
WATER INFORMATION SYSTEM (MAJI IS) USAGE IN TANZANIA: FINANCIAL IMPLICATIONS AND MODERATING ROLE OF ORGANISATIONAL CULTURE

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ABSTRACT

The research investigates the performance expectancy (PE) of the Water Information System, referred to as MAJI Information System (MAJI IS) usage, and its impact on the financial performance (FP) of public water utilities in Tanzania. Financial performance (FP) is described by revenue collection (FPR), service level effectiveness (FPS), functionality (FPF) and non-revenue water (FPN). Specifically, the study examines the moderating role of organisational culture, focusing on leadership style (OCL) and technology readiness (OCT), in strengthening usage and performance relationships.

Guided by the Unified Theory of Acceptance and Use of Technology (UTAUT), the study adopted a positivist philosophy, quantitative approach, and deductive design. Data were collected through structured questionnaires from 235 respondents across Tanzanian water utilities. Constructs included Performance Expectancy (PE) as a predictor of usage. Financial performance was assessed through Revenue Collection (FPR), Service Level Effectiveness (FPS), Functionality (FPF) and Non-Revenue Water (FPN). Data was analyzed using the Hierarchical Regression Model.

Results indicated that performance expectancy, and organisational culture significantly influence MAJI IS usage, which in turn positively enhances financial performance. Organisational culture dimensions were found to moderate the relationships, with leadership style and technology readiness showing the strongest effects.

This study adopted one variable of UTAUT by integrating organisational culture as a moderator and linking MAJI IS usage to organisational level outcomes, particularly financial performance in water utilities. It provides empirical evidence from the Tanzanian water sector, offering theoretical and practical insights for improving water utility performance.

Keywords: Financial Performance, MAJI IS, Organisational Culture, Performance Expectancy, Revenue Collection, UTAUT.

1. INTRODUCTION

Water utilities worldwide face increasing pressure to deliver reliable, efficient, and financially sustainable services. Developed countries face several challenges in their water systems, including ageing infrastructure, contamination of water quality, and rising operation costs (Kovacic and Benini, 2022). Building on this, water utilities in developing countries, especially in sub-Saharan Africa, face challenges such as high non-revenue water (NRW), underinvestment, and weak governance (AbuEltayef et al., 2023). In contrast, over 40% of water in Tanzania is lost through leakages, theft, or faulty metering, double the recommended 20% threshold (Zahor and Mromba,

2022). Rural areas also suffer from poor digital infrastructure and inefficient billing systems (Twaambo and Phiri, 2021). Inefficiencies in water utilities' operations, such as high non-revenue water (NRW) and unreliable service delivery, highlight the need for effective digital tools like MAJI IS.

MAJI Information System (MAJI IS) was introduced in Tanzania for billing, asset management, and performance monitoring (Kwikima et al., 2024) to address those inefficiencies. Furthermore, the financial impact remains under-researched. Studies from Kenya and South Africa suggested digital tools have succeeded when supported by strong institutional frameworks (Moghayed, 2024). Research shows that digital success in the public sector is largely dependent on internal factors, such as leadership, culture, and staff engagement (Komakech et al., 2020). The current study addresses a critical gap by examining the determinant of MAJI IS usage and its financial impact using the UTAUT framework, focusing on performance expectancy (Mahara et al., 2021). Organisational culture, through leadership style and technology readiness, was introduced as a moderating factor (Hassaan and Yaseen, 2024).

Unlike studies that treat culture as a monolith or focus on external pressures, this research explores internal dynamics shaping digital effectiveness. By integrating performance expectancy extracted from UTAUT and organisational culture from institutional theory, it links system use to financial performance, offering both theoretical and practical insights for improving digital governance in Tanzania's water sector.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1 Theoretical literature review

2.1.1 Performance Expectancy

Aligned with UTAUT, performance expectancy reflects users' belief that MAJI IS improves job performance (Venkatesh *et al.*, 2016). While most studies focus on system usage, few examine how such usage contributes to improved billing accuracy, customer management, service delivery, and non-revenue water reduction, factors that collectively enhance revenue collection and operational efficiency, as key dimensions of financial performance. Performance expectancy (PE) is also known as the degree to which an individual's use will result in performance gain or perceived usefulness (Twaambo and Phiri, 2022).

Some studies aligned institutional theory on dimensions of organisational culture, encompassing leadership, adaptability, technology readiness, and employee engagement, to shape decision-making and operations (Madi *et al.*, 2023). This study focused on organisational culture as a moderating variable rather than all institutional factors. Grecksch (2021) defined shared values influencing technology usage and performance as crucial in water management and MAJI IS usage. The study was guided by leadership style and technology readiness as a moderating role under the organisational culture.

2.1.2 Leadership style

Leadership style is the pattern of actions and decisions leaders use to motivate, manage, and engage employees to achieve collective outcomes (Dulewicz and Higgs, 2005). Leadership style is the approach leaders use to build trust, encourage innovation, reward performance, and involve employees in achieving organisational goals (Raveendran and Balakrishnan, 2021). The current study adopts Raveendran and Balakrishnan (2021) as it aligns with the employees' performance.

2.1.3 Technology readiness

Technology readiness refers to an organization's preparedness to embrace and effectively utilize new technologies, which directly influences the success of information system adoption. Parasuraman (2000) conceptualized technology readiness as comprising optimism, innovativeness, discomfort, and insecurity, highlighting both enabling and inhibiting beliefs toward technology use. Further, it can be stated as "the preparedness of organisations and individuals to integrate new information technologies into processes" (Aboelmaged, 2014). In organisational culture, high technology readiness fosters acceptance of systems like MAJI IS by reducing resistance, enhancing perceived ease of use, and increasing performance expectations. The technology-readiness construct refers to people's propensity to embrace and use new technologies to accomplish goals in home life and at work and is viewed as the overall state of mind resulting from a gestalt of mental enablers and inhibitors that collectively determine a person's predisposition to use new technologies (Parasuraman, 2000). The study adopts Parasuraman (2000) due to its embrace and use of new technologies for accomplishing goals.

2.2 Empirical Literature Review**2.2.1 Relationship between Performance expectancy of MAJI IS usage and financial performance of water management systems**

While numerous studies affirm that technology usage supports financial sustainability, few directly link performance expectancy (PE) to economic outcomes. For instance, Okoli (2023) highlighted cost as a key factor in smart water meter adoption in South Africa but did not explore PE's influence on financial performance. Similarly, De Camargo et al. (2023) evaluated a low-cost IoT monitoring system using statistical indicators such as RMSE and R^2 , but omitted any analysis of PE. Komakech et al. (2020) showed that cost management enhances financial sustainability in Tanzania using MANOVA, yet they neither studied MAJI IS nor PE specifically.

Although Tudose et al. (2022) found that PE can improve financial outcomes by reducing errors and boosting revenue, its direct role in MAJI IS usage, particularly its effect on revenue collection, cost control, and operational efficiency in Tanzania, remains unexplored. This study addresses this gap by examining how PE influences financial performance in Tanzanian water utilities.

2.2.2 Relationship between Organisational Culture on MAJI IS usage and financial performance of water management systems

While Mvulirwenande and Wehn (2021) emphasized trust and collaboration in smart water systems, they overlooked the internal role of organisational culture in shaping technology outcomes. Factors like leadership style, technology readiness, and employee engagement directly influence system usage and financial performance (Twaambo and Phiri, 2021; Tudose et al., 2022). However, consistent with Denison's and Cameron and Quinn's frameworks, organisational culture in this study was operationalized through leadership and technology readiness (Vatan et al., 2024). In Tanzania, the success of digital initiatives like MAJI IS depends less on external drivers and more on organisational strategies and technology readiness (Tea et al., 2023).

In this study, organisational culture is treated as a moderator that conditions how effectively the performance expectancy of MAJI IS usage translates into financial performance. Specifically:

1. Leadership Style enhances the impact of performance expectancy by aligning system use with strategic goals and communicating clear benefits (Madi Odeh et al., 2023).

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2. Technology readiness strengthens the role of effort expectancy and facilitating conditions, as robust infrastructure and skills reduce resistance and enhance usage quality (Aini et al., 2024).

2.3 Hypothesis development and research model

Twaambo and Phiri (2021) used it to examine e-billing in Zambia, while Aini et al. (2024) and Tean et al. (2023) validated its utility in public-sector technology use. However, most of these studies focused on individual user behaviour and usage after adoption, overlooking organisational outcomes such as financial performance.

This study addresses this gap by examining how performance expectancy influences financial performance in Tanzanian water utilities. Based on the reviewed evidence, this study hypothesizes that:

H: Higher performance expectancy using MAJI IS positively influences financial performance (revenue collection, service level effectiveness, functionality and non-revenue water) on water management systems.

H1a: Performance Expectancy (PE) positively influences Financial Performance – Revenue collection (FPR).

H1b: Performance Expectancy (PE) positively influences Financial Performance – Service level effectiveness (FPS).

H1c: Performance Expectancy (PE) positively influences Financial Performance – Functionality (FPF).

H1d: Performance Expectancy (PE) positively influences Financial Performance – Non-revenue water (FPN).

Raveendran and Balakrishnan (2021) observed that organizational commitment is defined as the bond and loyalty of the employee to the organization and the job. Therefore, the proposed research model has the following set of hypotheses:

H2: Organizational culture (OC) moderates the relationship between PE and FP; to analyze the stronger or weaker effect when OC is high or low.

H2a: Organizational culture – leadership style (OCL) moderates the relationship between PE and FPR

H2b: Organizational culture – leadership style (OCL) moderates the relationship between PE and FPS

H2c: Organizational culture – leadership style (OCL) moderates the relationship between PE and FPF

H2d: Organizational culture – leadership style (OCL) moderates the relationship between PE and FPN

Technology readiness, a preparedness to embrace and effectively utilise new technologies, which directly influences the success of information system adoption (Parasuraman, 2000), is hypothesized by:

H3a: Organizational culture – technology readiness (OCT) moderates the relationship between PE and FPR

H3b: Organizational culture – technology readiness (OCT) moderates the relationship between PE and FPS

H3c: Organizational culture – technology readiness (OCT) moderates the relationship between PE

and FPF

H3d: Organizational culture – technology readiness (OCT) moderates the relationship between PE and FPN

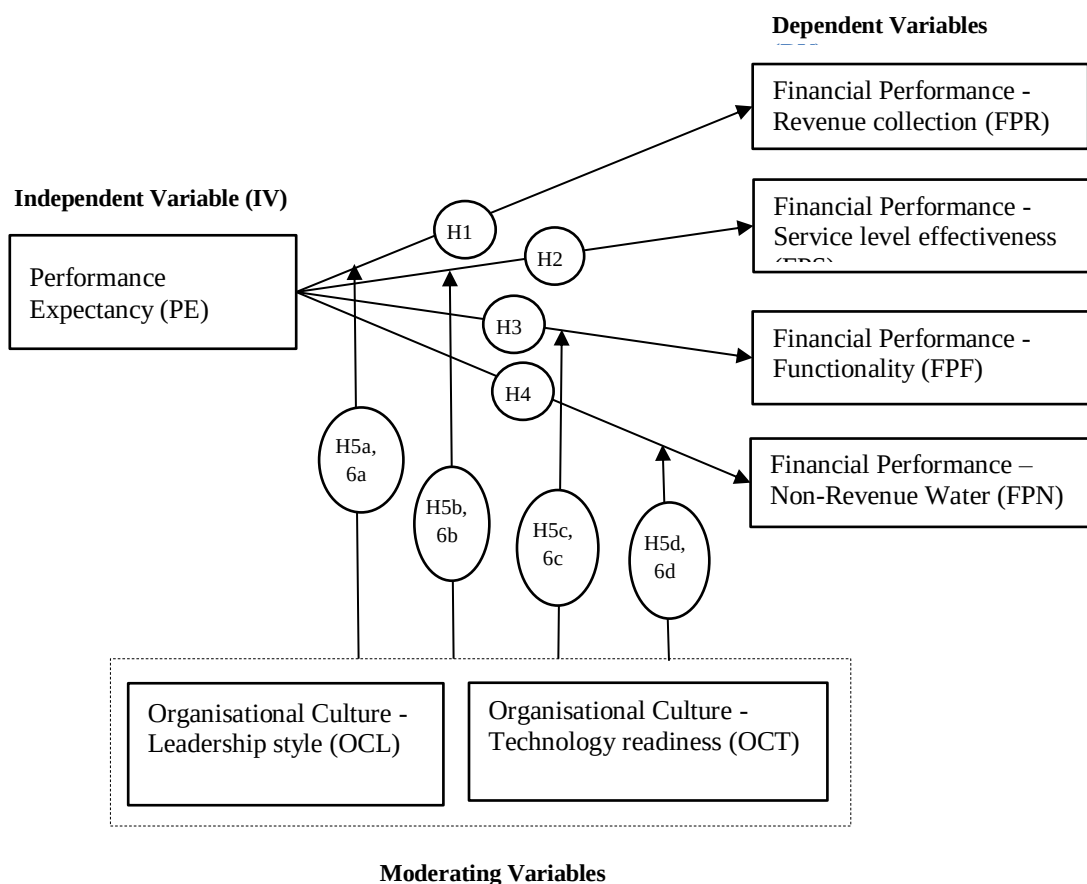
Engaged employees demonstrate higher levels of enthusiasm, dedication, and proactive behaviour, which are critical in the adoption and effective use of new systems (May et al., 2004). Based on that regard, the study can further hypothesize that:

H4a: Organizational Culture – employee engagement (OCE) moderates the relationship between EE and FPR

H4b: Organizational Culture – employee engagement (OCE) moderates the relationship between EE and FPS

H4c: Organizational Culture – employee engagement (OCE) moderates the relationship between EE and FPF

H4d: Organizational Culture – employee engagement (OCE) moderates the relationship between



EE and FPN

Figure 1. Research model. Source: Figure by author

3. METHODS

This study adopts a positivist philosophy, which assumes that reality is objective and best

understood through empirical observation (Saunders et al., 2019). It aligns with the study's quantitative design, focusing on testing hypotheses and examining causal relationships between system usage, organisational culture, and financial performance (Bell et al., 2022).

Structured questionnaires using a five-point Likert-like scale (Akinyi and Odundo, 2018; Ittner and Larcker, 1998; Maloba and Matlala, 2023; Murongo et al., 2025; and Twaambo and Phiri, 2022). Also, statistical tools like RA reflect positivism's emphasis on objectivity and replicability (Babbie, 2021). This approach may not capture subjective or contextual nuances; it is well-suited for analysing measurable outcomes and institutional patterns. Applying a deductive, theory-driven approach rooted in UTAUT and Institutional Theory, the study ensures value-free inquiry and enhances the generalisability of findings across Tanzania's water utilities.

This study will adopt a cross-sectional explanatory research design, which involves collecting and analysing data at a single point in time to examine the relationships between variables (Bell et al., 2022). The choice of this design is informed by the study's objective (Saunders et al., 2019) to assess the influence of key determinants of performance expectancy (PE) on the financial performance of water management systems through the adoption of MAJI IS, while considering the moderating role of organisational culture. The study follows a deductive research approach, in which theory guides the formulation of hypotheses, which are then tested empirically (Saunders et al., 2019). Deduction is a core feature of positivist research, allowing for the verification or falsification of theoretical propositions through statistical testing. The hypotheses concerning the influence of performance expectancy on financial performance, moderated by organisational culture, were tested using data collected from water service providers.

4. RESULT AND DISCUSSION

4.1 Overview

This chapter presents the results of the data analysis undertaken to examine effort expectancy as one of the determinants of MAJI IS usage and their influence on financial performance in Tanzanian water utilities, and the moderating role of organisational culture (leadership style, technology readiness and employee engagement). Structural Equation Modelling (SEM) using AMOS 28 was used to analyse measurement and structural models. The chapter covers reliability analysis, confirmatory factor analysis (CFA), construct validity, model fit assessment, structural model results, moderation effects, and a summary of findings. The results of the four components of financial performance, namely revenue collection, service level effectiveness, functionality, and reduction in non-revenue water (NRW) were significantly correlated ($r = .62$ to $.76$) and internally consistent (Cronbach's $\alpha = .965$).

4.1.1. Reliability

During measurement model specification, some latent constructs were measured using two indicators. In CFA, concerns can arise about model identification when constructs have fewer than three indicators. However, Bollen (1989) explains that a latent variable with two indicators can be identified statistically if appropriate constraints are applied. Similarly, Field (2005) noted that two-indicator constructs are common in applied research, especially when backed by strong theoretical reasoning. After confirming model identification, internal consistency reliability was measured using Cronbach's alpha. The results showed that all constructs had acceptable reliability, with

alpha values ranging from 0.70 to 0.91, confirming the internal consistency of the measurement scales.

4.2. Explanatory Factor Analysis Procedures and Output

Exploratory Factor Analysis (EFA) was done to look at the underlying factor structure of the MAJI IS study constructs. Principal Axis Factoring with Direct Oblimin rotation was used. This method lets factors correlate, which fits when theoretical constructs are expected to be related (Yong and Pearce, 2013). The correlation matrix confirmed that Direct Oblimin rotation was suitable, showing correlations higher than the recommended 0.32 (Meade and Craig, 2012). This suggests meaningful relationships among the factors. Multiple criteria were used to decide which factors to keep, including eigenvalues, factor loadings, and the scree plot. Following Kaiser's (1960) guideline, only factors with eigenvalues greater than one were kept. Factor loadings were checked using the threshold suggested by Yong and Pearce (2013), where items with loadings over 0.32 were seen as acceptable. The scree plot was examined, and factors above the point of inflection were retained. Using these criteria, twelve factors were extracted, explaining a total of 75.99% of the variance, showing a strong factor structure. All retained factors had eigenvalues greater than one. The factor loadings and the items associated with them are shown in Tables 4, while the individual measurement items were evaluated for how well they represented the retained constructs. Following Yong and Pearce (2013), items with low loadings, cross-loadings, or those that didn't load on any factor were removed to clarify the constructs and improve measurement accuracy. Some indicators were excluded and the remaining indicators (Table 4) showed satisfactory loadings (≥ 0.40) on their respective factors and had no problematic cross-loadings, confirming their fit for the upcoming confirmatory factor analysis and structural modeling.

4.3 Exploratory Factor Analysis (EFA) Results

The researchers conducted Exploratory Factor Analysis (EFA) to explore the underlying factor structure of the study constructs related to MAJI IS usage, organizational culture, and financial performance. The Principal Axis Factoring with Direct Oblimin rotation was used since the constructs were expected to be related. Only items with factor loadings of 0.40 or higher and without problematic cross-loadings for further analysis were retained.

Overall, the EFA results from Table 4 confirmed that all retained items loaded significantly on their respective factors, with eigenvalues exceeding one and satisfactory variance explained. These results demonstrate construct validity and justify the use of CFA and SEM in subsequent analyses. EFA was conducted to examine the underlying factor structure of the study constructs related to MAJI IS usage, organisational culture, and financial performance. Principal Axis Factoring with Direct Oblimin rotation was applied, as the constructs were theoretically expected to be correlated. Only items with factor loadings ≥ 0.40 and without problematic cross-loadings were retained for further analysis.

4.4 Confirmatory Factor Analysis (CFA)

Confirmatory Factor Analysis (CFA) was done to evaluate the measurement model and see if the observed items consistently represented their underlying latent constructs. CFA checks how strong the relationships between items and their factors are through standardized factor loadings. These loadings show how well each item contributes to the construct it aims to measure (Fornell and

Larcker, 1981). Generally, loadings of 0.50 or above are considered acceptable for construct validity. In this study, all standardized factor loadings were above the minimum threshold of .50, showing good indicator reliability. Most loadings fell between .503 and .810, confirming that items accurately reflected their corresponding constructs (Aini et al., 2025). Specifically, the loading ranges for each construct were as follows: Effort Expectancy (EE: .522 to .657), Leadership Style (OCL: .754 to .764), Technology Readiness (OCT: .503 to .642), Employee Engagement (OCE: .639 to .810), Revenue Collection Performance (FPR: .599 to .773), Service Level Effectiveness (FPS: .636 to .721), Functionality (FPF: .510 to .762), and Non-Revenue Water (FPN: .548 to .690). These results together show strong indicator reliability across all constructs in the measurement model. As described by Collier (2020) indicators should be retained unless there is a clear problem, since generally Cronbach's alpha values above .70 are acceptable (Table 3).

4.4.1 Data Screening, Assumption Testing, and Preparation for CFA and SEM

This section details the procedures and results of data screening, testing assumptions, and preparing the dataset for Confirmatory Factor Analysis (CFA) and Structural Equation Modelling (SEM). Each assumption is reported separately to ensure clarity and transparency.

4.4.2 Response Quality Assessment

The researcher examined response quality by looking at the standard deviation (SD) within respondents for Likert-scale items. This method helps spot patterns like straight lining, which might suggest inattentive answering and could affect data validity Meade and Craig, (2012). Following Collier, (2020), the researcher flagged respondents with SD values below 0.25 for further review. Cases with SD = 0, meaning they gave the same answer for all questionnaire items, were considered invalid. We removed these cases from the dataset. After this review, the final sample included 235 valid responses.

4.4.3 Normality Assessment

Normality was checked to see if the data was suitable for Maximum Likelihood estimation, which is needed for CFA and SEM. Normality was assessed using skewness and kurtosis statistics. Skewness values between -2 and +2 and kurtosis values from -10 to +10 were viewed as acceptable Tabachnick et al., (2019). The results (Table 4) showed that all constructs met the acceptable thresholds, indicating that the normality assumption was satisfied.

4.4.4 Linearity Assessment

The researcher examined the linearity between independent variables, moderators, and dependent variables using scatterplots and correlation analysis. A visual check showed linear relationships among the study variables, confirming that the assumption of linearity was met.

4.4.5 Multicollinearity Assessment

Multicollinearity was assessed using Variance Inflation Factor (VIF) and tolerance values. VIF values below 5 and tolerance values above 0.20 indicated that multicollinearity was not a concern in the dataset.

4.4.6 Mean Centering and Interaction Term Construction

Moderation analysis required creating interaction terms between the independent variables and organizational culture dimensions (OCL, OCT, and OCE). Interaction terms were built as product terms after mean centering the predictor and moderator variables. Mean centering involved subtracting the sample mean from each observed value (Collier, 2020). While earlier studies indicate that mean centering does not change key results (Echambadi and Hess, 2007), it decreases unnecessary multicollinearity and helps make sense of interaction effects (Dawson, 2014). Therefore, mean-centered variables were used to create all interaction terms included in the SEM model.

4.4.7 Implications for CFA and SEM

The results of data screening and assumption testing showed that the dataset was suitable for CFA and SEM analysis. The validated dataset was then used to estimate the measurement model through CFA. This was followed by structural modeling and moderation analysis using AMOS.

4.4.8. Content validity

Content validation was performed by the formula of content validity ratio (CVR) developed by Lawshe (1975). which is defined as:

$$CVR = \frac{ne - \frac{N}{2}}{\frac{N}{2}}$$

$$CVR = \frac{235 - \frac{243}{2}}{\frac{243}{2}} \quad CVR = 0.93$$

$$ne = 235$$

$$N = 243$$

Where ne = number of respondents who filled questionnaire correctly

n = the number of questionnaires returned

According to Nunnally (1978), a CVR value greater than 0.70 indicates acceptable content validity. The obtained CVR value of 0.93 therefore confirms that the measurement items adequately represent the content domain of the study constructs. This indicates that the questionnaire items were appropriate, relevant, and sufficiently comprehensive for measuring MAJI IS usage determinants, organisational culture, and financial performance.

4.4.9 Discriminant Validity

Discriminant validity was assessed using the Fornell-Larcker criterion. This criterion requires that the square root of the Average Variance Extracted (AVE) for each construct exceeds its correlations with other constructs (Fornell and Larcker, 1981). The results showed that AVE values for all constructs were greater than the squared inter-construct correlations. This confirmed adequate discriminant validity. Inter-construct covariances ranged from 0.38 to 0.67. These values did not exceed the AVE values of their respective constructs, further supporting discriminant validity (Fornell and Larcker, 1981). Additionally, the Heterotrait-Monotrait (HTMT) ratios were below the recommended threshold of 0.85. This provided further evidence of discriminant validity (Collier, 2020).

Table 3 summarises the results of the measurement model as assessed for all constructs included in the study. Factor loadings for each item ranging from .605 to .904, with the majority exceeding the recommended threshold of .70, indicates that the observed items strongly represent their

respective latent constructs. Composite Reliability (CR) values for all constructs exceeding 0.70, demonstrate internal consistency and confirm that the measurement scales are reliable. Likewise, from Table 3, the AVE values for each construct surpass the benchmark of .50, which support the convergent validity by showing each construct explains more than half of the variance of its indicators (Hair Jr et al., 2019). Discriminant validity as indicated on Table 3, assessed using the Heterotrait–Monotrait (HTMT) ratio, also meets the acceptable criterion ($HTMT < .85$ or $< .90$ as shown in Table 3, confirming that the constructs are empirically distinct from one another. Overall, the measurement model meets all reliability and validity requirements, indicating that the constructs are suitable for further structural analysis.

From Table 5, absolute fit indices (CMIN/DF and RMSEA) show that the model fits reasonably well, GFI and AGFI are slightly below ideal thresholds but within acceptable minimum ranges for large models (Kline, 1998), and incremental fit indices (CFI, TLI, IFI) are lower than expected, which is common in complex moderation models with many indicators and interaction terms (Hu and Bentler, 1999). Therefore, the model is acceptable for theory-testing, and AMOS models with many interaction terms generally depress CFI/TLI values (Kline, 1998). Moreover, researchers should interpret fit indices in conjunction with substantive theory and parameter estimates (Schreiber, 2017).

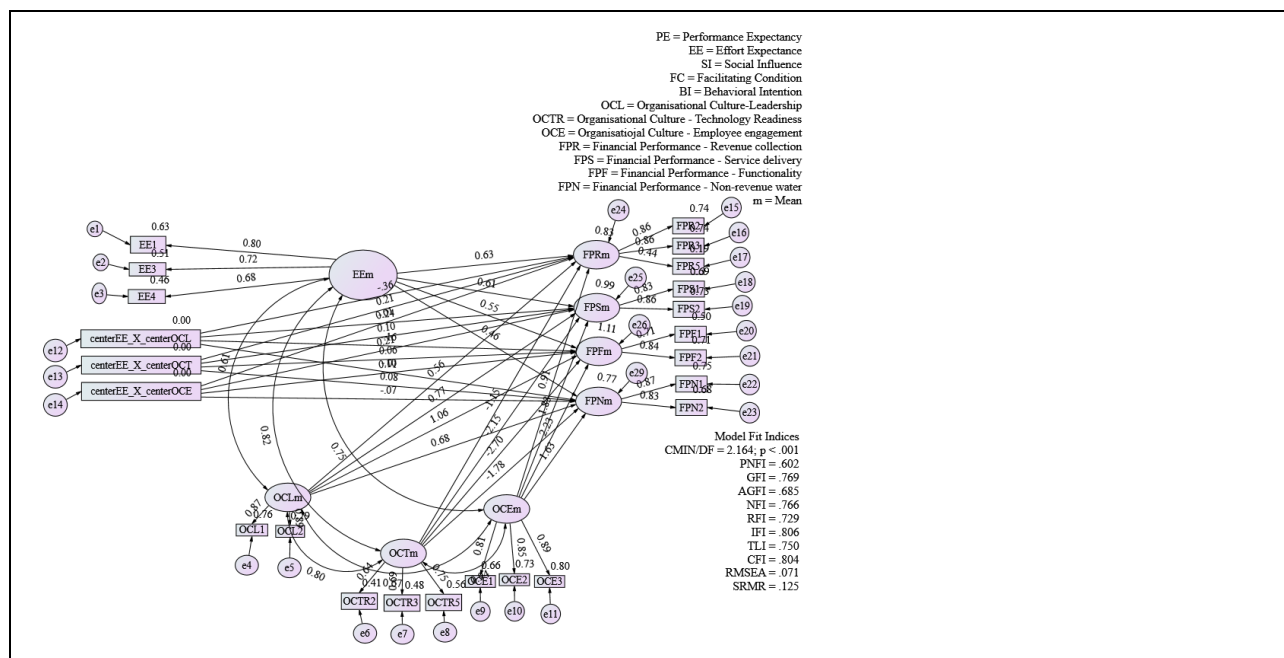


Figure 2: Research model. Source: Figure by author

4.4.10 Findings

The relationship between financial performance on revenue collection (as measured by the FPR) and effort expectancy (as measured by the EE Scale) was investigated using Pearson product-moment correlation coefficient. Preliminary analyses were performed to ensure no violation of the assumptions of normality, linearity and homoscedasticity. There was a strong, positive correlation among the four variables (Table 2). Table 2 presents Pearson correlation coefficients among the

key study variables. The results indicate that independent variable (EE) is positively and significantly correlated with financial performance – revenue collection (FPR) ($r = 0.583$, $p < 0.01$). Similarly, organisational culture - leadership style (OCL) shows a moderate positive relationship with FPR ($r = .457 - .670$, $p < .01$), organisational culture – technology readiness (OCT) shows a moderate positive relationship with FPR ($r = .600 - .679$, $p < .01$), and organisational culture – employee engagement (OCE) shows a moderate positive relationship with FPR ($r = .575 - .744$, $p < .01$). The findings suggest that improvements in MAJI IS usage determinant is likely associated with enhanced financial outcomes from revenue collection in Tanzanian water utilities.

Table 2 shows that Effort Expectancy (EE) is strongly and positively related to all financial performance dimensions. The highest correlation is with revenue collection ($r = .70$), followed by service level effectiveness ($r = .69$), functionality ($r = .67$), and non-revenue water reduction ($r = .67$). The dimensions of organizational culture, including leadership style (OCL), technology readiness (OCT), and employee engagement (OCE), are also strongly and positively connected. This indicates that higher employee engagement comes with stronger leadership and better technological readiness. Additionally, the financial performance indicators are moderately to strongly correlated, confirming that they create a coherent and consistent construct. Overall, the results suggest that a positive organizational culture and higher effort expectancy are closely linked to improved financial performance outcomes. This highlights the importance of effective MAJI IS usage in boosting the performance of Tanzanian water utilities.

The AMOS-SEM results in Table 6 confirm that the proposed model is significant and suitable for testing hypotheses. The analysis of direct effects shows that Effort Expectancy (EE) positively affects financial performance, especially revenue collection (FPR) ($p < .001$), which supports H1a. Although EE also has positive relationships with service level effectiveness (FPS), functionality (FPF), and non-revenue water reduction (FPN), these effects are not statistically significant, which means H1b, H1c, and H1d are not supported.

In terms of moderation effects, leadership style (OCL) shows mixed results. The interaction between OCL and EE significantly affects the relationship between EE and service level effectiveness (FPS), supporting H2b. However, its effects on revenue collection (H2a), functionality (H2c), and non-revenue water reduction (H2d) are not supported.

Technology readiness (OCT) shows selective moderation. OCT significantly weakens the relationship between EE and revenue collection (FPR), supporting H3a. However, its moderating effects on FPS (H3b), FPF (H3c), and FPN (H3d) are not statistically significant.

Lastly, employee engagement (OCE) has limited moderating influence. The interaction between OCE and EE significantly strengthens the relationship between EE and service level effectiveness (FPS), supporting H4b. The other moderation hypotheses (H4a, H4c, and H4d) are not supported. Overall, the findings suggest that while Effort Expectancy directly improves revenue collection, its overall financial impact depends on specific organizational cultural factors, especially leadership style, technology readiness, and employee engagement. The results of the structural model path coefficients (β), significance levels (p -values), and hypothesis testing outcomes for the relationships between effort expectancy (EE) and various dimensions of financial performance (FP), as well as the moderating effects of Organizational Culture (OC). These results highlight the role of organizational culture in determining how ease of system use translates into real financial performance outcomes in Tanzanian water utilities.

Table 6: Results of hypotheses testing

Model	Path	β	p	Hypothesis	Sign	Support
1	EE $\rightarrow$ FPR	0.630	***	H1a	(+)	Supported
2	EE $\rightarrow$ FPS	0.607	.057	H1b	(+)	Not Supported (marginal)
3	EE $\rightarrow$ FPF	0.547	.170	H1c	(+)	Not Supported
4	EE $\rightarrow$ FPN	0.456	.108	H1d	(+)	Not Supported
5	OCL $\rightarrow$ FPR	0.563	***	–	(+)	Supported
6	OCL $\rightarrow$ FPS	0.769	.006	–	(+)	Supported
7	OCL $\rightarrow$ FPF	1.061	.004	–	(+)	Supported
8	OCL $\rightarrow$ FPN	0.676	.006	–	(+)	Supported
9	OCT $\rightarrow$ FPR	–1.150	.005	–	(–)	Supported
10	OCT $\rightarrow$ FPS	–2.151	.002	–	(–)	Supported
11	OCT $\rightarrow$ FPF	–2.705	.003	–	(–)	Supported
12	OCT $\rightarrow$ FPN	–1.776	.004	–	(–)	Supported
13	OCE $\rightarrow$ FPR	0.912	.001	–	(+)	Supported
14	OCE $\rightarrow$ FPS	1.831	***	–	(+)	Supported
15	OCE $\rightarrow$ FPF	2.226	***	–	(+)	Supported
16	OCE $\rightarrow$ FPN	1.625	***	–	(+)	Supported
17	OCL $\times$ EE $\rightarrow$ FPR	–0.361	***	H2a	(–)	Supported
18	OCL $\times$ EE $\rightarrow$ FPS	–0.240	.002	H2b	(–)	Supported
19	OCL $\times$ EE $\rightarrow$ FPF	–0.158	.067	H2c	(–)	Not Supported
20	OCL $\times$ EE $\rightarrow$ FPN	–0.013	.886	H2d	(–)	Not Supported
21	OCT $\times$ EE $\rightarrow$ FPR	0.213	.006	H3a	(+)	Supported
22	OCT $\times$ EE $\rightarrow$ FPS	0.099	.222	H3b	(+)	Not Supported
23	OCT $\times$ EE $\rightarrow$ FPF	0.056	.527	H3c	(+)	Not Supported
24	OCT $\times$ EE $\rightarrow$ FPN	0.085	.360	H3d	(+)	Not Supported
25	OCE $\times$ EE $\rightarrow$ FPR	0.008	.915	H4a	(+)	Not Supported
26	OCE $\times$ EE $\rightarrow$ FPS	0.208	.012	H4b	(+)	Supported
27	OCE $\times$ EE $\rightarrow$ FPF	0.103	.250	H4c	(+)	Not Supported
28	OCE $\times$ EE $\rightarrow$ FPN	–0.067	.455	H4d	(–)	Not Supported

Note. *** $p < .01$; ** $p < .05$; EE = Effort Expectancy; FPR = Financial Performance – Revenue collection; FPS = Financial Performance Service level effectiveness; FPF = Financial Performance -Functionality; FPN = Financial Performance – Non-revenue water; OCL = Organisational Culture-Leadership style; OCT = Organisational Culture- Technology readiness; OCE = Organisational Culture – Employee engagement.

Source: Researcher's data analysis (SPSS output, 2025)

4.4.11. Summary of hypothesis testing

The structural model results show that effort expectancy directly influences financial performance mainly through revenue collection. Its effects on service level effectiveness, functionality, and reducing non-revenue water are positive but not statistically significant. Organizational culture

dimensions, such as leadership style and employee engagement, have strong direct impacts on all financial performance measures. In contrast, technology readiness has a negative direct effect, indicating that being unprepared limits performance outcomes.

The moderation analysis indicates that organizational culture selectively affects the link between effort expectancy and financial performance. Leadership style reduces the reliance of revenue collection and service effectiveness on how easy the system is to use. Meanwhile, technology readiness strengthens the impact of effort expectancy on revenue collection alone.

Employee engagement improves the relationship between effort expectancy and service level effectiveness. Overall, only five out of the twelve moderation hypotheses were confirmed. This finding suggests that easy system use by itself is not enough to boost financial performance without supportive organizational conditions.

5. CONCLUSION

5.1. Conclusion

This study examined the performance expectancy determinant of the Water Information System referred to as MAJI IS usage and its influence on the financial performance classified as revenue collection, service level effectiveness, functionality, and non-revenue water (NRW) of water utilities in Tanzania, focusing on the moderating effect of organisational culture categorised by leadership style, and technology readiness. Drawing upon the variable from Unified Theory of Acceptance and Use of Technology (UTAUT) and supported by contextual evidence from Tanzania's public water sector, the findings demonstrate that performance expectancy significantly influences positively financial performance dimensions, including revenue collection, service level effectiveness, functionality, and non-revenue water reduction (H1a, H1b, H1c, and H1d from Table 4).

Importantly, the moderating analysis revealed that organisational culture, through leadership style and technology readiness, strengthens the relationship between performance expectancy and financial performance in terms of revenue collection, service level effectiveness, and functionality (H2b, H2c, H3a, H3b, and H3c in Table 4). However, the model fails to support the moderation effects of organisational culture by leadership style and of technology readiness by revenue collection, service level effectiveness, and non-revenue water reduction on financial performance (H2a, H2d, and H3d, from Table 4). Water utilities with strong, usage, and participative organisational cultures in leadership style and technology readiness demonstrated higher system usage, improved operational efficiency, and more sustainable financial outcomes in terms of revenue collection, service level effectiveness, functionality and NRW. The findings highlight the importance of aligning internal organisational culture with the benefits of technology use. The study contributes to both theory and practice by extending performance expectancy, a UTAUT variable, to an organisational context, providing empirical support for its applicability in the public water management sector and for establishing organisational culture as a lens-moderating factor in technology usage and performance relationships.

Essentially, a supportive culture that is characterised by effective leadership and technology readiness creates an enabling environment for digital systems to drive measurable improvements in performance.

The study makes significant contributions to both theoretical and practical applications. Theoretically, it extends and strengthens the UTAUT from the individual level to the

organisational context, demonstrating its relevance for analysing institutional use of digital systems within the public sector. In practical terms, the study provides evidence from water utilities in Tanzania that organisational culture (especially leadership style and technology readiness) plays a crucial moderating role in the relationship between technology use and financial performance outcomes. The insight offers valuable guidance for both policymakers and utility managers seeking to strengthen digital transformation initiatives by aligning organisational culture.

5.2 Theoretical Implications

Theoretically, this research advances the understanding of information system usage by using the UTAUT model beyond the level of individual contexts to the performance framework of an organisational level. By incorporating organisational culture as a moderator, the study extends the predictive power of UTAUT and responds to calls for more sensitive context applications in public sector environments (Venkatesh et al., 2016; Jais et al., 2025).

Furthermore, the empirical validation of culture's moderating role provides a fresh lens through which technology use can be understood, not only as a technical or managerial process, but also as one embedded in cultural and institutional realities. This integration enhances the models' explanatory power, particularly in resource-constrained settings where cultural and institutional variables often shape technology assimilation outcomes.

5.3 Practical Implications

From a managerial perspective, the findings highlight five actionable implications for policy makers, regulators, the CBWSO management team, and utility managers in Tanzania and similar developing contexts:

1. Technology readiness enhancement

Continuous training, capacity building in technical areas, and upgrades to information and communication technology (ICT) infrastructure are essential for sustaining MAJI IS functionality. A technological readiness workforce accelerates adoption and improves data accuracy and system reliability.

2. Strengthen leadership style

Water utilities and community-based water organisations (CBWSO) should invest in fostering leadership styles that promote participation, transparency, and innovation. Transformational leadership practices are particularly effective in mobilising employee commitment toward system usage.

3. Monitoring and evaluation practices improvement

Establishing structured monitoring frameworks for MAJI IS usage can help utilities track system performance, identify bottlenecks, and ensure data-driven decision-making for financial performance and sustainability.

4. Policy and institutional alignment

The Ministry of Water, the Rural Water Supply and Sanitation Agency (RUWASA), and the Energy and Water Utilities Regulatory Authority (EWURA) should align their strategies with national digitalisation to local utility practices, promoting standardisation and interoperability across systems.

5.4 Future Research Directions

While this study offers robust insights, it also opens avenues for further investigation. Future research could incorporate longitudinal designs to examine how organisational culture evolves as MAJI IS usage continues. Additionally, comparative studies across different regions or sectors in rural and urban utilities could reveal how contextual differences influence usage outcomes. Integrating other institutional or environmental moderators may further refine the model's explanatory power.

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