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Risk Management Factors and Organisational Performance at Etihad Water and Electricity in the UAE

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Abstract

Risk management is increasingly recognised as an important organisational capability, yet limited evidence exists on whether distinct risk-management activities contribute differently to organisational performance, particularly within utility organisations in the United Arab Emirates. This study examines the relationships between five risk-management dimensions; Risk Identification, Risk Assessment, Risk Mitigation, Risk Management Implementation, and Risk Management Monitoring and Organisational Performance at Etihad Water and Electricity (EtihadWE), UAE. A quantitative cross-sectional survey was conducted using data from 291 employees across managerial, supervisory, operational, maintenance, administrative, and risk-related functions. Partial least squares structural equation modelling (PLS-SEM) was employed to assess the measurement and structural models. The five risk-management dimensions jointly explained 72.5% of the variance in Organisational Performance. Risk Management Implementation exhibited the strongest significant positive relationship with performance ($\beta = 0.436$, $p < 0.001$), followed by Risk Mitigation ($\beta = 0.253$, $p = 0.025$), whereas Risk Identification, Risk Assessment, and Risk Management Monitoring did not demonstrate statistically significant unique direct relationships. Structural collinearity was within acceptable limits, with inner VIF values ranging from 3.139 to 3.857, although several HTMT values exceeded the conservative 0.85 criterion, indicating some overlap among the risk-management dimensions. The findings suggest that organisational performance in the

utility context is particularly associated with embedding risk management into organisational processes and translating risk information into effective mitigation actions. The study contributes context-specific evidence from a UAE utility and supports viewing risk management as an integrated organisational process rather than a set of isolated practices.

Keywords: risk management; organisational performance; risk mitigation; risk management implementation; PLS-SEM; utility sector; Etihad Water and Electricity; UAE

1. Introduction

Risk management has become an established component of organisational governance and decision-making (Arena et al., 2010; Bromiley et al., 2015; Committee of Sponsoring Organizations of the Treadway Commission [COSO], 2017). However, the formal adoption of risk-management policies and procedures does not necessarily ensure improved organisational performance, as the performance effects of enterprise risk management (ERM) may depend on how effectively it is implemented and embedded within organisational processes (Otero González et al., 2020; Malik et al., 2020; Resende et al., 2024). In many organisations, risk-management activities may remain fragmented across functional areas or be implemented primarily as compliance and documentation exercises rather than being fully integrated into strategic and operational processes (Arena et al., 2010; Bromiley et al., 2015). ISO 31000 emphasises that effective risk management requires integration with governance, decision-making, planning, reporting, organisational culture, and day-to-day operations (International Organization for Standardization [ISO], 2018). Similarly, the COSO ERM framework emphasises the integration of risk management with organisational strategy and performance (COSO, 2017). This suggests that organisational outcomes may depend not merely on whether risk management exists, but on how effectively its different processes are carried out and integrated (Crawford & Jabbour, 2024; Resende et al., 2024).

This issue is particularly important in utility organisations. Water and electricity providers operate in environments characterised by high infrastructure dependence, service-continuity requirements, technological complexity, regulatory obligations, and exposure to multiple sources of risk. Utility-sector performance itself encompasses operational efficiency, service quality, reliability, infrastructure performance, and expenditure considerations, reflecting the complexity of managing essential services (European Water Regulators, 2024; Maziotis et al., 2025; Ofwat, 2025; Vilarinho et al., 2024). Climate-related hazards can affect water availability, water quality, infrastructure integrity, and continuity of supply, while the effectiveness of resilience measures remains uneven across contexts (Howard et al., 2026). At the same time, cyber insecurity, technological disruption, supply-chain dependencies, and geopolitical uncertainty continue to increase the complexity of organisational risk exposure (World Economic Forum, 2025). These conditions reinforce the importance of systematic risk-management processes within utility organisations, where operational failures can have consequences extending beyond the organisation itself (ISO, 2018; World Economic Forum, 2025).

Despite this practical importance, the empirical relationship between risk management and organisational performance remains insufficiently differentiated. A considerable proportion of the literature examines enterprise risk management as an organisational-level or aggregate construct rather than distinguishing the effects of individual risk-management activities (Bromiley et al., 2015; Malik et al., 2020; Resende et al., 2024). Although this approach is useful for evaluating the overall presence, effectiveness, or maturity of risk-management systems, it may conceal differences in the contribution of specific risk-management activities. Previous studies have reported positive associations between ERM and organisational outcomes, while also suggesting that such relationships depend on implementation quality,

strategic alignment, governance arrangements, and complementary organisational capabilities (Malik et al., 2020; Syrová & Špička, 2022; Le et al., 2024; Resende et al., 2024). Other evidence has shown that ERM adoption does not necessarily generate significant improvements across all performance measures (Otero González et al., 2020). Nevertheless, relatively limited attention has been given to whether individual stages of the risk-management process make distinct contributions to organisational performance.

This distinction is important because risk management comprises several closely connected activities. Risk identification concerns the systematic recognition of threats and opportunities; risk assessment involves analysing and evaluating identified risks; risk mitigation concerns the selection and application of responses intended to reduce or manage exposure; risk-management implementation reflects the extent to which risk-management practices are embedded in organisational processes; and risk-management monitoring concerns the continuing review of risks, controls, and responses (ISO, 2018). The COSO framework similarly emphasises interconnected processes involving governance, strategy, performance, review, and information and communication (COSO, 2017). Although these dimensions are theoretically related, they need not contribute equally to organisational performance. Treating them solely as a single composite concept may therefore obscure their respective roles, particularly because the organisational value of ERM may depend on how risk information is incorporated into managerial judgement and organisational decision-making (Crawford & Jabbour, 2024).

A further gap concerns the empirical distinctiveness of these dimensions. Theoretically differentiated constructs may nevertheless exhibit substantial overlap when measured within the same organisational setting. This creates both a measurement and a structural concern. At the measurement level, the constructs must demonstrate sufficient indicator reliability, internal consistency reliability, convergent validity, and discriminant validity to justify treating them as separate dimensions (Hair et al., 2019, 2020, 2022). In particular, the heterotrait-monotrait ratio of correlations (HTMT) provides an established approach for evaluating discriminant validity in variance-based structural equation modelling (Henseler et al., 2015). At the structural level, strong correlations among predictor constructs can generate multicollinearity, making it difficult to isolate their unique relationships with organisational performance (Hair et al., 2019, 2022). Collinearity is also important when data for predictors and outcomes are obtained from the same respondents because excessive shared variance may complicate structural interpretation (Kock, 2015). Consequently, an appropriate empirical assessment should examine not only whether risk management collectively explains organisational performance, but also whether the individual dimensions are sufficiently distinct and whether each provides a meaningful unique contribution.

These issues are especially relevant in the context of public and government-related utilities in the Gulf Cooperation Council (GCC) region. Such organisations operate within distinctive regulatory, environmental, infrastructural, and institutional conditions. More broadly, utility performance is shaped by service-quality, operational, efficiency, infrastructure, and regulatory considerations that differentiate utilities from many conventional private-sector organisations (European Water Regulators, 2024; Maziotis et al., 2025; Ofwat, 2025;

Vilarinho et al., 2024). However, much of the existing empirical evidence on risk management and organisational performance represented in the current literature has been generated in private-sector, listed-company, SME, or non-utility settings (Malik et al., 2020; Otero González et al., 2020; Syrová & Špička, 2022; Resende et al., 2024). Evidence concerning multidimensional risk-management processes in UAE utility organisations remains comparatively limited. This creates a contextual gap in understanding how established risk-management principles operate within regulated utility environments.

Against this background, the present study examines the relationship between five risk-management dimensions; risk identification, risk assessment, risk mitigation, risk-management implementation, and risk-management monitoring and organisational performance in Etihad Water and Electricity (EtihadWE) in the United Arab Emirates. The study conceptualises these dimensions as related but theoretically distinct components of the organisational risk-management process, consistent with the process orientation of ISO 31000 (ISO, 2018), and evaluates their relationships with organisational performance within a single integrated model.

The study makes three principal contributions. First, it extends the empirical literature by examining risk management within a UAE utility context, thereby providing evidence from an institutional and sectoral setting that has received comparatively limited attention in the ERM-performance literature. Second, it adopts a multidimensional perspective that distinguishes among five components of the risk-management process rather than representing risk management solely as an aggregate organisational construct, responding to broader calls for greater attention to how ERM operates within organisational processes (Arena et al., 2010; Bromiley et al., 2015). Third, it evaluates both the measurement properties of the constructs and the structural relationships among them, enabling a distinction to be made between the overall explanatory capacity of the risk-management framework and the unique contribution of each risk-management dimension (Hair et al., 2019, 2020, 2022; Henseler et al., 2015). Accordingly, the study addresses the following research question:

To what extent do risk identification, risk assessment, risk mitigation, risk-management implementation, and risk-management monitoring explain organisational performance in EtihadWE?

To address this question, the study first evaluates whether the proposed constructs demonstrate satisfactory indicator reliability, internal consistency reliability, convergent validity, and discriminant validity, consistent with established PLS-SEM assessment procedures (Hair et al., 2019, 2020, 2022; Henseler et al., 2015). It then assesses collinearity among the risk-management dimensions, the explanatory power of the structural model, the incremental contribution of each predictor, and the significance of the hypothesised relationships with organisational performance (Hair et al., 2019, 2022). This approach provides a systematic basis for evaluating both the overall relevance of the risk-management framework and the extent to which individual dimensions exhibit distinguishable relationships with organisational performance.

2. Conceptual Framework and Hypothesis Development

The conceptual framework integrates the process logic of ISO 31000, the strategic integration perspective of the COSO Enterprise Risk Management (ERM) framework, and empirical evidence linking risk management to organisational performance (Committee of Sponsoring Organizations of the Treadway Commission [COSO], 2017; International Organization for Standardization [ISO], 2018; Malik et al., 2020; Resende et al., 2024). Rather than conceptualising risk management as a single organisational practice or adoption decision, the framework distinguishes five interrelated dimensions: risk identification, risk assessment, risk mitigation, risk management implementation, and risk management monitoring. These dimensions represent complementary activities through which risk information is generated, evaluated, translated into action, embedded in organisational processes, and subsequently reviewed (COSO, 2017; ISO, 2018).

ISO 31000 provides the principal process logic underlying this multidimensional conceptualisation. It defines risk as the effect of uncertainty on objectives and emphasises a systematic process involving risk identification, analysis and evaluation, treatment, monitoring, and review (ISO, 2018). This process perspective is important because it avoids treating risk management as an undifferentiated organisational attribute. Instead, it allows specific capabilities within the risk-management process to be examined in relation to organisational outcomes, consistent with calls in the ERM literature to examine how risk management operates within organisational processes rather than focusing solely on its formal adoption (Arena et al., 2010; Bromiley et al., 2015).

The COSO ERM framework complements this process perspective by emphasising the integration of risk management with strategy and performance. COSO highlights governance and culture, strategy and objective setting, performance, review and revision, and information, communication, and reporting as interconnected components of effective ERM (COSO, 2017). This integration perspective is particularly relevant to organisational settings in which risk-related decisions are distributed across multiple functional and managerial areas. Effective risk management therefore requires more than identifying and assessing risks; risk considerations must also be translated into actions, responsibilities, controls, and routine organisational decision-making (Arena et al., 2010; Crawford & Jabbour, 2024).

Empirical research generally supports a relationship between effective ERM and organisational performance, although the evidence is not uniform. Malik et al. (2020), for example, report a positive association between ERM effectiveness and firm performance and show that stronger board-level risk governance can reinforce this relationship. In contrast, Otero González et al. (2020) find no significant improvement in several financial performance measures associated with ERM adoption among Spanish listed companies. More recent research similarly suggests that the value derived from ERM depends on organisational context, implementation quality, governance arrangements, knowledge and technological capabilities, and complementary organisational resources (Crawford & Jabbour, 2024; Le et al., 2024; Resende et al., 2024; Syrová & Špička, 2022).

Hence, these findings suggest that the performance implications of risk management may be obscured when ERM is represented only through adoption, disclosure, or a single aggregate construct (Bromiley et al., 2015; Otero González et al., 2020). The present framework therefore opens this conceptual "black box" by examining five theoretically distinguishable components of the risk-management process. Importantly, these dimensions are expected to be related because they form part of an integrated process (COSO, 2017; ISO, 2018). However, conceptual relatedness does not necessarily imply identical empirical effects. Their measurement distinctiveness and structural collinearity must therefore be evaluated before the individual relationships with organisational performance are interpreted (Hair et al., 2019, 2020, 2022; Henseler et al., 2015).

2.1 Organisational Performance in the Utility Context

Organisational performance is conceptualised as the outcome construct in the proposed framework. In regulated utility environments, performance cannot be adequately represented by a single financial indicator because utilities are expected to achieve multiple operational and service objectives simultaneously. Performance typically encompasses dimensions such as operational efficiency, service reliability, service quality, customer outcomes, infrastructure performance, environmental performance, and expenditure control (European Water Regulators, 2024; Maziotis et al., 2025; Ofwat, 2025; Vilarinho et al., 2024).

This multidimensional perspective is consistent with utility-sector performance frameworks in which organisations are evaluated against multiple performance commitments and key performance indicators rather than a single financial measure. For example, utility regulatory systems commonly combine efficiency, service, reliability, and expenditure-related indicators when assessing organisational performance (European Water Regulators, 2024; Ofwat, 2025). Recent utility research similarly adopts multidimensional approaches that integrate economic, operational, service-quality, and customer-centred outcomes (Maziotis et al., 2025; Vilarinho et al., 2024).

Accordingly, organisational performance is treated in this study as a latent construct representing employees' assessments of broader organisational outcomes rather than as a purely financial measure. This conceptualisation is particularly appropriate for Etihad Water and Electricity (EtihadWE), where organisational effectiveness involves the reliable and efficient delivery of essential utility services. More broadly, contemporary utility-performance frameworks emphasise reliability, efficiency, service quality, and customer outcomes as central aspects of performance (European Water Regulators, 2024; Maziotis et al., 2025; Ofwat, 2025; Vilarinho et al., 2024).

2.2 Risk Identification and Organisational Performance

Risk identification represents the systematic recognition of events, conditions, sources of uncertainty, and dependencies that may affect organisational objectives. It constitutes the starting point of the risk-management process because risks that are not recognised cannot subsequently be assessed, treated, or monitored (ISO, 2018). Effective identification can support organisational performance by reducing information gaps and enabling earlier

recognition of operational, strategic, technological, and environmental threats. The quality and availability of risk information are important because ERM contributes to organisational decision-making by improving managers' understanding of uncertainty and its potential implications (Crawford & Jabbour, 2024). In utility organisations, early identification is particularly relevant given their exposure to infrastructure, technological, environmental, and service-continuity risks (Howard et al., 2026; World Economic Forum, 2025).

However, identifying risks does not itself guarantee improved performance. Its value depends on whether identified risks are incorporated into subsequent assessment, decision-making, and treatment processes (ISO, 2018). This distinction may partly explain why research based primarily on the existence or adoption of ERM practices has produced mixed performance findings (Bromiley et al., 2015; Otero González et al., 2020). Nevertheless, stronger risk-identification capability should enhance the information available for organisational decision-making and is therefore expected to be positively associated with performance (Crawford & Jabbour, 2024).

H1: Risk identification is positively related to organisational performance.

2.3 Risk Assessment and Organisational Performance

Risk assessment involves analysing identified risks and evaluating their relative significance in relation to organisational objectives. Through this process, organisations can compare risks according to factors such as likelihood, consequence, and organisational exposure and subsequently establish priorities for managerial attention and treatment (ISO, 2018). The performance relevance of risk assessment lies primarily in its prioritisation and decision-support functions. Organisations operate under resource constraints and cannot treat all risks with equal intensity. Systematic assessment can therefore improve decision quality by directing managerial attention and organisational resources towards risks with the greatest potential consequences and by supporting more informed operational and strategic choices (Crawford & Jabbour, 2024; ISO, 2018). The effective use of risk-related knowledge and information has similarly been linked to the capacity of ERM to contribute to organisational performance (Le et al., 2024).

This function is particularly important in utility organisations, where management must balance service continuity, infrastructure requirements, operational efficiency, service quality, and expenditure commitments (European Water Regulators, 2024; Maziotis et al., 2025; Ofwat, 2025). Risk assessment is therefore expected to contribute positively to organisational performance when assessment outputs inform planning, resource allocation, and operational decision-making.

H2: Risk assessment is positively related to organisational performance.

2.4 Risk Mitigation and Organisational Performance

Risk mitigation represents the transition from risk analysis to organisational action. Consistent with the risk-treatment stage of ISO 31000, it encompasses the selection and application of measures intended to modify risk exposure, including preventive controls,

contingency arrangements, risk reduction, transfer, avoidance, or other treatment responses (ISO, 2018).

Among the dimensions examined in this study, mitigation has a particularly direct operational connection with performance because it converts information about risk into actions designed to reduce the probability or consequences of adverse events. Effective mitigation can contribute to process stability, reduce disruption, protect organisational resources, and support continuity of service. This is particularly important for utility organisations, where infrastructure disruption and climate-related hazards may affect water availability, infrastructure integrity, and continuity of essential services (Howard et al., 2026). More broadly, organisations face an increasingly complex risk environment involving technological disruption, cyber insecurity, supply-chain vulnerabilities, and geopolitical uncertainty (World Economic Forum, 2025).

Nevertheless, mitigation effectiveness depends on the quality of the selected response and the organisation's capacity to execute it. Risk-management benefits therefore remain contingent on organisational capabilities, alignment, implementation quality, and the effective integration of risk information into organisational decision-making (Crawford & Jabbour, 2024; Le et al., 2024; Syrová & Špička, 2022). Subject to these conditions, more effective risk mitigation is expected to be associated with stronger organisational performance.

H3: Risk mitigation is positively related to organisational performance.

2.5 Risk Management Implementation and Organisational Performance

Risk management implementation captures the extent to which risk-management principles, responsibilities, procedures, resources, and controls are embedded in organisational routines and decision-making. It is conceptually distinct from individual stages such as identification or assessment because an organisation may formally conduct risk analyses without consistently integrating their outputs into operational practice. This distinction is consistent with the broader ERM literature, which emphasises that formal adoption alone does not necessarily indicate that risk management has become embedded within organisational practices (Arena et al., 2010; Bromiley et al., 2015).

Both ISO 31000 and COSO emphasise integration as a fundamental condition of effective risk management. ISO 31000 requires risk management to be incorporated into governance and organisational activities, while COSO positions ERM as an integral part of strategy formulation and performance management (COSO, 2017; ISO, 2018). From this perspective, implementation provides the organisational mechanism through which risk-management intentions become routine managerial and operational behaviours.

Empirical evidence also indicates that ERM generates greater value when supported by effective governance structures and organisational integration. Malik et al. (2020), for instance, demonstrate that the performance implications of ERM effectiveness are reinforced by robust risk governance. Crawford and Jabbour (2024) further highlight the importance of integrating ERM with managerial judgement and organisational decision-making. Effective implementation can establish clear responsibilities, strengthen accountability, facilitate the

routine use of risk information, and improve coordination across organisational units (Arena et al., 2010; COSO, 2017). Consequently, greater integration and implementation of risk-management practices should be associated with improved organisational performance.

H4: Risk management implementation is positively related to organisational performance.

2.6 Risk Management Monitoring and Organisational Performance

Risk management monitoring refers to the continuing review of risk exposures, controls, treatment measures, and changes in the organisational environment. ISO 31000 treats monitoring and review as integral to the risk-management process because risks and the effectiveness of responses may change over time (ISO, 2018). COSO similarly incorporates review and revision as a central component of ERM, recognising the need to evaluate changes in organisational performance and risk-management practices over time (COSO, 2017).

Monitoring can support organisational performance through several mechanisms. First, it enables organisations to identify emerging or changing risks. Second, it can reveal deterioration in control effectiveness or deviations from planned treatment measures. Third, monitoring creates feedback that supports organisational learning and adaptation (COSO, 2017; ISO, 2018). Such adaptive capacity is increasingly important because organisations face evolving technological, geopolitical, environmental, and supply-chain risks (World Economic Forum, 2025). In the utility context, changing environmental conditions and climate-related hazards further reinforce the importance of continually reviewing resilience and risk responses (Howard et al., 2026).

The benefits of monitoring may not always be immediately observable because some improvements occur through prevention, learning, adaptation, and the adjustment of organisational responses over time. More broadly, research suggests that the relationship between ERM and performance may operate through indirect organisational mechanisms rather than only through immediate direct effects (Resende et al., 2024; Syrová & Špička, 2022). Nevertheless, systematic monitoring should strengthen an organisation's capacity to detect deviations and adjust its risk responses, providing a theoretical basis for expecting a positive relationship with organisational performance.

H5: Risk management monitoring is positively related to organisational performance.

2.7 Proposed Conceptual Framework

The proposed framework integrates the five hypotheses into a multidimensional model in which risk identification, risk assessment, risk mitigation, risk management implementation, and risk management monitoring are specified as direct predictors of organisational performance. Figure 1 presents the conceptual model. The specification reflects the process orientation of ISO 31000 and the strategy-and-performance integration emphasised within the COSO ERM framework (COSO, 2017; ISO, 2018).

The model extends broad ERM-adoption approaches in three respects. First, it conceptualises risk management as a set of differentiated but interconnected capabilities rather than as a binary adoption decision or undifferentiated organisational construct, responding to concerns that broad ERM measures may obscure the organisational processes through which risk management operates (Arena et al., 2010; Bromiley et al., 2015). Second, it integrates the process orientation of ISO 31000 with the strategic and organisational embedding emphasised by COSO ERM (COSO, 2017; ISO, 2018). Third, it conceptualises performance in a manner appropriate to the utility context, where organisational outcomes extend beyond conventional financial performance to include operational efficiency, service reliability, service quality, customer outcomes, and expenditure-related performance (European Water Regulators, 2024; Maziotis et al., 2025; Ofwat, 2025; Vilarinho et al., 2024).

The direct-effect specification is appropriate to the theoretical objective of determining whether each risk-management dimension exhibits a distinct relationship with organisational performance when the dimensions are considered simultaneously. This specification does not imply that indirect or conditional mechanisms are absent. Existing research indicates that governance arrangements, managerial decision-making, organisational capabilities, and corporate social responsibility may shape or transmit the relationship between ERM and organisational performance (Crawford & Jabbour, 2024; Malik et al., 2020; Resende et al., 2024; Syrová & Špička, 2022). Such mechanisms represent important directions for subsequent research but are beyond the scope of the present model.

Because the five dimensions constitute closely connected components of an integrated risk-management process (COSO, 2017; ISO, 2018), the framework also recognises the possibility of substantial empirical overlap. The empirical analysis therefore evaluates not only the significance of the hypothesised structural relationships but also the reliability, convergent validity, discriminant validity, and collinearity of the constructs. These assessments are necessary when determining whether theoretically differentiated latent constructs demonstrate sufficient empirical distinctiveness and whether their individual structural relationships can be meaningfully interpreted (Hair et al., 2019, 2020, 2022; Henseler et al., 2015). This enables the model to distinguish between the joint explanatory relevance of the risk-management system and the unique association of each constituent dimension with organisational performance.

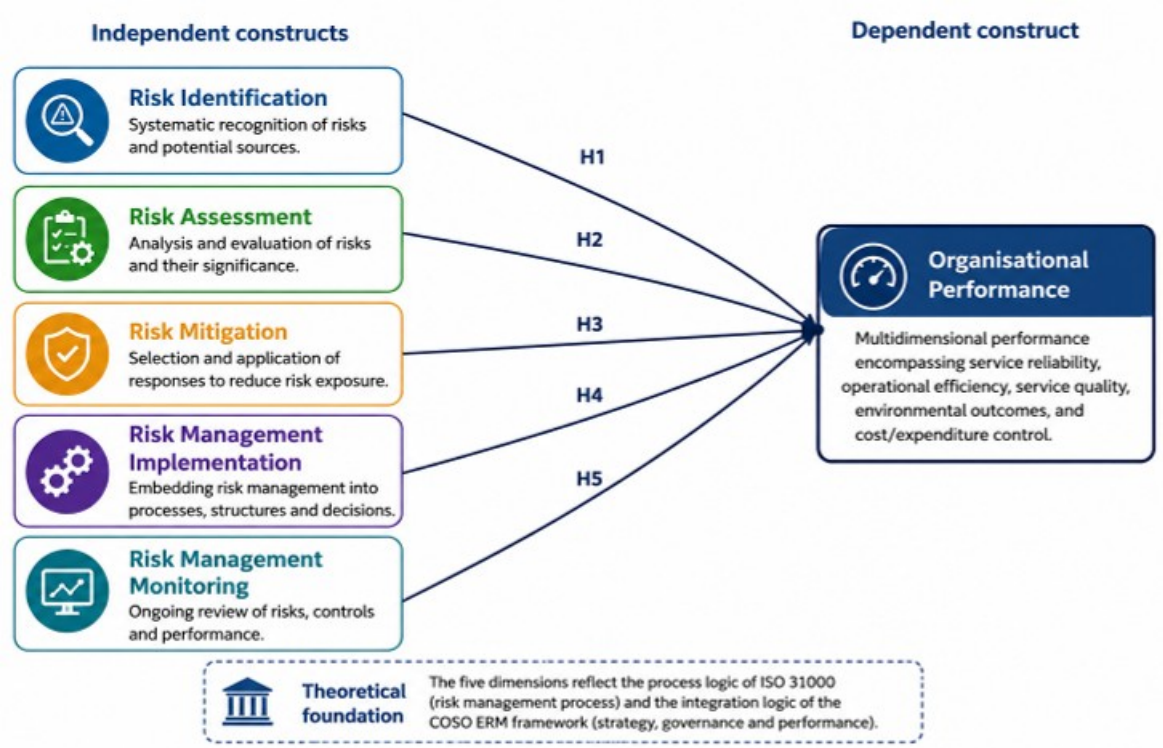

Figure 1. Proposed conceptual framework

3. Methodology

3.1 Research Design and Setting

This study employed a quantitative, deductive, cross-sectional survey design to examine the relationships between five risk-management dimensions and organisational performance. Cross-sectional designs are appropriate for examining relationships among variables measured at a single point in time, although they provide limited grounds for establishing temporal order and causality (Maier et al., 2023). The study was conducted at Etihad Water and Electricity (EtihadWE) in the United Arab Emirates. The unit of analysis was the individual employee.

The conceptual model specified Risk Identification, Risk Assessment, Risk Mitigation, Risk Management Implementation, and Risk Management Monitoring as exogenous constructs and Organisational Performance as the endogenous construct. Because the data were collected at a single point in time, the estimated relationships were interpreted as associations rather than definitive causal effects, consistent with the limitations of cross-sectional research designs (Maier et al., 2023).

3.2 Population, Sampling, and Sample Size

The target population comprised EtihadWE employees whose roles provided sufficient exposure to organisational risk-management practices and performance-related processes.

These included employees working in managerial, supervisory, operational, maintenance, administrative, and risk-related functions. The organisational employee list served as the sampling frame, comprising 1,140 employees. A simple random sampling technique was used. Based on the finite-population sample-size approach developed by Krejcie and Morgan (1970), the required sample size was 291 respondents. The final dataset contained 291 usable questionnaires, meeting the planned sample requirement. The achieved sample represented a range of organisational roles and functions, supporting the assessment of risk-management practices as organisation-wide rather than department-specific activities.

3.3 Instrument and Data Collection

Data were collected using a self-administered structured questionnaire. The instrument measured six reflective constructs: Risk Identification, Risk Assessment, Risk Mitigation, Risk Management Implementation, Risk Management Monitoring, and Organisational Performance. Questionnaire development was informed by the theoretical domains established in ISO 31000 and the COSO ERM framework, together with the related empirical literature on enterprise risk management and organisational performance (Committee of Sponsoring Organizations of the Treadway Commission [COSO], 2017; International Organization for Standardization [ISO], 2018; Malik et al., 2020; Resende et al., 2024). Items were reviewed for content relevance and clarity before administration, and minor wording modifications were made where necessary. All substantive items were measured using a five-point Likert scale ranging from strongly disagree to strongly agree. The questionnaire also included demographic items for sample profiling.

Following data collection, responses were coded and screened for completeness, valid response ranges, and obvious entry errors. The final dataset contained no missing values, and no cases were removed based on the documented screening procedures. Because the predictor and outcome constructs were measured using the same questionnaire and obtained from the same respondents, common method bias was recognised as a potential concern (Podsakoff et al., 2003). Procedural remedies included confidentiality assurances, clear item wording, consistent response formats, and separation of demographic and substantive questions, consistent with recommended approaches for reducing common method bias in behavioural research (Podsakoff et al., 2003). Statistical collinearity diagnostics were also considered during model assessment because collinearity-based procedures can provide supplementary evidence when evaluating potential common method bias in PLS-SEM (Kock, 2015).

3.4 PLS-SEM Analysis

Partial least squares structural equation modelling (PLS-SEM) was used to evaluate the proposed framework because the model comprised multiple latent constructs and several simultaneous structural relationships. PLS-SEM is suitable for estimating complex models involving latent variables and for simultaneously assessing measurement and structural relationships (Hair et al., 2019, 2022).

The analysis followed a two-stage procedure recommended for PLS-SEM assessment (Hair et al., 2019, 2020, 2022). First, the reflective measurement model was assessed using outer

loadings, Cronbach's alpha, composite reliability, and average variance extracted (AVE) to evaluate indicator reliability, internal consistency reliability, and convergent validity (Hair et al., 2019, 2020, 2022). Discriminant validity was primarily assessed using the heterotrait-monotrait ratio of correlations (HTMT), which has been recommended as a more sensitive criterion for assessing discriminant validity in variance-based structural equation modelling (Henseler et al., 2015). The Fornell–Larcker criterion and cross-loadings were treated as supplementary diagnostics, consistent with contemporary PLS-SEM assessment guidance (Hair et al., 2020, 2022).

Second, the structural model was assessed using inner variance inflation factors (VIF), the coefficient of determination (R^2), effect sizes (f^2), and bootstrapped path coefficients, consistent with established procedures for evaluating PLS-SEM structural models (Hair et al., 2019, 2022). The five hypothesised relationships were:

H1: Risk Identification → Organisational Performance
H2: Risk Assessment → Organisational Performance
H3: Risk Mitigation → Organisational Performance
H4: Risk Management Implementation → Organisational Performance
H5: Risk Management Monitoring → Organisational Performance

Statistical significance was evaluated at the 5% level using the bootstrapped path estimates (Hair et al., 2019, 2022). Particular attention was given to predictor collinearity because the five risk-management dimensions were theoretically related and could share substantial variance. Inner VIF values were therefore examined before interpreting individual structural relationships (Hair et al., 2019, 2022).

3.5 Ethical Considerations

Participation was voluntary, and respondents were informed of the purpose of the study before completing the questionnaire. Confidentiality was maintained by avoiding unnecessary personal identifiers and reporting findings in aggregate form. The study also sought to minimise perceived organisational pressure by emphasising that participation was voluntary and that responses would be used for research purposes only.

4. Results of the Conceptual Framework Modelling

Partial least squares structural equation modelling (PLS-SEM) was employed to assess the measurement and structural models using data obtained from 291 employees of Etihad Water and Electricity (EtihadWE) in the United Arab Emirates. The respondents were drawn from managerial, supervisory, operational, maintenance, administrative, and risk-related functions. These roles were considered appropriate for the analysis because they provided employees with sufficient exposure to organisational risk-management practices and work processes associated with organisational performance.

The analysis was conducted in two stages, consistent with established PLS-SEM assessment procedures (Hair et al., 2019, 2020, 2022). First, the measurement model was evaluated by examining indicator reliability, internal consistency reliability, convergent validity, and

discriminant validity. Second, the structural model was assessed to determine collinearity among the predictor constructs, the model's explanatory power, the effect sizes of the predictors, and the significance of the hypothesised relationships with organisational performance (Hair et al., 2019, 2022). The measurement-model results are presented first, followed by the structural-model assessment and hypothesis-testing results.

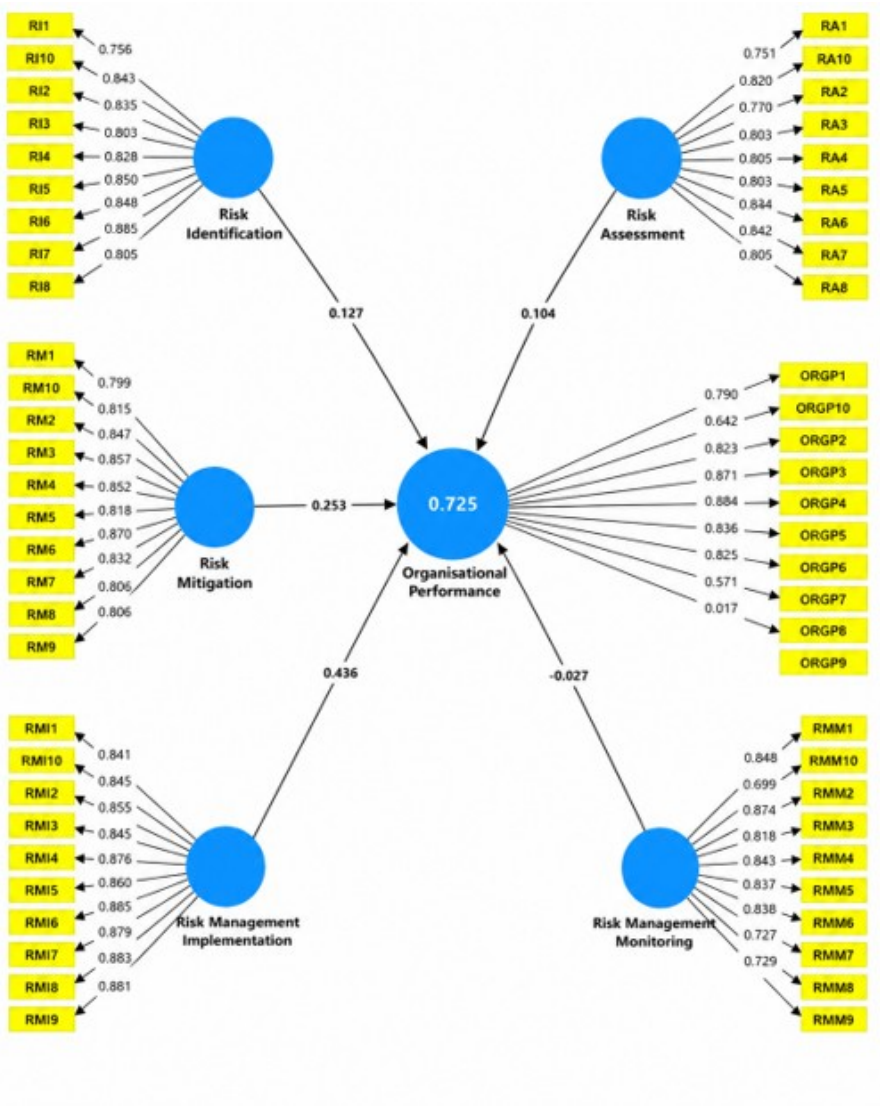

Figure 2: PLS model of the study

4.1 Measurement Model Assessment

The reflective measurement model was assessed using indicator loadings, Cronbach's alpha, composite reliability, average variance extracted (AVE), and the heterotrait-monotrait ratio of correlations (HTMT), consistent with recommended procedures for evaluating reflective measurement models in PLS-SEM (Hair et al., 2019, 2020, 2022). Three indicators of Organisational Performance (ORGP6, ORGP9, and ORGP10) were removed during measurement-model refinement. Following their removal, the retained Organisational

Performance indicators exhibited satisfactory outer loadings ranging from 0.790 to 0.884. The remaining constructs also demonstrated acceptable indicator reliability. Outer loadings ranged from 0.751 to 0.842 for Risk Assessment, 0.756 to 0.885 for Risk Identification, 0.826 to 0.885 for Risk Management Implementation, 0.699 to 0.874 for Risk Management Monitoring, and 0.799 to 0.870 for Risk Mitigation.

The minimum loading of 0.699 for Risk Management Monitoring was marginally below the conventional 0.70 guideline. However, the indicator was retained because the deviation was negligible and the construct continued to demonstrate satisfactory internal consistency and convergent validity. Indicators with loadings close to 0.70 should not be removed automatically when their retention contributes to theoretical and content validity and when other measurement-quality criteria remain satisfactory (Hair et al., 2019, 2022). Table 1 summarises the measurement-model results.

Table 1. Measurement model assessment

Construct	Retained items	Loading range	Cronbach's α	Composite reliability	AVE
Organisational Performance	7	0.790–0.884	0.944	0.944	0.707
Risk Assessment	10	0.751–0.842	0.939	0.948	0.646
Risk Identification	10	0.756–0.885	0.950	0.957	0.689
Risk Management Implementation	10	0.826–0.885	0.962	0.967	0.744
Risk Management Monitoring	10	0.699–0.874	0.941	0.950	0.656
Risk Mitigation	10	0.799–0.870	0.950	0.957	0.689

All constructs exceeded the recommended minimum reliability level of 0.70 (Hair et al., 2019, 2020, 2022). Composite reliability ranged from 0.944 to 0.967, while Cronbach's alpha ranged from 0.939 to 0.962, indicating strong internal consistency. However, reliability coefficients around or above 0.95 may also indicate highly similar or potentially redundant indicators rather than superior measurement quality (Hair et al., 2019, 2022). The particularly high reliability values for Risk Identification, Risk Management Implementation, and Risk Mitigation should therefore be interpreted together with the discriminant-validity results.

Convergent validity was assessed using AVE. All AVE values exceeded the recommended threshold of 0.50, ranging from 0.646 to 0.744. This indicates that each construct explained more than half of the variance in its indicators and therefore demonstrated satisfactory convergent validity (Hair et al., 2019, 2020, 2022).

4.1.1 Discriminant Validity

Discriminant validity was primarily evaluated using HTMT, with the Fornell-Larcker criterion and cross-loadings considered as supplementary diagnostics (Henseler et al., 2015; Hair et al., 2020).

Table 2. HTMT ratios

Construct	ORGP	RA	RI	RMI	RMM	RM
ORGP	—					
RA	0.834	—				
RI	0.776	0.860	—			
RMI	0.865	0.884	0.821	—		
RMM	0.810	0.886	0.785	0.855	—	
RM	0.867	0.742	0.827	0.855	0.877	—

The HTMT values ranged from 0.742 to 0.886. None exceeded the more lenient threshold of 0.90. However, several construct pairs exceeded the more conservative threshold of 0.85, including Risk Assessment–Risk Identification, Organisational Performance–Risk Management Implementation, Organisational Performance–Risk Mitigation, Risk Assessment–Risk Management Implementation, Risk Assessment–Risk Management Monitoring, Risk Management Implementation–Risk Management Monitoring, Risk Management Implementation–Risk Mitigation, and Risk Management Monitoring–Risk Mitigation. Both 0.85 and 0.90 have been used as reference values when evaluating HTMT, with the appropriate criterion depending partly on the conceptual similarity of the constructs (Henseler et al., 2015; Hair et al., 2020, 2022).

The discriminant-validity evidence is therefore mixed. The results satisfy the 0.90 criterion but indicate insufficient separation for several construct pairs under the stricter 0.85 criterion. This pattern is consistent with the high intercorrelations observed among the risk-management dimensions and suggests substantial empirical overlap between theoretically related stages of the risk-management process. Such overlap is particularly important in PLS-SEM because adequate discriminant validity is required to establish that conceptually distinct constructs capture sufficiently different phenomena (Henseler et al., 2015; Hair et al., 2020).

Accordingly, discriminant validity cannot be regarded as unequivocally established. The five risk-management dimensions appear to capture closely related components of a broader risk-management process. This limitation was therefore considered when interpreting the structural-model results.

4.2 Structural Model Assessment

The structural model was evaluated using inner-model collinearity, the coefficient of determination (R^2), effect sizes (f^2), and bootstrapped path coefficients, consistent with established PLS-SEM structural-model assessment procedures (Hair et al., 2019, 2022).

4.2.1 Explanatory Power, Effect Size, and Structural Collinearity

The explanatory power of the structural model was first assessed using the coefficient of determination (R^2). The five risk-management dimensions jointly explained 72.5% of the variance in Organisational Performance ($R^2 = 0.725$), indicating substantial in-sample

explanatory power. In PLS-SEM, R^2 represents the proportion of variance in the endogenous construct explained collectively by its predictors and should be interpreted in relation to the research context and model complexity (Hair et al., 2019, 2022).

The incremental contribution of each predictor was subsequently evaluated using the effect size (f^2). As shown in Table 3, the f^2 values were 0.102 for Risk Identification, 0.106 for Risk Assessment, 0.025 for Risk Mitigation, 0.107 for Risk Management Implementation, and 0.111 for Risk Management Monitoring. These values indicate relatively small incremental effects based on conventional PLS-SEM guidelines (Hair et al., 2019, 2022). Risk Management Monitoring exhibited the largest f^2 value (0.111), followed closely by Risk Management Implementation (0.107), Risk Assessment (0.106), and Risk Identification (0.102), whereas Risk Mitigation showed the smallest incremental effect (0.025). The relatively small effect sizes, despite the high overall R^2, suggest that the risk-management dimensions collectively explain a substantial proportion of organisational performance while each contributes a comparatively modest amount of additional explanatory variance.

Structural collinearity was then examined using the inner variance inflation factor (VIF) before interpreting the individual path coefficients. The VIF values ranged from 3.139 to 3.857, comprising 3.581 for Risk Identification, 3.139 for Risk Assessment, 3.447 for Risk Mitigation, 3.491 for Risk Management Implementation, and 3.857 for Risk Management Monitoring. All values were below the commonly applied threshold of 5.0, indicating that collinearity did not reach a critical level that would preclude interpretation of the structural relationships (Hair et al., 2019, 2022). Risk Management Monitoring recorded the highest VIF (3.857), suggesting comparatively greater shared variance with the remaining predictors, although the value remained within the acceptable range.

Taken together, the results indicate that the model possesses strong overall explanatory power, while the individual risk-management dimensions provide relatively small incremental contributions to Organisational Performance. The acceptable inner VIF values further suggest that the estimated structural paths can be interpreted without evidence of critical predictor collinearity. Nevertheless, the moderate VIF levels indicate some shared variance among the risk-management dimensions, which is theoretically plausible given that they represent interconnected components of the broader risk-management process.

Table 3. Explanatory power, effect size, and structural collinearity

Relationship	R^2	f^2	Inner VIF
Risk Identification → Organisational Performance	0.725	0.102	3.581
Risk Assessment → Organisational Performance	0.725	0.106	3.139
Risk Mitigation → Organisational Performance	0.725	0.025	3.447
Risk Management Implementation → Organisational Performance	0.725	0.107	3.491
Risk Management Monitoring → Organisational Performance	0.725	0.111	3.857

4.2.2 Hypothesis Testing

The direct relationships between the five risk-management dimensions and Organisational Performance were assessed using bootstrapping to determine the statistical significance of the structural path coefficients (Hair et al., 2019, 2022). Table 4 presents the path coefficients (β), t statistics, p values, and hypothesis-testing decisions.

Table 4. Structural model and hypothesis-testing results

Hypothesis	Relationship	β	t	p	Decision
H1	Risk Identification → Organisational Performance	0.127	1.095	0.274	Not supported
H2	Risk Assessment → Organisational Performance	0.104	0.819	0.413	Not supported
H3	Risk Mitigation → Organisational Performance	0.253	2.239	0.025	Supported
H4	Risk Management Implementation → Organisational Performance	0.436	4.233	<0.001	Supported
H5	Risk Management Monitoring → Organisational Performance	−0.027	0.181	0.856	Not supported

Risk Management Implementation exhibited the strongest positive relationship with Organisational Performance ($\beta = 0.436$, $t = 4.233$, $p < 0.001$), providing support for H4. Risk Mitigation also demonstrated a positive and statistically significant relationship with Organisational Performance ($\beta = 0.253$, $t = 2.239$, $p = 0.025$), supporting H3. At the 5% significance level, these results indicate that implementation and mitigation were the two risk-management dimensions with statistically significant positive relationships with Organisational Performance in the estimated model (Hair et al., 2019, 2022).

In contrast, Risk Identification showed a positive but statistically non-significant relationship with Organisational Performance ($\beta = 0.127$, $t = 1.095$, $p = 0.274$), and H1 was therefore not supported. Risk Assessment similarly exhibited a positive but non-significant coefficient ($\beta = 0.104$, $t = 0.819$, $p = 0.413$), resulting in H2 not being supported. Risk Management Monitoring produced a very small negative and statistically non-significant coefficient ($\beta = -0.027$, $t = 0.181$, $p = 0.856$); consequently, H5 was not supported.

Collectively, the hypothesis-testing results indicate that Risk Management Implementation and Risk Mitigation provide the clearest positive relationships with Organisational Performance. Risk Management Implementation produced the largest path coefficient, suggesting that embedding risk-management practices within organisational routines and decision-making has the strongest unique association with performance among the five dimensions examined. Risk Mitigation also demonstrated a meaningful positive relationship, indicating that translating risk information into concrete treatment actions is associated with improved organisational performance.

The non-significant relationships for Risk Identification, Risk Assessment, and Risk Management Monitoring should not, however, be interpreted as evidence that these activities are organisationally unimportant. As reported in Section 4.2.1, the inner VIF values ranged from 3.139 to 3.857 and remained below the commonly applied threshold of 5.0. Thus,

structural collinearity was not at a critical level that would prevent interpretation of the individual path coefficients (Hair et al., 2019, 2022). Nevertheless, the moderate VIF values indicate some shared variance among the risk-management dimensions, which is theoretically expected because identification, assessment, mitigation, implementation, and monitoring represent interconnected stages of an integrated risk-management process.

Particular caution is warranted when interpreting the coefficient for Risk Management Monitoring. Although its path coefficient was negative, the magnitude was extremely small ($\beta = -0.027$) and statistically non-significant ($p = 0.856$). The result therefore provides no evidence that monitoring adversely affects Organisational Performance. Rather, the findings indicate that monitoring did not demonstrate a statistically distinguishable unique direct relationship with performance after the other risk-management dimensions were considered simultaneously.

Overall, the hypothesis-testing results should be interpreted alongside the model's strong explanatory power. The five risk-management dimensions jointly explained 72.5% of the variance in Organisational Performance ($R^2 = 0.725$), while only Risk Management Implementation and Risk Mitigation demonstrated statistically significant unique positive relationships. This pattern suggests that the risk-management dimensions possess substantial collective explanatory relevance, although their individual direct contributions differ. Given the previously identified discriminant-validity concerns, conclusions regarding the relative importance of the five dimensions should therefore remain appropriately cautious (Henseler et al., 2015; Hair et al., 2020, 2022).

5. Discussion

This study examined the relationship between five risk-management dimensions and organisational performance at Etihad Water and Electricity (EtihadWE), UAE. The model demonstrated strong explanatory power, with Risk Identification, Risk Assessment, Risk Mitigation, Risk Management Implementation, and Risk Management Monitoring jointly explaining 72.5% of the variance in Organisational Performance. However, only Risk Management Implementation and Risk Mitigation showed statistically significant positive relationships with performance, whereas Risk Identification, Risk Assessment, and Risk Management Monitoring were not significant when all dimensions were considered simultaneously. These findings indicate that, within EtihadWE, the performance implications of risk management are particularly associated with the organisation's ability to translate risk-related knowledge into operational action and embed risk management within organisational processes.

Risk Management Implementation emerged as the strongest predictor of Organisational Performance ($\beta = 0.436$, $p < 0.001$). This finding supports the view that risk management creates organisational value when it becomes embedded in routine decision-making, responsibilities, controls, and operational processes. Both ISO 31000 (International Organization for Standardization [ISO], 2018) and the COSO ERM framework (Committee of Sponsoring Organizations of the Treadway Commission [COSO], 2017) emphasise that effective risk management requires integration with governance, strategy, and performance

rather than functioning as a stand-alone compliance activity. The result is also consistent with Malik et al. (2020), who demonstrate that effective ERM and strong risk governance can contribute positively to organisational performance, and with Crawford and Jabbour (2024), who emphasise the importance of integrating risk information into managerial judgement and decision-making. In the EtihadWE context, this suggests that formal risk-management procedures are more likely to contribute to performance when they are incorporated into operational responsibilities and organisational decision processes.

Risk Mitigation was also positively and significantly associated with Organisational Performance ($\beta = 0.253$, $p = 0.025$). This finding is particularly relevant to the utility sector, where effective risk treatment can contribute to infrastructure reliability, operational continuity, resource protection, and service stability. Utility organisations face interconnected operational, technological, environmental, and supply-chain risks, making the ability to implement preventive and corrective responses especially important. Climate-related hazards can affect water availability, infrastructure integrity, and service continuity (Howard et al., 2026), while technological disruption, cyber risks, and geopolitical uncertainty further increase organisational exposure (World Economic Forum, 2025). The significant role of mitigation therefore reinforces the importance of converting risk assessments into concrete treatment actions that reduce either the likelihood or the consequences of adverse events.

In contrast, Risk Identification and Risk Assessment showed positive but statistically non-significant relationships with Organisational Performance. These findings should not be interpreted as indicating that identification and assessment are unimportant. Rather, their contribution may depend on subsequent stages of the risk-management process. Risk identification provides information about potential threats, while risk assessment supports prioritisation and resource allocation; however, neither activity necessarily improves performance unless the resulting information is translated into mitigation measures, implementation decisions, and managerial action. This interpretation is consistent with research showing that the formal adoption or presence of ERM does not automatically lead to superior performance outcomes (Bromiley et al., 2015; Otero González et al., 2020). It also supports the view that the value of ERM depends on organisational capabilities and the effective use of risk-related information (Le et al., 2024; Resende et al., 2024).

Risk Management Monitoring also displayed a very small negative and statistically non-significant coefficient ($\beta = -0.027$, $p = 0.856$). The result provides no evidence that monitoring adversely affects organisational performance. Rather, it indicates that monitoring did not demonstrate a statistically distinguishable unique direct relationship with performance when the other risk-management dimensions were included simultaneously. The inner VIF values ranged from 3.139 to 3.857, remaining below the commonly applied threshold of 5.0 and therefore indicating that structural collinearity was not at a critical level that would prevent interpretation of the individual path coefficients (Hair et al., 2019, 2022). Nevertheless, these moderate VIF values indicate some shared variance among the risk-management dimensions, which is theoretically plausible because identification, assessment, mitigation, implementation, and monitoring represent interconnected stages of an integrated risk-management process (ISO, 2018; COSO, 2017).

The measurement-model findings nevertheless warrant some caution. Several HTMT values exceeded the conservative 0.85 criterion, although none exceeded 0.90. This suggests that the empirical distinction among some risk-management dimensions is not unequivocal, even though structural collinearity remained within acceptable limits. The overlap is conceptually understandable because the dimensions represent related components of the same risk-management process. Consequently, the non-significant relationships for Risk Identification, Risk Assessment, and Risk Management Monitoring should be interpreted as an absence of statistically significant **unique direct effects** in the specified model rather than as evidence that these activities lack organisational relevance.

The combination of a high R^2 and relatively small individual effect sizes further supports this interpretation. The five risk-management dimensions collectively explain a substantial proportion of Organisational Performance, while each contributes relatively limited incremental variance once the other predictors are included. This finding is consistent with the broader ERM literature, which conceptualises risk management as an organisationally embedded and interconnected process rather than as a collection of isolated practices (Arena et al., 2010; Bromiley et al., 2015). It may also help explain why previous studies have produced mixed findings regarding the direct performance effects of ERM (Malik et al., 2020; Otero González et al., 2020; Resende et al., 2024; Syrová & Špička, 2022).

Overall, the findings contextualise the relationship between risk-management factors and organisational performance within EtihadWE by demonstrating that the most clearly distinguishable performance benefits are associated with implementation and mitigation. This is particularly important in a water and electricity utility, where organisational performance encompasses service reliability, operational efficiency, infrastructure performance, customer outcomes, and expenditure control rather than financial outcomes alone (European Water Regulators, 2024; Maziotis et al., 2025; Ofwat, 2025; Vilarinho et al., 2024). The results therefore suggest that EtihadWE should place particular emphasis on translating risk information into effective treatment actions and embedding risk management into operational and managerial processes. At the same time, identification, assessment, mitigation, implementation, and monitoring should continue to be managed as interconnected elements of an integrated risk-management system rather than as isolated organisational practices.

6. Conclusion

This study examined the relationship between five risk-management dimensions and organisational performance within Etihad Water and Electricity (EtihadWE), UAE. The findings demonstrate that the five dimensions collectively possess substantial explanatory relevance, accounting for 72.5% of the variance in Organisational Performance. However, their individual contributions differed. Risk Management Implementation emerged as the strongest significant predictor of organisational performance, followed by Risk Mitigation, whereas Risk Identification, Risk Assessment, and Risk Management Monitoring did not demonstrate statistically significant unique direct relationships.

These findings indicate that the organisational value of risk management within EtihadWE is particularly associated with the translation of risk information into organisational action.

Identifying and assessing risks remain essential components of the risk-management process, but their contribution to performance is likely to depend on whether the resulting information is converted into mitigation measures and embedded within organisational routines, responsibilities, controls, and decision-making. For a utility organisation responsible for essential water and electricity services, this is particularly important because effective risk management ultimately supports operational continuity, service reliability, infrastructure performance, and organisational efficiency.

The results should nevertheless be interpreted with appropriate caution. Several HTMT values exceeded the conservative 0.85 criterion, indicating some overlap among the risk-management dimensions, although none exceeded 0.90. In contrast, the inner VIF values ranged from 3.139 to 3.857 and remained below the commonly applied threshold of 5.0, indicating that structural collinearity was not at a critical level. The non-significant relationships for Risk Identification, Risk Assessment, and Risk Management Monitoring should therefore be interpreted as an absence of statistically significant unique direct effects within the specified model rather than as evidence that these activities are organisationally unimportant.

From a practical perspective, the findings suggest that EtihadWE should continue strengthening the integration of risk management into managerial and operational processes, with particular emphasis on translating identified and assessed risks into clear treatment actions, responsibilities, controls, and implementation mechanisms. However, implementation and mitigation should not be managed independently of the broader risk-management cycle. Their effectiveness depends on the quality of risk identification, assessment, and continuing monitoring.

The study contributes to the ERM literature by providing evidence from a UAE utility context and by examining risk management as a multidimensional process rather than solely as an aggregate organisational construct. Nevertheless, the cross-sectional and single-organisation design limits causal interpretation and broader generalisability. Future research could test the framework across multiple utilities or public-sector organisations, employ longitudinal designs, and examine whether the conceptual overlap among the five dimensions is better represented through a higher-order risk-management construct. Such extensions would provide further insight into both the collective and dimension-specific pathways through which risk management contributes to organisational performance.

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