisational factors improved blockchain adoption outcomes, and another study (Mukred, Al-Khoury & Hassan 2019) used UTAUT in the education sector to study the adoption of electronic records management (ERMS), extending it with factors such as policy support, training, system quality and security to better explain ERMS adoption and found that performance expectancy, effort expectancy, social influence and facilitating conditions significantly influence users' intention to adopt

ERMS, while the added organisational and technological factors further enhance adoption outcomes. A study that applied both models in the e-government sector revealed that technological and organisational barriers limited adoption in developing countries (Alfiani Gunawan & Santoso 2024). However, few studies have applied both models simultaneously in the South African energy sector, indicating a clear research gap.

### Unified Theory of Acceptance and Use of Technology model

The UTAUT model, developed by Venkatesh et al. (2003), identifies four key constructs: performance expectancy, effort expectancy, social influence and facilitating conditions, as determinants of users' behavioural intention to adopt a technology. In this study, UTAUT is applied to investigate how individual-level perceptions drive KMS use. Specifically, performance expectancy was measured to assess whether employees believe that using KMSs would enhance their job performance, and self-efficacy was included as an additional construct because of its empirical relevance in influencing technology acceptance, particularly in organisational contexts where digital systems are newly introduced (Venkatesh et al. 2003). Effort expectancy was initially included in the questionnaire but was ultimately not supported in the final regression model, highlighting the complexity of perceived ease of use in the target population.

The following constructs from the UTAUT informed the conceptual framework and were found to be relevant for the study:

- Performance expectancy assesses the construct as the extent to which an individual believes that using the system will help attain gains in job performance (Venkatesh, Thong & Xu 2016).
- Effort expectancy is the extent of ease associated with the use of the system (Venkatesh et al. 2016).
- Self-efficacy refers to employees being able to easily navigate the system and find the information they need (Venkatesh et al. 2016).
- Social influence is the extent to which an individual perceives that important others believe that individuals should use the new system (Mashaba 2021).
- Several other moderating constructs, such as gender and experience (skill and qualification level), are used to predict user behaviour and behavioural intentions within the UTAUT theoretical model.
- Skill refers to the employees' acquired abilities, competencies and proficiencies through practice and experience (Venkatesh et al. 2016).
- Qualification level refers to the relative complexity, depth and expertise associated with a particular educational or training attainment (Venkatesh et al. 2016).

Demographic factors, such as age and experience, are moderately important constructs that influence how employees adopt and utilise KMSs (Venkatesh et al. 2003).

In the South African energy sector, these differences are particularly important, as varying digital literacy and workforce experience affect system usability and reliance on organisational support, shaping overall KMS adoption (Marikyan & Papagiannidis 2023).

### Integration of Unified Theory of Acceptance and Use of Technology and Technology Organisation and Environment for a multidimensional perspective

Integrating UTAUT and TOE provides a comprehensive model for assessing KMS adoption. Unified Theory of Acceptance and Use of Technology captures user-level behavioural drivers, while TOE accounts for organisational and environmental readiness (Kayikci et al. 2022; Tornatzky & Fleischer 1990; Venkatesh et al. 2003). This multidimensional perspective is crucial in the South African energy sector, where ageing infrastructure, diverse employee skill levels and complex regulatory demands require a layered understanding of innovation uptake (Okharedia 2019). Collectively, these models informed the study's hypotheses:

- H1a: Compatibility has a positive influence on behavioural intention to use KMS to improve decision-making.
- H1b: Security has a positive influence on behavioural intention to use KMS to improve decision-making.
- H2a: Effort expectancy has a positive influence on behavioural intention to use KMS to improve decision-making.
- H2b: Usefulness has a positive influence on behavioural intention to use KMS to improve decision-making.
- H2c: Self-efficacy has a positive influence on behavioural intention to use KMS to improve decision-making.
- H3a: Training has a positive influence on behavioural intention to use KMS to improve decision-making.
- H3b: Motivational culture has a positive influence on behavioural intention to use KMS to improve decision-making.
- H4a: Communication has a positive influence on behavioural intention to use KMS to improve decision-making.
- H4b: Process has a positive influence on behavioural intention to use KMS to improve decision-making.
- H5a: Skills have a positive influence on behavioural intention to use KMS to improve decision-making.
- H5b: Qualification level has a positive influence on behavioural intention to use KMS to improve decision-making.
- H5c: Social influence has a positive influence on behavioural intention to use KMS to improve decision-making.
- H5d: Performance expectancy has a positive influence on behavioural intention to use KMS to improve decision-making.
- H6a: Community of practice has a positive influence on behavioural intention to use KMS to improve decision-making.

- H6b: Policies and standards have a positive influence on behavioural intention to use KMS to improve decision-making.
- H7: Behavioural Intention to use KMS has a positive influence on improved decision-making.

This combined theoretical approach enhances explanatory power, capturing behavioural, organisational and structural dimensions of KMS adoption in a complex operational context.

## Research methods and design

This study employed a quantitative research approach to test the relationships between theoretical constructs and actual KMS usage within the energy sector. A deductive logic was used to evaluate how selected variables derived from the UTAUT and TOE models influence the use of KMSs for decision-making.

Quantitative methods provided a structured and objective means of collecting and analysing numerical data, enabling the researcher to identify statistically significant factors affecting behavioural intention and system usage. This approach also facilitated the development of a generalisable model applicable to similar organisational contexts within the South African energy sector. The research approach was thus aligned with the study's main objective: to develop a model for KMS to improve decision-making. By applying statistical tools to measure perceptions, behaviours and organisational conditions, the study could validate theoretical assumptions and identify the most influential predictors of system usage.

### Population and sampling techniques

The population for this study comprised employees within the distribution department, where KMSs were being considered as part of broader organisational improvement initiatives. The distribution department was selected because it plays a pivotal role in operational decision-making and is particularly affected by knowledge retention challenges as experienced staff retire or exit the organisation.

A random sampling technique was employed to select participants from various job positions that influence decision-making, thereby improving the reliability and generalisability of the results (Bryman, Bell & Harley 2022). A total of 150 participants from a targeted population of 235 completed the online questionnaire.

All participants received detailed information about the study's objectives, their rights as research participants, and the voluntary nature of their involvement. Informed consent was obtained before data collection began. Confidentiality of individual responses was strictly maintained, with no identifying information linked to the survey data. Ethical clearance was granted by the relevant institutional ethics committee before the commencement of the fieldwork.

Data were collected via a structured, closed-ended questionnaire using a five-point Likert scale to measure perceptions across the study constructs. An online version of the questionnaire was distributed through SurveyMonkey, with reminders sent every 3 days to improve the response rate. Participation was entirely voluntary and anonymous, ensuring independent and secure completion of the survey.

The collected data were exported to Microsoft Excel for initial cleaning, validation and preparation, including the removal of incomplete or biased responses. The cleaned dataset was then imported into IBM SPSS Statistics Version 27 for comprehensive analysis, supporting both descriptive and inferential procedures (Field 2022). Survey items were coded numerically based on a five-point Likert scale (where 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree and 5 = strongly agree). The numerical coding facilitated the computation of means, standard deviations and other measures of central tendency.

### Descriptive statistics

Descriptive statistics were employed to summarise the demographic characteristics of the sample, including age, gender, years of service, job role and educational background. Frequencies and percentages provided a clear overview of respondent distribution across these categories. Measures of central tendency (means) and dispersion (standard deviations) were calculated for each construct derived from the study's theoretical models (UTAUT and TOE), offering insights into the general perceptions of KMS use within the organisation. All descriptive statistics were reported in aggregate form to ensure that individual responses could not be identified, thereby addressing full compliance with confidentiality requirements and South Africa's *Protection of Personal Information Act* (Republic of South Africa 2013).

### Instruments reliability

A reliability analysis was conducted using Cronbach's alpha to assess the internal consistency of the constructs measured in Table 1. This study comprises 17 constructs, which were assessed for internal consistency. All constructs achieved acceptable reliability, with alpha coefficients exceeding the recommended threshold of 0.70.

### Inferential statistics

Inferential statistical techniques were applied to test the study's hypotheses and examine relationships between variables. A Pearson's correlation analysis was conducted to assess the strength and direction of associations between independent variables (e.g. organisational support, system quality and user motivation) and the dependent variable (behavioural intention to use KMSs).

**TABLE 1:** Reliability statistics of constructs.

Construct	Cronbach's alpha
Compatibility	0.831
Security	0.811
Effort expectancy	0.539
Usefulness	0.816
Self-efficacy	0.884
Training	0.820
Motivational culture	0.900
Communication	0.760
Process	0.760
Skills	0.720
Qualification	0.550
Social influence	0.830
Performance expectancy	0.882
Community of practice	0.857
Policies and standards	0.870
Behavioural intention	0.944
Decision-making	0.957

In addition, a multiple regression analysis was performed to identify which factors significantly predicted the intention to adopt and use KMSs for decision-making. The regression models examined the relative contribution of each predictor variable and quantified the proportion of variance explained in the outcome variable.

## Ethical considerations

Ethical clearance to conduct this study was obtained from the Tshwane University of Technology Faculty Committee for Research Ethics (No. REC2023/12/008).

## Results

The presentation of results is a crucial component of research reporting. The findings are summarised below to facilitate a clear understanding and interpretation. The results cover the demographic profile of respondents, reliability of constructs, descriptive statistics, correlation analysis and multiple regression analysis.

### Demographics of respondents

This study received 150 completed questionnaires from employees working in the distribution department. The demographic characteristics of respondents are presented in Table 2, which demonstrates participants' demographics grouped in the indicated categories.

The majority of respondents (37.3%) were between 36 years and 45 years old, while 30.7% were between 46 years and 55 years old and 16.0% were 56 years old and older. A smaller proportion (13.3%) were between 26 years and 35 years old, with very few (2.7%) between 18 years and 25 years old, indicating that younger employees represented a minor share of the sample. Regarding overall work experience, most respondents reported having long tenures in the workforce, with 60.7% indicating 16 years or more of experience. About a quarter (24.0%) had 12 years to 15 years of experience and smaller groups had less than 12 years.

**TABLE 2:** Demographic profile of respondents ( $N = 150$ ).

Factor	Category	Frequency	Percentage
Age group (years)	18–25	4	2.7
	26–35	20	13.3
	36–45	56	37.3
	46–55	46	30.7
	56 and older	24	16.0
Overall working experience (years)	0–3	4	2.7
	4–7	7	4.7
	8–11	12	8.0
	12–15	36	24.0
	16 and above	91	60.7
Years of experience in the organisation	0–3	10	6.7
	4–11	12	8.0
	12–15	45	30.0
	16 and above	83	55.3
	Role in the organisation	Analyst	31
Field Operator		40	26.7
Work Coordinator		12	8.0
Technicians		19	12.7
Manager		48	32.0
Level of qualification		Higher Certificate	26
	Diploma	43	28.7
	Bachelor's Degree/BTech/ Advance Diploma	36	24.0
	Honours Degree	23	15.3
	Masters Degree	22	14.7

BTech, Bachelor of Technology.

A similar trend was evident in years of service within the organisation, where more than half (55.3%) reported working for 16 years or longer in their current organisation, and 30.0% had been with the organisation between 12 years and 15 years.

In terms of role within the organisation, nearly a third (32.0%) of respondents were managers, 26.7% were field operators, 20.7% were analysts, 12.7% were technicians and 8.0% were work coordinators. This distribution reflects a broad cross-section of operational and management staff. With respect to qualifications, just over a quarter (28.7%) of respondents held a diploma, while 24.0% had obtained a bachelor's degree, BTech or advanced diploma, and 15.3% had an honours degree. Respondents with a master's degree comprised 14.7% of the sample, and 17.3% reported holding a higher certificate as their highest qualification.

### Descriptive statistics of constructs

Descriptive statistics were calculated to summarise respondents' perceptions of each construct measured in Table 3. The highest mean scores were observed for skills ( $M = 4.15$ , standard deviation [SD] = 0.763), communication ( $M = 4.07$ , SD = 0.994) and decision-making ( $M = 4.05$ , SD = 0.783), indicating positive perceptions in these areas. The lowest mean was observed for effort expectancy ( $M = 2.71$ , SD = 1.155). Table 3 also shows that the use of a KMS has the highest standard deviation, meaning that the system is more likely to be at least implemented; and therefore, it appears possible and interest in KMS seems good.

## Correlation analysis

The Pearson correlation analysis revealed several statistically significant positive relationships between behavioural intention and key influencing constructs. Performance expectancy emerged as the strongest predictor ( $r = 0.552, p < 0.01$ ), followed by motivational culture ( $r = 0.505, p < 0.01$ ), self-efficacy ( $r = 0.473, p < 0.01$ ) and perceived usefulness ( $r = 0.422, p < 0.01$ ). These results confirm the study's hypotheses, indicating that employees are more likely to adopt KMSs when they believe the systems enhance their performance, feel confident in their ability to use them and perceive a supportive culture that values knowledge sharing. The positive association with perceived usefulness further underscores the importance of perceived value in fostering behavioural intention toward KMS usage.

Moreover, the correlation matrix highlights several positively associated and interrelated constructs, reflecting a cohesive network of influencing factors. For example, compatibility, security, effort expectancy, usefulness and self-efficacy show sequential positive correlations, as do training, motivational culture, communication and process-related variables. Likewise, relationships among skills, qualifications, social influence, performance expectancy, community of practice (CoP) and organisational policies further illustrate interconnectedness among the constructs. Behavioural intention also correlates positively with policies and standards ( $p = 0.340$ ) and improved decision-making ( $p = 0.542$ ). Overall, these results demonstrate that all constructs are meaningfully linked, collectively reinforcing employees' behavioural intention to adopt and use KMSs.

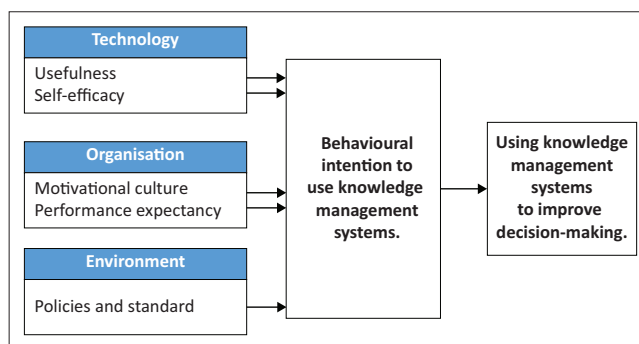
## Regression analysis

The multiple regression analysis focused on identifying the key factors that significantly predict behavioural intention to use KMSs for improving decision-making. Among the variables tested across three models, five constructs were found to be statistically significant predictors. Self-efficacy showed the strongest predictive power in Model 1, with a beta coefficient of 0.340 ( $p = 0.001$ ), indicating that employees' confidence in their ability to use KMSs significantly influences their intention to adopt the KMSs. In Model 2, performance expectancy (Beta = 0.303,  $p = 0.005$ ) and motivational culture (Beta = 0.203,  $p = 0.038$ ) also emerged as significant contributors, suggesting that employees are more likely to engage with KMSs when they expect improved performance and operate in a supportive cultural environment. In Model 3, policies and standards were identified as a significant predictor (Beta = 0.289,  $p = 0.002$ ), underlining the importance of clear governance and procedural models in facilitating KMS adoption. Although perceived usefulness approached statistical significance (Beta = 0.195,  $p = 0.055$ ), it was not ultimately included among the supported predictors. Therefore, the empirical

**TABLE 3:** Descriptive statistics of constructs.

Construct	Mean	SD
Compatibility	3.79	0.840
Security	3.69	0.919
Effort expectancy	2.71	1.155
Usefulness	3.89	0.840
Self-efficacy	3.77	0.901
Training	3.56	0.986
Motivational culture	3.39	0.962
Communication	4.07	0.994
Process	3.79	0.973
Skills	4.15	0.763
Qualification	4.09	0.822
Social influence	3.71	0.902
Performance expectancy	3.88	0.866
Community of practice	3.72	0.906
Policies and standards	3.67	0.966
Behavioural intention	3.92	0.901
Decision-making	4.05	0.763

SD, standard deviation.



**FIGURE 1:** Proposed knowledge management systems (KMS) model: Conceptual model of KMSs.

foundation for the proposed KMS model supported five constructs: self-efficacy, performance expectancy, motivational culture, policies and standards, and perceived usefulness. These findings affirm that both individual-level and organisation-level factors play a central role in driving the effective use of KMSs for improved decision-making in the South African energy sector. Figure 1 (Proposed KMS model) demonstrates the model developed from the findings of this study. The factors that were considered significant and relevant informed the final model.

## Summary of hypotheses results

Based on the correlation and regression analyses, the set hypotheses were tested, and the results are presented in Table 2. An overview of the theories in this study revealed that of 16 hypotheses formulated, only 6 hypotheses were accepted, while 10 hypotheses were rejected. The rejected hypotheses are H1a, H1b, H2a, H3a, H4a, H4b, H5a, H5b, H5c and H6a, which implies that compatibility, security, effort expectancy, training, communication, process, skills, social influence, qualification level and CoP towards the use of KMS do not influence behavioural intention to improve decision-making. The final model is therefore shown in Table 2.

**TABLE 4:** Summary of hypothesis testing and results.

Hypothesis		<i>p</i> -value	Result
H1a	Compatibility will positively influence behavioural intention to use a KMS to improve decision-making.	0.803 > 0.05	Rejected
H1b	Security will positively influence behavioural intention to use KMS to improve decision-making.	0.699 > 0.05	Rejected
H2a	Effort expectancy will positively influence behavioural intention to use KMS to improve decision-making.	0.212 > 0.05	Rejected
H2b	Usefulness will positively influence behavioural intention to use KMS to improve decision-making.	0.055 < 0.05	Accepted
H2c	Self-efficacy will positively influence behavioural intention to use KMS to improve decision-making.	0.001 < 0.05	Accepted
H3a	Training will positively influence behavioural intention to use KMS to improve decision-making.	0.503 > 0.05	Rejected
H3b	Motivational culture will positively influence behavioural intention to use KMS to improve decision-making.	0.038 < 0.05	Accepted
H4a	Communication will positively influence behavioural intention to use KMS to improve decision-making.	0.067 > 0.05	Rejected
H4b	The process will positively influence behavioural intention to use KMS to improve decision-making.	0.184 > 0.05	Rejected
H5a	Skills will positively influence behavioural intention to use KMS to improve decision-making.	0.202 > 0.05	Rejected
H5b	Qualification level will positively influence behavioural intention to use KMS to improve decision-making.	0.800 > 0.05	Rejected
H5c	Social influence will positively influence behavioural intention to use KMS to improve decision-making.	0.328 > 0.05	Rejected
H5d	Performance expectancy will positively influence behavioural intention to use KMS to improve decision-making.	0.005 < 0.05	Accepted
H6a	A community of practice will positively influence behavioural intention to use KMS to improve decision-making.	0.326 > 0.05	Rejected
H6b	Policies and standards will positively influence behavioural intention to use knowledge. Management systems will improve decision-making.	0.002 < 0.05	Accepted
H7a	Behavioural intention will significantly positively influence the use of KMS for improved decision-making.	0.000 < 0.05	Accepted

KMS, Knowledge Management System.

## Discussion

The objective of this study was to develop a model for using KMSs to improve decision-making within the South African energy sector. To achieve this objective, secondary objectives were identified, and their results are discussed below. The two models discussed in the theoretical section were underpinned by selected constructs, which led to the development of the conceptual model. And the derivation of hypotheses. The proposed factors were tested for significance, and based on the findings, the final model was constructed (Figure 1: Proposed KMS model).

To address the first objective, which was to determine the factors influencing the use of KMSs for improved decision-making, a literature review was conducted, and theoretical models such as the TOE and UTAUT models were consulted to derive the factors. These models provided the foundation for identifying 16 relevant constructs, which were subsequently incorporated into a conceptual model tested in this study. Hypotheses were then discussed (Table 4).

To address the second objective, which focused on determining the significance of the identified factors in the use of KMSs for improved decision-making, the study tested

16 factors that were identified in research objective 1; hypotheses were suggested and tested. Of 16 factors, only 6 were found to be significant. The 6 accepted and 10 rejected hypotheses are discussed below, followed by a discussion of the third objective, which was to synthesise the identified accepted components into a proposed KMS model.

## Six accepted hypotheses

The six hypotheses that were supported by the study's findings highlight the key factors that significantly influence the phenomenon:

- **H2b:** Usefulness has a positive influence on the behavioural intention to use KMSs to improve decision-making. The hypothesis was accepted with a significance value of 0.055, which is below the maximum threshold value of 0.05. These results may mean that to ensure the usefulness of a KMS system, users of the system must be motivated in order to transfer the knowledge. The results of this study are supported by a study that found usefulness influences knowledge management processes (Oumram, El Arbi & Berrado 2021).
- **H2c:** Self-efficacy has a positive influence on the behavioural intention to use KMSs to improve decision-making. The hypothesis was accepted with a significance value of 0.001, which is below the maximum threshold value of 0.05. This result suggests strong statistical evidence that employees who believe in their own abilities and feel confident in their skills are more likely to use KMSs to improve organisational performance. The results of this study are supported by a study that found self-efficacy to have a significant influence on the adoption of knowledge management processes. Employees with higher self-confidence are more inclined to engage in knowledge-sharing activities (Oumram et al. 2021). On the other hand, some organisational factors were found to be significant to behavioural intention to use KMSs for improved decision-making.
- **H3b:** Motivational culture has a positive influence on the behavioural intention to use KMSs in improving decision-making. The hypothesis was accepted with a significance value of 0.038, which is below the maximum threshold value of 0.05. This could be an indication that within the organisation, there is a culture that motivates employees to share knowledge, whether through recognition, rewards or support. The results of this study are supported by a study that found that organisational culture and motivational incentives play a crucial role in fostering knowledge-sharing behaviours and improving the effectiveness of knowledge management processes (Ganapathy et al. 2020).
- **H5d:** Performance expectancy has a positive influence on the behavioural intention to use KMSs for improving decision-making. The hypothesis was accepted with a significance value of 0.005, which is below the maximum threshold value of 0.05. This could be an indication that employees believe that using KMSs will improve decision-making within the organisation by enabling

quicker access to relevant information. As a result, employees are more likely to adopt and use KMSs, while decision-makers will perceive that KMSs effectively provide accurate information that contributes to better outcomes and improved decision-making. The results of this study are supported by a study that found performance expectancy to be a significant predictor of technology adoption, with employees being more inclined to use systems that enhance efficiency and productivity in organisational processes (Venkatesh et al. 2003). Some environmental factors were found to be significant in relation to the behavioural intention to use KMSs for improved decision-making.

- **H6b:** Policies and standards have a positive influence on the behavioural intention to use KMSs to improve the decision-making model. The hypothesis was accepted with a significance value of 0.002, which is below the maximum threshold value of 0.05. This indicates that employees are more likely to consider policies and standards as essential for enhancing their confidence, willingness and performance within an organisation, particularly in the areas of governance and risk control. The results of this study are supported by a study that found that well-structured policies and regulatory models significantly contribute to employees' acceptance and effective utilisation of KMSs by ensuring alignment with organisational objectives and compliance requirements (Marikyan & Papagiannidis 2023).
- **H7:** Behavioural intention will significantly and positively influence the use of KMSs for improved decision-making. The hypothesis was accepted with a significance value of 0.000, which is below the maximum threshold value of 0.05. This indicates that employees have a strong intention to use KMSs and will consistently engage with KMSs to enhance performance and support decision-makers in improving organisational decision-making. Employees' willingness to actively participate in KMSs is primarily determined by their behavioural intention, which is influenced by factors such as self-efficacy, compatibility and effort expectancy. The results of this study are supported by a study that found behavioural intention to be a strong predictor of actual system usage. Individuals are more likely to adopt and continue using a system that they perceive as beneficial and aligned with their expectations (Venkatesh et al. 2003). The study found that compatibility, security, effort expectancy, training, communication, process, skills, social influence, qualification level and CoP were insignificant to behavioural intention to use KMSs for improved decision-making.

## Ten rejected hypotheses

The 10 hypotheses that were not supported reveal possible reasons and implications for future research:

- **H1a** Compatibility has a positive influence on the behavioural intention to use KMSs to improve decision-making. This hypothesis was rejected because it insignificantly contributes to the study with a value of

0.803, which is above the threshold value of 0.05. This revealed how well KMSs support existing practices and systems within an organisation without having a statistically significant impact on the intention to use KMSs. In the context of this study, the relationship between security and behavioural intention is insufficiently significant.

- **H1b:** Security has a positive influence on the behavioural intention to use KMSs to improve decision-making. The hypothesis was rejected because it insignificantly contributes to the study with a value of 0.699, which is above the threshold value of 0.05. This could be an indication that security does not have a statistically significant impact on users' intention to adopt and use KMSs for decision-making, nor to influence employees' decisions to engage with KMSs. In the context of this study, the relationship between security and behavioural intention is insufficiently significant.
- **H2a:** Effort expectancy has a positive influence on the behavioural intention to use KMSs for improved decision-making. The hypothesis was rejected because it insignificantly contributes to the study with a value of 0.212, which is above the threshold value of 0.05. This implies the level of user-friendliness employees perceive KMSs to have and has little influence on their decision to accept and use the system.
- **H3a:** Training has a positive influence on the behavioural intention to use KMSs to improve decision-making. The hypothesis was rejected because it insignificantly contributes to the study with a value of 0.503, which is above the threshold value of 0.05. Based on the study findings, training did not significantly influence users' intention to use KMSs for decision-making. In the context of this study, the relationship between training and behavioural intention is insufficiently significant.
- **H4a:** Communication has a positive influence on the behavioural intention to use KMSs to improve decision-making. This hypothesis was rejected because it insignificantly contributes to the study with a value of 0.067, which is above the threshold value of 0.05. Based on the study findings, this implies a lack of communication regarding the information stored on the KMS, with information not shared among employees within the organisation. Communication did not significantly influence users' intention to use KMSs for decision-making. In the context of this study, the relationship between communication and behavioural intention is insufficiently significant.
- **H4b:** Process has a positive influence on the behavioural intention to use KMSs for improved decision-making. The hypothesis was rejected because it insignificantly contributes to the study with a value of 0.184, which is above the threshold value of 0.05. Based on the study findings, well-defined processes are in place; however, employees are not using them for guidance with their daily work. In the context of this study, the relationship between process and behavioural intention is insufficiently significant.

- **H5a:** Skills have a positive influence on the behavioural intention to use KMSs to improve decision-making. The hypothesis was rejected because it insignificantly contributes to the study with a value of 0.202, which is above the threshold value of 0.05. Based on the study findings, this could be an indication that employees are not well-trained to use or understand the system. Perhaps the KMS is not user-friendly, which results in it being a barrier to work. In the context of this study, the relationship between skills and behavioural intention is insufficiently significant.
- **H5c:** Social influence has a positive influence on the behavioural intention to use KMSs to improve decision-making. The hypothesis was rejected because it insignificantly contributes to the study with a value of 0.328, which is above the threshold value of 0.05. Based on the study findings, this could be an indication that those who see their counterparts fully engaging with the system may possibly follow suit. In the context of this study, the relationship between social influence and behavioural intention is insufficiently significant.
- **H5b:** Qualification level has a positive influence on the behavioural intention to improve decision-making. The hypothesis was rejected because it insignificantly contributes to the study with a value of 0.800, which is above the threshold value of 0.05. Based on the study findings, employees with higher qualifications use KMS more effectively for decision-making. In the context of this study, the relationship between qualification level and behavioural intention is insufficiently significant.
- **H6a:** Community of practice has a positive influence on the behavioural intention to use KMSs to improve decision-making. The hypothesis was rejected because it insignificantly contributes to the study with a value of 0.326, which is above the threshold value of 0.05. Based on the study findings, employees agreed to share information willingly within the repositories, among the community and for benchmarking. Community of practice does not have a statistically significant impact on users' intention to use KMSs for decision-making. In the context of this study, the relationship between the CoP and behavioural intention is insufficiently significant.

To address the third objective, which was to identify the components of a model for using KMSs to improve decision-making, the related Information Systems theoretical models (the TOE and UTAUT) were discussed and analysed. A conceptual model with constructs was outlined, and hypotheses were derived. The proposed factors were tested for significance, and based on the findings, the final model is presented in Figure 1: Proposed KMS model.

### Perceptions of Knowledge Management System factors

Descriptive statistics indicated that respondents generally held positive views of constructs such as skills, communication and decision-making. The highest mean scores were recorded

for skills ( $M = 4.15$ ) and decision-making ( $M = 4.05$ ), suggesting a favourable climate for knowledge sharing. However, effort expectancy had a relatively low mean ( $M = 2.71$ ), implying that employees perceive KMSs as requiring effort to learn and use effectively. This finding is consistent with a study that identified ease of use as a barrier in many organisations (Venkatesh et al. 2003).

### Relationships among constructs

A correlation analysis revealed that behavioural intention was strongly linked to performance expectancy, self-efficacy and motivational culture. For example, performance expectancy showed a correlation coefficient of 0.552, indicating that employees who believed KMSs would improve their job performance were more likely to adopt them. This supports the UTAUT model that highlights performance expectancy as a central determinant of behavioural intention.

### Predictors of behavioural intention

Multiple regression analysis identified self-efficacy, motivational culture, performance expectancy and policies and standards as the most significant predictors. Self-efficacy had the strongest influence (Beta = 0.340,  $p = 0.001$ ), emphasising the importance of confidence in using KMSs. Motivational culture (Beta = 0.203) and performance expectancy (Beta = 0.303) also significantly predicted behavioural intention. Policies and standards (Beta = 0.289) played a key role in supporting KMS adoption. These findings are in line with prior research, which underscores the interplay of individual beliefs, organisational norms and governance models in shaping technology adoption (Tornatzky & Fleischer 1990; Venkatesh et al. 2003).

### Proposed Knowledge Management System model

Based on the study's findings, a conceptual model is proposed to guide the adoption and effective use of KMSs for decision-making in the energy sector. The model highlights four main areas of focus and includes specific hypotheses reflecting the tested relationships. At the individual level, self-efficacy and performance expectancy are crucial. Employees need confidence in their ability to use KMSs and a clear understanding of the benefits these systems bring to their work. This can be supported through targeted training and visible examples of how KMSs improve decision quality.

The proposed model examines factors influencing the use of KMS to improve decision-making. It hypothesises that usefulness (H1a), self-efficacy (H2c), performance expectancy (H5d), motivational culture (H3b) and organisational policies and standards (H6b) positively affect behavioural intention, which in turn drives actual KMS use (H7a).

## Research contributions

The findings of this study are important on a practical level. On this level, it is acknowledged that the use of KMSs to improve decision-making is vital. The developed model of using KMSs is of great use to top management and employees within the energy sector. This KMS model will be used to gain insights into ways in which management can effectively use KMSs to improve decision-making, thus better expediting service delivery. This study makes a practical contribution by making this KMS model available and user-friendly for use within any energy sector department of an organisation. Application of this model will ensure that effective training is provided where necessary. Another practical contribution is that decision-makers now have a model to follow when making decisions. Furthermore, the study's findings will be extended to the knowledge of KMSs. The study could be used during the knowledge management decision-making process by decision-makers within the KMSs. When applied daily during operations, the expected practical data will help in better decision-making. The data will also address operational challenges and assist with more accurate information.

This study makes a major contribution to practice and management on the use of KMSs to improve decision-making. Likewise, results from this study could be applied to investigate other technology usage within an organisation in the energy sector. The study underpinned the TOE and UTAUT models as theoretical backgrounds, providing a well-rounded approach to understanding the multifaceted aspects of technology acceptance and implementation. The contribution was realised through the incorporation of theories and the process followed to collect data from an organisation within the energy sector. The study has advanced our understanding of KMSs in improving decision-making within any energy sector of an organisation. The current study confirmed that UTAUT and TOE are useful theoretical models in attempting to understand and explain behavioural intention to use KMSs for improved decision-making. The research demonstrated that the two theories can predict user acceptance and implementation of KMS tools.

There is currently little research on the successful use of KMSs for improving decision-making within the South African energy sector. Some studies have focused on broader knowledge management and knowledge sharing. This study analysed constructs evaluated against items and tested hypotheses. As a result, 6 of 16 characteristics were significantly associated with the use of KMSs for improved decision-making. This study will contribute to the literature on Information Systems by providing suggestions for future studies, as well as by expanding the body of knowledge in the field. Finally, this work will make a significant theoretical addition. The constructed model can be used and referenced by other researchers in the application of KMSs to improve decision-making within the South African energy sector.

## Implications for practice

The study highlights that enhancing employees' self-efficacy and clarifying the benefits of KMSs can increase adoption. Further, creating a supportive organisational culture and implementing clear policies are essential steps. Managers should invest in training and communication to reduce perceived effort and build trust in KMS processes.

## Recommendations for future research

Based on the findings, several recommendations are proposed to enhance the adoption and effective use of KMSs in the South African energy sector. Organisations should prioritise building employees' self-efficacy through focused training and continuous support. Practical demonstrations and peer learning opportunities can help users feel more confident in engaging with the system. Clear communication of the benefits of KMSs is essential. Managers should highlight how these systems contribute to better decision-making, improved performance and streamlined workflows.

To address perceptions of effort expectancy, organisations are encouraged to invest in user-friendly system interfaces and provide accessible resources that simplify use. Creating a strong motivational culture is also important. Recognising and rewarding knowledge-sharing behaviours can strengthen commitment and encourage participation across teams. Policies and standards should be formalised to guide the consistent use of KMSs. Clear procedures, defined responsibilities and governance structures will help ensure that knowledge management becomes an integrated part of daily operations.

## Conclusion

This study set out to examine the factors that influence the use of KMSs to improve decision-making within a South African state-owned energy organisation. Drawing on the UTAUT and TOE models, the research identified the key individual, organisational and structural enablers that support successful KMS adoption. The findings demonstrate that self-efficacy, performance expectancy, motivational culture and policies and standards are the most significant predictors of behavioural intention to use KMSs. Employees who believe in their own capability, perceive clear performance benefits, experience a supportive organisational culture and work within an environment with defined policies are more likely to adopt knowledge management practices.

The study also highlights that while respondents generally viewed KMSs positively, perceived effort expectancy remained relatively low, suggesting that ease of use remains a barrier to adoption. This insight reinforces the need for targeted training and user-friendly system design. Overall, the research contributes to a deeper understanding of knowledge management in the energy sector by presenting an evidence-based model that organisations can use to

improve decision-making processes. By addressing the identified factors, managers and policymakers can build a culture that values knowledge sharing and supports the sustainable use of KMSs to drive operational effectiveness.

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The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

## CRedit authorship contribution

Masehlabane J. Mamogobo: Conceptualisation, Formal analysis, Investigation, Methodology, Visualisation, Writing – original draft, Writing – review & editing. Agnieta B. Pretorius: Funding acquisition, Supervision, Writing – review & editing. Stevens P. Mamorobela: Funding acquisition, Supervision, Writing – review & editing. All authors reviewed the article, contributed to the discussion of results, approved the final version for submission and publication, and take responsibility for the integrity of its findings.

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## Data availability

The data that support the findings of this study are available from the corresponding author, Masehlabane J. Mamogobo, upon reasonable request.

## Disclaimer

The views and opinions expressed in this article are those of the authors and are the product of professional research. It does not necessarily reflect the official policy or position of any affiliated institution, funder, agency or that of the publisher. The authors are responsible for this article's results, findings and content.

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