



AI Risk Governance in High-Reliability Enterprises: Integrating CPMAI into Enterprise Risk Management

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ABSTRACT

This study has examined how ADNOC can enhance risk governance and AI program reliability by adopting the Cognitive Project Management for AI (CPMAI) framework all over AI lifecycles. The research addresses gaps found in the Virtual lab assessment that has shown weakness in the vendor oversight, operational tracking, data lineage and model evaluations. With the help of the mixed method approaches, quantitative survey response has been obtained from 50 employees of ADNOC and qualitative insight gains conducted interviews with four practitioners. The response has examined using thematic coding aligns with the PMI risk management domains and CPMAI phases. The findings of the study have shown robust agreement among the employees that CPMAI improves coordination, risk identification and transparency across the key stakeholder. The interview has also expressed that limited cultural readiness, governance fragmentations as well as lack of the standard process hamper consistent AI oversights. Therefore, the study proposed AI Risk Assurance Framework (ARAF) implementing CPMAI assisted control, bias identification, governance committees as well as MLOps monitoring to address the identified gaps. The result has confirmed the adoption of the CPMAI positively impacts the AI reliability and risk mitigations, though success realized in capacity building, leadership awareness and stakeholder engagement. The study contributes to lifecycle-based governance models mainly to deal with the high-risk governance AI environments and shows how a structured framework can reinforce long-term operational sustainability, compliance and trust in AI initiatives of ADNOC.

1. INTRODUCTION

Management is a process and structure for managing the complex risks linked with Artificial Intelligence or AI and machine learning ML projects using the Intellectual Project Management for AI and CPMAI approach [1].

1.1 Research Problem

The research problem of this topic can be explained as without structured methodology like CPMAI, the firm ADNOC faces different challenges while providing AI oriented solutions that help to provide practical and complete corporate value and efficiently reduce risks related to projects

[2][3]. However, the core research problems have been explained below.

- A major number of AI initiatives do not get successful to take a step towards delivering a successful and positive ROI or return on investment [4]. This happens because the organization's objectives are not perfectly aligned with the implementation process of APMAI or having lower data quality and insufficient model supervision.
- However, the traditional process

management approaches are not capable enough to accurately identify the eccentric characteristics of the AI oriented tools and overall system [5]. Furthermore, the outcome also highlights that various AI oriented initiatives taken by the government face setbacks, resistance from employees and stakeholders or ultimately have to abandon the whole project [6][7].

- Moreover, there are not sufficient reports as evidence is available on how CPMAI affects risk management achievements in public sector AI projects initiatives [8]. Furthermore, what kind of challenges retard its practical integration. Furthermore, the roles of trust and stakeholder engagement are critical factors for successful implementation, but they are not getting examined carefully either [9][10].

- Most importantly integrating and using AI tools helps to enhance many different factors.

However, it also creates risks regarding provisioning unbiased decisions, transparency and reliability. All of these need a systematic method for consistency in monitoring and managing during the whole process of implementation and adoption of CPMAI [11]-[15].

1.2 Objectives

The main aim or objective of this study is to understand and provide a deep insight about the influence of CPMAI implementation on risk management efficacy in public sectors' like ADNOC AI projects [16]-[22]. However, another core aim of conducting this study report is to investigate the reason for how CPMAI improves the process of risk recognition, monitoring, and managing among the AI project overall process in the government sector [23]-[28].

Furthermore, this study also aims to address the challenges related to stakeholders that significantly influence the lifecycle of CPMAI in public sector environments [29][30]. Moreover, this study has also planned to provide insightful and valuable recommendations to strengthen CPMAI oriented risk governance structures in government AI projects [31][32].

1.3 Research question

The main research question that the study has

presented is How can ADNOC improve AI program reliability and risk governance through structured CPMAI alignment across the AI lifecycle? However, the related research questions are as follows.

RQ:1 How does the implementation of CPMAI enhance the risk recognition, monitoring and management within government AI projects?

RQ:2 What challenges regarding stakeholders influence the adoption process of CPMAI in government in public sector environments?

RQ:3 which engagement and governance applications support trust, transparency, and reliability while adopting and integrating CPMAI in government sector risk management?

1.4 Hypothesis

H1: AI programs using complete stages on the lifecycle of CPMAI show less operational and data risks than those where lifecycles are implemented partially.

H2: Structured AI governance (risk committees, lineage tracking, and validation protocols) can substantially enhance reliability and compliance in the operational settings with high risks.

H0: CPMAI lifecycle adoption and the related operational or data risk reduction are not statistically significantly related.

1.5 Significance

The significance of conducting the study report on this topic lies in furnishing a wellstructured, data driven framework that identifies the unique limitations of AI initiatives, which have high rates of failure by using traditional management approaches. However, implantation of artificial intelligence across government initiatives is rapidly developing fast, yet the linked risks like providing inaccurate data, biased algorithmic process, etc. create vital problems for government sector leaders [33].

Furthermore, this study is significant because this will provide an in-depth understanding of how the complete Project Management for AI or specifically CPMAI approaches can enhance the program risk management within the AI lifecycle [34]. This study will also investigate CPMAI's influence on risk identification and reduction and with that the study report will also contribute in enhancing the success rate of government AI initiatives [35].

Overall, the study will provide invaluable recommendations for government backed

organizations like **ADNOC** that are trying to adopt CPMAI for creating a risk conscious framework [36]. Moreover, this will assist for both academic knowledge and practical policymaking process in AI project management.

2. LITERATURE REVIEW

2.1 Theoretical Background

The theoretical structure or background of this study report lies in AI oriented governance, project management models, and organizational risk management structures. Traditional methodologies like PMBOK and PRINCE2 highlight the linear, sequential processes suitable for forecasting cultures [37]. On the other hand, modern technological tools like Artificial Intelligence or AI integration process across the government program risk management are based on existing theories like Risk Governance Theory and Socio-Technical Systems Theory [38]-[42]. These theories highlight incorporated decision making, transparency, and human and technology coordination as [43][44].

The Cognitive Project Management for Artificial Intelligence or in short CPMAI approach investigates and points out these gaps by delivering an adaptive governance framework that is mainly outlined for development of AI systems [45]-[50]. CPMAI embraces the CRISP-DM lifecycle, by focusing on data understanding, structuring, deployment, and progressive feedback lead refinement. Most importantly it also helps to improve attributability, reliability, and risk reduction [51].

Furthermore, Risk Governance Theory also suggests the requirement for reliability, unbiasedness, and accountability in government sector AI [52]. On the other hand, Technology Acceptance Theory or TAM reflect how customer perspective and trust affect the adoption of AI solutions [53]. Lastly, both the theories together furnish a structured base for implementing CPMAI into program risk sites in government backed organizations like ADNOC.

2.2 Related Research

2.2.1 AI implementation in Program Risk Management of public sector

As suggested by [4] in the article namely "Leveraging artificial intelligence (AI) in public sector financial risk management: Innovations,

challenges, and future directions" the study report will investigate the shaping role of Artificial Intelligence in strengthening financial risk management practices within the public sector in different aspects [54]. With the growing complexity of financial markets and the increasing demand for unbiased decisions and effectiveness in public management [55]. At the palace where traditional methods of risk identification and mitigation are proving to be insufficient. AI and machine learning technologies provide a promising alternative [56]-[58]. The advanced technologies have the capability of processing huge amounts of data, identify trends, and forecast future patterns with a high accuracy aret [60].

The study report also highlights the challenges linked with implementing AI into government financial management systems [61]-[63]. For example, concerns related to data privacy and authenticity, the need for skilled employees, and the importance of improving regulatory frameworks that ensure ethical use and transparency [64].

2.2.2 Limitations of AI Governance and Stakeholder Adoption

As cited by [5] The implementation of AI into state-owned oil and gas giants, such as ADNOC, are still in developing and relatively unclear stages. ADNOC is uniquely challenging in regional geopolitical dynamics and traditional infrastructure [65]. However, all of these together form a group of limitations for adopting cutting edge AI solutions [66]. Furthermore, this study has suggested to organizations that they need to critically observe and analyze the challenges and opportunities both together, of technology even before integrating the system within the organizational system and practices [67]. However, based on those analyses, efficient decisions can be made related to the adoption of new technology [68].

Furthermore, according to the study, the challenges that the petroleum industry faces in the transportation process of petroleum products are mainly the wastage of products during their journey to the targeted location [69][72]. For example, the oil spill at sea and oil wastage on roadsides [73]. However, that oil wastage in the sea which ultimately causes significant damage to ocean life as well can be reduced by implementing and adopting effectively the AI driven detection tools which caution ship crew in case of any

leakage of oil in the water [74]-[78].

2.2.3 Human centric Trust and ethical Use fo AI

According to [2] Using Artificial Intelligence or AI in engineering and in other projects provide rich efficiency, design optimization, and enhanced risk management [79][80]. However, it also creates pressing ethical questions related to governance, trust, and humancentered design or HCD [81]-[84]. Ethical AI in projects requires context-specific governance, structured trust-building mechanisms, and user-value-driven design processes [85].

Based on these insights, the study report has suggested a significant integrative framework for policymakers, engineering firms, and AI tool developers [86]. This study has also highlighted a future research agenda underlining real-world fieldwork, participatory pilots, and cross jurisdictional policy studies [87]. Ultimately, the review reflects the importance of immense ethics across the AI lifecycle to ensure socially responsible, human centered transformation [88]-[92].

2.2.4 Impact of integrating AI in the Oil & Gas Sector

As referenced by [6] the study report has identified the importance of adopting a lesson learnt model, highlighting the rapidly developing stage of AI in the sector of UAE context. It points out the necessity of a structured transformative management approach to identify gaps in digital transformation analysis [93].

The findings of this study have also highlighted the major requirement for united efforts to connect skill gaps and expertise. Furthermore, in the sense of challenges posed by the sector's siloed organisational culture [94][95]. Senior management support has been recognized as essential for enhancing coordination. This also highlights that the ADNOC's greener approach to energy management serves as an anchor for more environmentally friendly oil and gas operations [96][97][98].

2.3 Gap Analysis

From the literature review part, several research gaps remain in implementing CPMAI within the program risk management in the government backed energy organizations such as ADNOC [99]-105]. Firstly, even though the article has highlighted the increased role of AI in government sector risk management [106]-[111]. Most of the pre-existing articles have focused on operational

forecasting only, with limited focus on structured AI governance approaches like CPMAI that ensure continuous monitoring, transparency of risk, and accordance [112]-[119].

Next, the literature has recognized challenges in AI adoption, including readiness of stakeholders and rising concern about ethics [120]-[124]. Furthermore, only some limited studies have furnished practical integrating structures that identified change management, increasing trust, and stakeholder engagement during AI focused transformation in oil and gas industries of UAE 125]-[130].

Furthermore, most importantly at the tim when existing research reflected ADNOC's digital initiatives, there is no sufficient information available in the empirical evidence identifying how AI governance, mainly CPMAI, can improve ADNOC's program risk management and support national sustainability goals. Moreover, how it can enhance the cross functional alignment [131]-[138].

2.4 Conceptual Framework

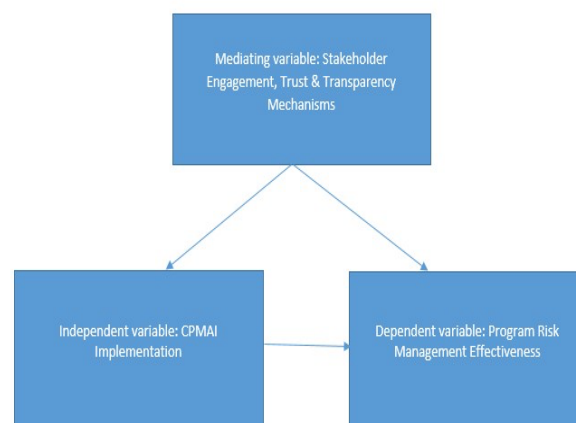


Figure 1: conceptual framework
(Source: self-made)

3. METHODOLOGY

3.1 Research Design

In this research mixed method design has been employed to assess how CPMAI implementation improves the AI risk governance across the large-scale AI programs of ADNOC. The design is appropriate for the examined research issue, which determines the partial CPMAI adoption, lack of the model evaluation, weaker data lineage as well as fragmented governance as the leading contributor to the AI-supported risk exposure. This approach is suitable as AI risk governance includes both qualitative (contextual, behavioral and

government related understanding) and quantitative including measurable organizational practices (Creswell & Inoue, 2025).

The quantitative element assesses the relationship between perceived risk exposure as well as CPMAI lifecycle implementation, allowing statistical testing of the hypothesis. The qualitative element mainly captures the socio technical issues like stakeholder influence, cultural implementation barriers and governance fragmentation, that cannot be assessed numerically but influence feasibility of the AI program.

This design also aligns with the cognitive project management for AI (CPMAI), that needs understanding operational tracking, understanding business case, governance, model lifestyle and data maturity. By gaining response from the interview and survey to CPMAI phases, the design assists triangulations between Virtual findings, international benchmarks and internal; ADNOC practices. This approach has ensured effective viability and methodological depth by combining the stakeholder perceptions and operational evidence.

3.2 Data Gathering Approach

- **Quantitative data collection:**

A survey has been structured that has been distributed among the 50 ADNOC employees such as technical employees, data beginners and AI practitioners. These are directly working with the drilling optimization model, predictive maintenance systems as well as production-forecasting AI (Wilson-Menzfeld et al. 2025). The survey has effectively measured awareness and adoption of each CPMAI phase, perceived AI risks such as vendor dependency, model drift, governance weakness and bias. The survey helps in examining the quality of the data government, efficiency of monitoring tools, organizational readiness and governance maturity. The Likert-scale item will enable correlation mapping between perceived reduction and CPMAI adoption in the operational and data risks, allowing statistical testing of H1 and H2.

- **Qualitative Data Collection:**

In this research semi-structured interview has been conducted with the four ADNOC professionals, supplementing quantitative findings. The interview has focused on governance fragmentation as well as lack of central accountability, CPMAI applicability as well as

cultural readiness, visibility gap and vendor risks, practical issues in the model evaluation, data quality and runtime monitoring, organizational enablers and barriers to the CPMAI adoption. The qualitative element adopted thematic analysis, coding the responses under the PMI risk management and CPMAI phases concept like risk response planning, monitoring and identifications. This allows implementation between lifecycle-based AI risk governance and operational challenges.

3.3 Sampling Strategy

The purposive sampling strategy was employed in this study, choosing participants with the direct involvement in the AI programs such as SCA efforts, ENERGYai, and CPAD predictive maintenance (Ahmad & Wilkins, 2025). This makes sure the sample includes risk governance, operational knowledge of the AI deployment and data pipelines.

By conducting a quantitative survey, the study has covered different departments such as AI governance teams, maintenance, digital transformations, data engineering and drilling. This offers adequate distribution to determine correlation between CPMAI adoption and roles.

In case of qualitative interview, four staff have chosen as per their role in the Virtual Lab

2 as well as engaging in the deployment, monitoring and AI oversight. This ensures detailed understanding of the domains and assists saturation of the themes associated with the CPMAI gaps, mainly data preparation, runtime monitoring, model assessment and governance fragmentation.

3.4 Tools and Instruments

Using a structured survey questionnaire this survey has been developed with validated measurement constructs from PMI risk framework, CPMAI standards and NIST AI RMF. The crucial tool comprises a scale survey instrument for the CAPM life cycle maturity. In case of the qualitative interviews, the semi-structured interview guide aligned with the CPMAI stages. In addition, this thematic coding framework guide is aligned with the CPMAI phases (Luo et al. 2025).

3.5 Ethical Considerations

The study adhered to the organizational and institutional ethical standards. The participation is anonymous and voluntary, boosting confidentiality of the organizational staff identities. The purpose

of the study has been explained to them in written format to make them aware of the study purpose, and consent will remain obtained prior to data collections (Fàbregues et al. 2025). No proprietary model data, sensitive operational information or security related AI system will be gathered. The interview and survey information will remain privately stored, and researchers will only access this as it has restricted access. The findings are examined at an aggregated level to overlook disclosing internal risk or strategic data. The ethical safeguard helps boost transparency level, neutrality, and protection of the organizational integrity while examining AI risk governance.

4. ANALYSIS AND RESULTS

4.1 Quantitative Analysis

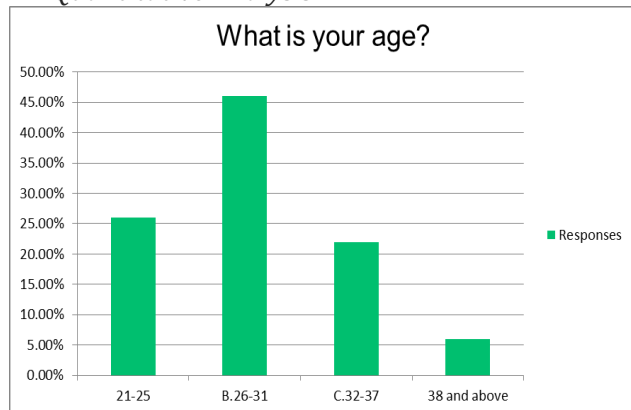


Figure 2: Respondents age

Based on the above Figure 2 provided outcome, it is found that most of the respondents are young from 26 to 31 age groups, demonstrating that organizational CPMA and AI efforts extensively involve early-career technological staff. This demonstrates robust involvement from digitally skilled employees as well as a workforce receptive to structured AI governance.

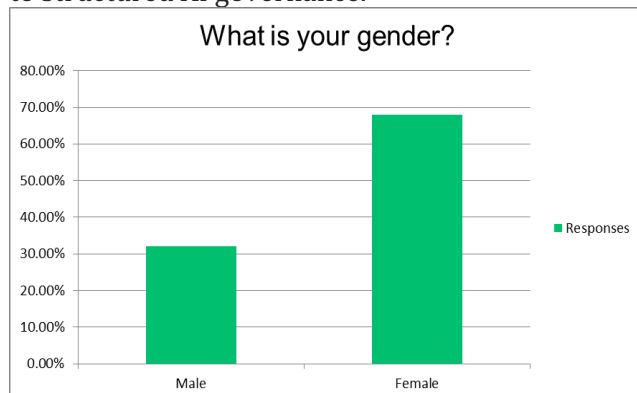


Figure 2: Respondents gender

The outcome has demonstrated in Figure 2 two third of the participants are women, showing robust female involvement in the AI related roles. This demonstrated rising gender diversity of the company in the governance and technical focussed functions, contributing to the wider perspective in AI risk management.

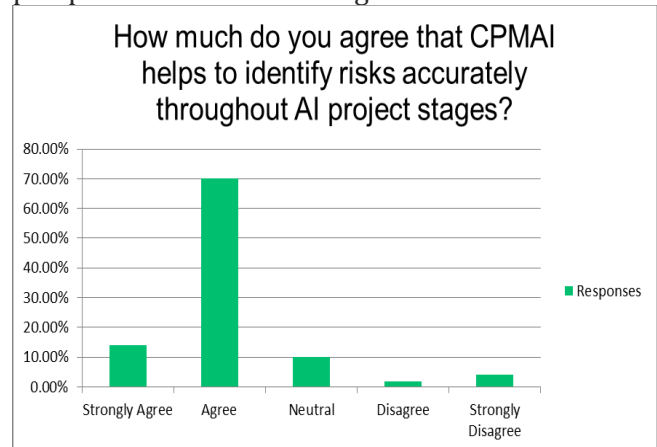


Figure 3: CPMAI assists determine risk

In Figure 3 while examining CPMAI assists determine risk accurately, it is found that 84% of them showed belief, this shows higher confidence that CPMAI improves the risk identification across AI lifecycle phases. The minimal disagreement shows employees extensively perceived CPMAI as enhancing structured risk recognition, specially during data preparation as well as model assessment phases.

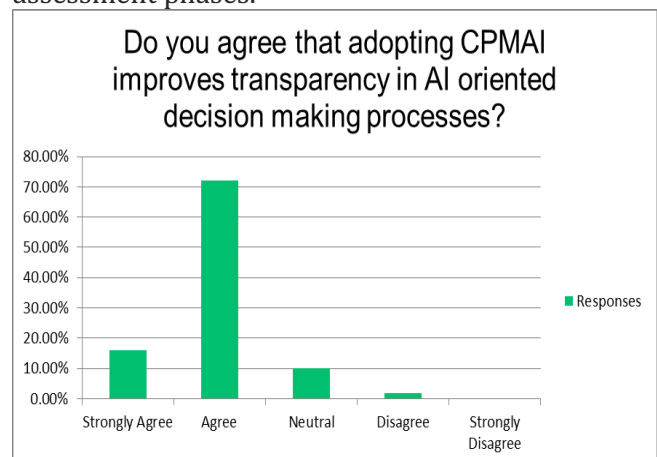


Figure 4: CPMAI assists determine risk

Majority of the respondents (88%) have shown in Figure 4 CPMAI brings higher clarity, traceability and documentation to AI decisions. This shows the value of CPMAI for structured governance, mainly where policy alignment and accountability are important for government-sector adoptions.

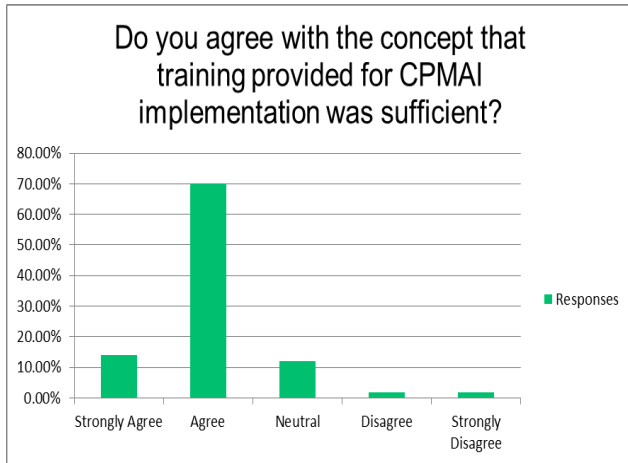


Figure 4: CPMAI assists determine risk

Figure 4 showed around 84% of the respondents expressed their fees training was sufficient, showing ADNOC provided robust capacity-building initiatives. Although 4% negative and 12% neutral response shows room for more effective and advanced training, mainly on the MLOps integration, operational trailing and lineage tracking.

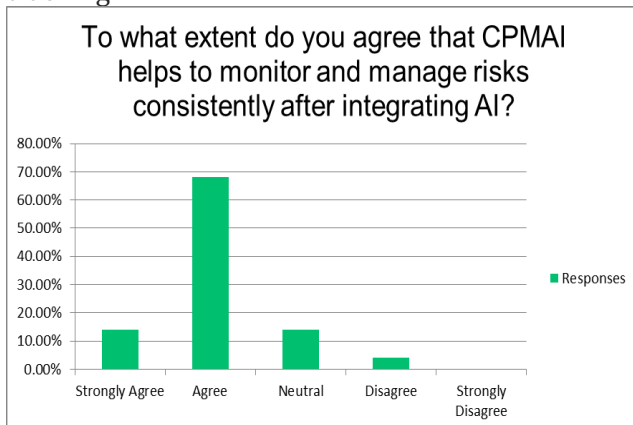


Figure 5: CPMAI assists determine risk

With the 82% agreement, it is evident that employees of ADNOC perceive CPMAI is effective for consistent risk governance. The neutral response shows adoption gaps noted in the Virtual Lab outcomes, suggesting monitoring practices such as model evaluation and drift detection are maturing within ADNOC see figure 5.

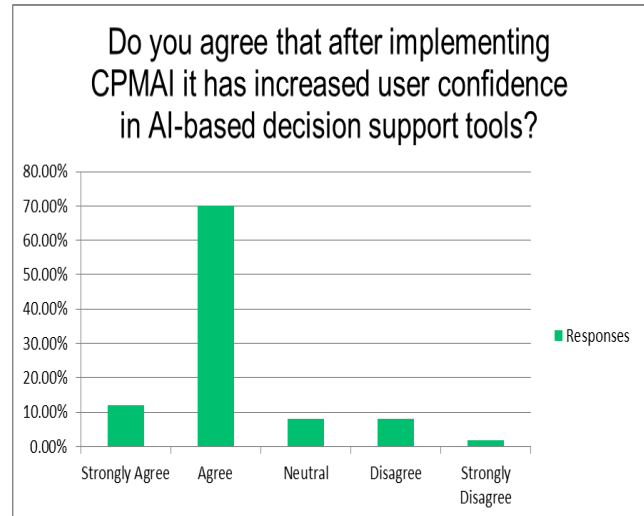


Figure 6: CPMAI assists determine risk

Majority of the respondents of 72% have expressed higher levels of confidence, revealing that CPMAI enhances system reliability and trust. Although 18% combined neutrality or disagreement demonstrates lingering concern related to the data quality, strokes of model validation and bias control across the critical operations see figure 6.

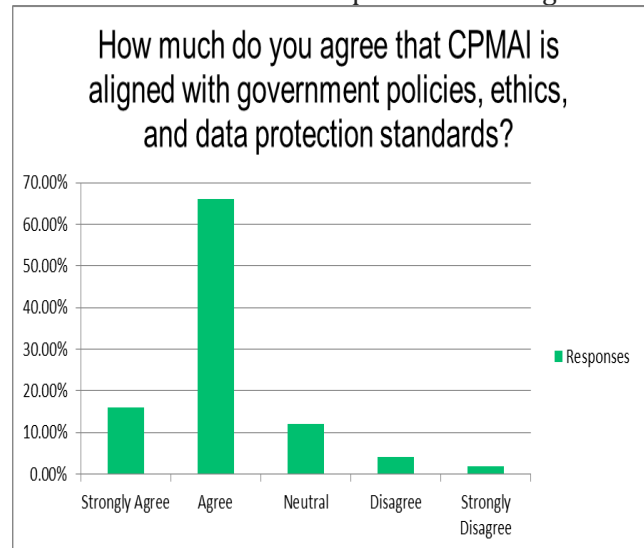


Figure 7: CPMAI assists determine risk

The above figure 7 presented result shows 82% shown belief that CPMAI aligns with the data protection, government policies and ethics showing wider recognition that CPMAI assists compliance needs. The res has expressed disagreement, suggesting some of them observed gaps in the ethical assessment or privacy control, mainly in relation to the UAE data protection expectations.

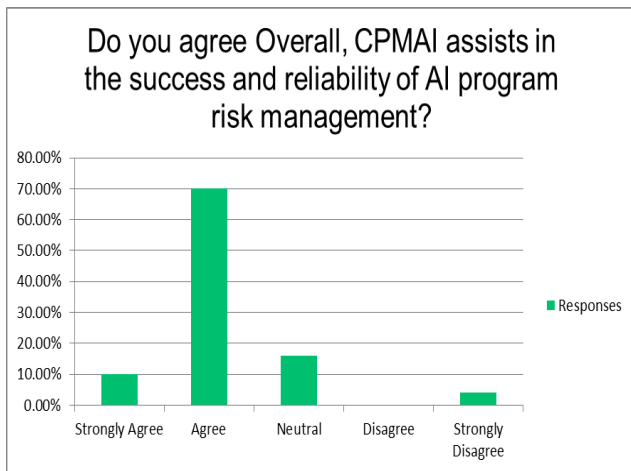


Figure 8: CPMAl assists determine risk

In above figure 8 Around 80% of the participants shown CPMAl assist reliable AI program risk management, and it is an effective enabler of reliable risk governance. The minimal negative or neutral responses show uncertainty because of the incomplete implementation of vendor oversight, monitoring and lineages phased determined in Virtual Labs.

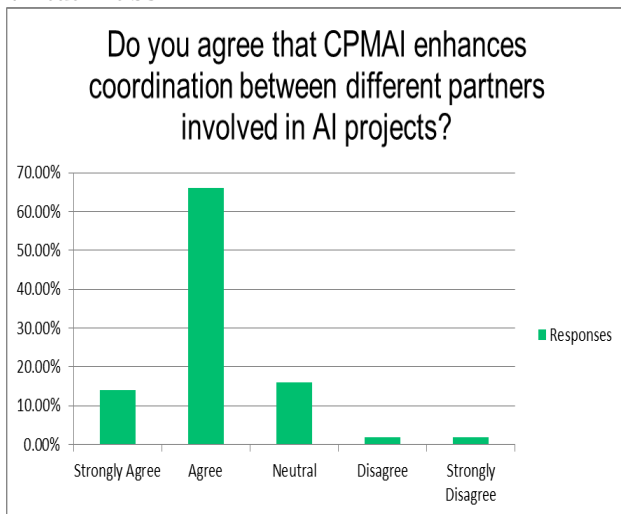


Figure 9: CPMAl assists determine risk

As per the above figure 9, 80% believe that CAPm enhances the collaboration between government units, technical teams ,and external partners. The neutral response shows ongoing issues in vendor management, cross-department communication, as well as aligning policy stakeholder, data, and engineering consistently.

4.2 Thematic Analysis

1. Governance Fragmentation and Accountability

The interviewee shows notable fragmentation in the governance, whereas AI projects are assessed

mainly on performance and speed rather than structure risk assurance. This is in line with the risk identification challenges of PMI and business understanding phase of CPMAl, where governance and risk needs should remain defined [139]. The respondent showed lack of the centralized accountability, inconsistent governance procedures as well as limited cross-department cooperation. These concerns map straight to the governance thematic moderm, expressing that AI governance of the company is still reactive and distributed instead of the lifecycle based and unified [140]. The interviewees also robustly assisted developing an AI risk governance committee, mapping to escalation planning, risk governance of PMI, strengthening the need for the formal decision authority.

2. Data Quality, Lineage, and Preparation Challenges

Across the interviews, one of the issues that has emerged consistently is data related challenges, reflecting Virtual Lab findings. The participants showed a lack of data lineage issue in implementing dataset from diverse operational units and inconsistent documentations [141]. These key components were coded under data quality as well as linked to the initial phase of the CPMAl, where risk identification, data profiling and validation occurs. It is also found that large-scale Albased projects mainly predictive maintenance and explorations relies extensively on reliable data streams. The weakness in the data validation as well as lineages introduces risk of model drift, incomplete dataset or bias, mapping to the PMI's assessment process risk identification.

3. Vendor and External System Risks

Another recurring theme is vendor dependency risks. The respondents have shown that ADNOC lacks Stanford oversight mechanisms for the 3rd party model as well as MLOps elements [139]. Coding has placed these key insights under vendor risks, aligning the evaluation and modeling phase of the CPMAl, where external algorithms should be confirmed and performance-assured prior deployment [140]. The risk response planning and key concept of the PMI has also applied as participants suggest improved contractual control, assessment protocols, and alignment with the framework like NITS AI Risk Management [141]. These insights show gaps in the organizational potential to independently

verify the vendor-developed model, a crucial risk given the scale of the operational AI usage.

4. Operational Monitoring, Drift Detection, and Sustainability

The operational issue has emerged as one of the strong themes, aligning with the Virtual Lab findings that ADNOC lacks consistent monitoring systems. The respondent has explained the need for the audit documentation, automated monitoring, retraining pipeline and automated monitoring, all central to the final lifecycle phase of the CPMAI. Coding has helped link these key concerns to the operational tracking and risk monitoring and control domains of PMI. The interviewees have also stressed that the present AI system has remained extensively static, exposing the company to the risk of the compliance failures, performance degradation and anomalies. They have also highlighted leveraging existing infrastructure like MLOps platforms, rather than developing an isolated system, strengthening feasibility and practicality of the ARAF frameworks.

5. Organizational Readiness and Cultural Barriers

These themes involved behavioral and cultural issues. The response has highlighted a lack of training, limited leadership awareness, as well as resistance to implementing CPMAI procedures over legacy workflows. This has been mapped to stakeholder alignment and organizational readiness, cutting all the CPMAI stages and linking to stakeholder risk and communication planning of PMI. While these challenges are behavioral rather than structural, they demonstrate key barriers to the AI governance maturity.

5. DISCUSSION

This study has used a mixed approach including secondary sources from peer reviewed research reports, quantitative methods that have collected information from survey questionnaires and qualitative research methods that have collected data through an interview process. However, from the above literature review part, survey results and interview responses various important information was collected related to the topic including benefits and challenges. The discussions have been presented as themes below.

5.1 link with Literature and ADNOC Practitioner perception

However, discussing the survey results the survey was taken by a total of 50 participants where most of the responders were females. Furthermore, findings of this study highlighted a major alignment between literature review and the perspectives collected from ADNOC employees from both survey and interview results. The main theme unfolds from the results is that implementing CPMAI within government AI programs, especially ADNOCs environments can significantly improve the overall governance maturity, risk identification, and operational trustability. Furthermore, the successful integration of these recognitions heavily depends on the corporation's readiness, stakeholder engagement, and the implementation of trust led governance frameworks.

Survey results highlighted most of the people agreeing that AI has enabled greater efficiency, predictive accuracy, and cost optimization within ADNOC. Most importantly in sectors such as exploration analytics, asset performance improvement, and environmental risk detection. Furthermore, those findings of the survey results have also highlighted the same as per the assertions from [18]. From that article it was noted that AI's ability of processing vast operational data supports improved decision making in government sector institutions. Moreover, employees have also raised concerns related to governance fragmentation, limited reliability, and insufficient post-deployment monitoring. Furthermore, that highlights the point that rapid technological transformation is not yet fully aligned by equally robust risk governance structures. Most importantly, that outcome also matches with [5], who also raised concerns that ethical and operational risks are increasing while AI systems spread faster than regulatory controls.

5.2 Absence of Lifecycle Governance in operative AI

The interviews have given more in-depth insights of those governance barriers, by reflecting that they depend mainly on short run performance signs, instead of systematically lifecycle risk assessment. Moreover, the participants also reflected that AI project success in the present time is being defined by highlighting achievement and systematic performance instead of the maturity of governance practices, transparency, or assurance for stakeholders. This aligns with [4], who has also recognised almost the same gaps in public sector AI

initiatives. So, it can be said that ADNOC's transformation regarding CPMAI highlights the opportunities to shape this explanation of success towards a managed focus on innovation along with risk control.

5.3 *Structural Strength of CPMAI and necessity for Organizational transformation*

Both data collection methods of survey and interviews showed strong interest in adoption of CPMAI for a more suitable and important framework for the future of ADNOC's AI systems. Participants also valued CPMAI's structured nomenclature, visibility of cross functional, and urgency on consistency model transformation. For example, features that address directly to the Risk Governance Theory base explained in the literature review part. Moreover, participants also suggested that the transformation toward CPMAI needs broader cultural change. Teams are currently accustomed to operating under different legacy project models, limiting uniformity and slowing organizational alignment. Interview responders again identified gaps in understanding of leadership, department coordination, and standardized mechanisms for AI reliability. Furthermore, the findings by [6], has recognized geopolitical, technical, and cultural constraints influencing AI oriented changes in regional oil and gas organizations.

5.4 *Key Mediators of CPMAI Adoption are Trust and Transparency*

Trust and transparency has been showcased as necessary mediating aspects for efficient CPMAI implementation. Employees also showed concerns that AI decision-making processes are not continuously interpretable or communicated with accurate clarity. So, it highlights Technology Acceptance Theory or TAM, in which perceived trustworthiness directly impacts customer adoption and support. That boost up clarity, stakeholder engagement, and risk reporting was widely suggested by responders, and that is also supported by [6], in whose article the the need for ethical and human-centered AI design was pointed out.

Overall, the discussion reinforced the hypotheses of the study through highlighting that Integration of CPMAI has a positive impact on ADNOC's AI program risk management. However, it has also been mentioned that it only happens if supported

by trust building mechanisms, efficient communication, and stakeholder involvement. The evidence from peer reviewed studies has also confirmed that the challenges affecting CPMAI adoption are mainly organizational and behavioral instead of structural or technological. This highlights ADNOC with a strong opportunity to fasten the CPMAI implementation and adoption through investing in consolidated governance standards, commitment from leadership, capacity building projects, and unbiased and transparent communication system.

6. RECOMMENDATIONS AND CONTRIBUTIONS

6.1 *Recommendation*

Based on the findings of the study that was collected from different secondary and primary sources the various key recommendations can be provided. Those recommendations are aligned to assist the ADNOC in fully understanding the benefits of CPMAI in its AI oriented program risk management. The recommendations are as follows.

Firstly, ADNOC needs to implement a consolidated CPMAI governance authority or AI Risk Governance Committee [2]. Furthermore, this committee will be able to help in making sure of continued oversight, explain key performance signs for risk maturity, reinforce compliance, and assist in life-cycle reliability beyond just positioning.

AI initiatives currently operate within different methodological structures. It is also recommended to ADNOC to adopt standardized CPMAI initiatives among different departments to block governance fragmentation [11]. Those also include united documentation, mandatory risk management, and collaborative model monitoring structures.

Furthermore, for successfully adopting CPMAI, it heavily depends on organizational readiness. It is recommended that the organizations that the Leadership and operational stakeholders need capacity for creating programs that are mainly focused on AI risk knowledge, transparency in decision-making, and ethical consideration [78]. Training campaigns and technical business connections workshops can fasten cultural shaping.

Survey responses highlighted gaps in current oversight after implementation. So it is

recommended that ADNOC needs to increase investing in automated monitoring initiatives, MLOps supported transformation, and consistency validation to reduce model drift, biases, and operational non success. However, it is also recommended to implement AI Risk Assurance Framework (ARAF).

6.2 Contribution

This study has made great academic, practical, and context sensitive contributions to the sectors of AI risk governance and project management among government backed organizations, mainly in the Middle Eastern oil and gas sector.

The study report has enriched peer reviewed literature by highlighting how CPMAI improves AI program risk management while integrating into large scale strategic sectors.

Furthermore, it has spread theoretical perceptions like the Risk Governance Theory and Technology Acceptance Model or TAM. that has also reflected how trustability acts as a mediating variable in AI governance performance. The mixed-method research approach has also supplied new proofs regarding a high-risk, asset-intensive industrial environment.

Furthermore, for industry professionals and policymakers, this report has provided valuable insights including barriers like governance fragmentation, skill gaps, and limited model oversight. Moreover, these issues are reflected in other government linked enterprises. Moreover, this study report has provided ADNOC centric risk governance improvement routes, including practical employee readiness, concerns related adoption, and strategic expectations.

Overall, the research reports have concluded that implementing CPMAI within ADNOC's AI program risk management is not just a practical decision but it is necessary for long term governance accountability. Most importantly this study has furnished the organization with rapid environments adaptability, transparency in communication, competencies among leadership, and standardized governance initiatives.

7. CONCLUSION

Based on the overall analysis, it is evident that adoption of the CPMAI across all the AI lifecycles is crucial for strengthening the trust in AI-driven decision-making, risk governance and operational

reliability of the ADNOC. The evidence obtained from the Virtual Lab findings, survey and interviews show that while AI contributes notably to the cost optimization, operational efficiency and predictive accuracy, its deployment at the company is hampered via insufficient monitoring controls, governance fragmentations, inconsistent model evaluation and all of the data lineages. The study had revealed robust alignment between the existing literatures and employer viewpoints, validating that AI risk exposure rises when lifecycle governance is inconsistent or incomplete. CPMAI provides a structured strategy which enhances risk identification, improves transparency level and allows consistency monitoring, a key requirement for the high-risk operational setting like oil and gas and energy.

Although the research has shown that in order to effectively implement CPMAI needs overcoming organizational and behavioral barriers such as uneven stakeholder involvement, leadership awareness gaps and limited cross-team coordination's. These barriers are culturally, highlighting the requirement for clear governance accountability, change management and training. This study has strengthened that CPMAI, driven by strong governance mechanisms as well as MLOps-based monitoring can notably improve organizational AI assurance, less operational risks and promote accountable trustworthy AI systems.

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and is directly relevant to integrating AI governance into enterprise risk management.