

Toward an AI-Driven National Reference Architecture for Saudi Arabia (NORA).

literature Review

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Assignment Report: Toward an AI-Driven National Reference Architecture for Saudi Arabia (NORA): A Literature Review

Table of Contents

Summary Research Paper's 3

Critical Analysis:..... 6

Connections..... 7

Conflicts Between the Findings 8

Synthesis Matrix for Literature Review:..... 9

References11

Summary Research Paper's

Paper1: Guideline for the National Overall Reference Architecture

The Guideline for the National Overall Reference Architecture (NORA) provides a clear guideline and definition for a successful implementation of Saudi Arabia's digital-government ecosystem. It suggested multiple main phases for a successful governance of the six architecture layers - Business, Application, Data, Technology, Integration, and Security. The published document by Digital Government Authority (DGA), provides a blueprint to government entities for successful implementation and sharing digital services across the country. Unfortunately, the published framework is new, conceptual, and does not involve Artificial Intelligence (AI), or automation. Also, the lack of experience agents causes the limitation of its implementation due the strong presence of the TOGAF framework in the Saudi entities (Digital Government Authority, 2024).

Paper 2: Artificial Intelligence in Enterprise Architecture: Innovations and Challenges

In this research paper, the authors conducted a systematics literature review on how Artificial Intelligence (AI) can have a positive impact on reshaping- transforming traditional Enterprise Architecture (EA). The authors looked at 72 published technical papers that investigated automation, analytics, and compliance improvement. The result of this paper indicated that AI integration with EA can have a critical enhancement on areas of the TOGAF framework such as architectural agility, traceability, and governance. While the review covers the topic in considerable depth, it falls short of showing how its ideas can be tested or adapted within real public-sector settings such as NORA, leaving the practical side of implementation still unclear (Bakar, Ali & Khan, 2024).

Paper 3: AI-Driven Enterprise Architecture: Transforming Frameworks and Decision-Making in the Age of AI

This research provided us with a new idea of implementing AI agents and analytics into Enterprise Architecture (EA) framework. This paper sheds light on how AI agents can automate daily processes such architecture analysis, risk mitigations, and tracking performance. Also, this paper highlighted that AI agents improved C level decision making speed and decision quality, transparency, and culture adaptability compared to traditional style of implement EA. Enthought, this paper validation is confined to limited case simulations and has yet to be examined within national or regulatory contexts. Because it hasn't been tested in Saudi government entities frameworks like NORA, its findings are challenging to adopt (Engin et al., 2025).

Paper 4: Enterprise Architecture's Effects on Organizations' Ability to Adopt Artificial Intelligence: A Resource-Based Perspective

The main concept of this research is provided and examination on how enterprise architecture maturity within the organization can determine the level of readiness for AI adoption. The authors have applied regression analysis on data that they collected from over 100 organizations from different industry backgrounds to find out how the strength of an organization's enterprise architecture affects the success of its AI projects. This resulted in a strong direct correlation between EA maturity and AI. The main issue here is, this paper mainly focusses on European private sector, which means it has a limited application to Saudi Government Framework (Schmidt & Müller, 2020).

Paper 5: AI Agentic Workflows and Enterprise APIs: Adapting API Architectures for the Age of AI Agents

In this study, the author follows a technical approach that combines prototype development, workflow simulation, and system integration testing. His results show that adaptive APIs support dynamic data exchange, improve interoperability, and promote automation across applications. The findings mentioned in the paper are quite relevant to what NORA's Integration Architecture layer suggested. However, those findings are not tested in real life leading to the lack of scalability and implementation in government entities (Hernandez et al., 2025).

Paper 6: Enterprise Architecture as a Dynamic Capability for Scalable and Sustainable Generative AI Adoption

This research strongly believes that agility in enterprise architecture (EA) enables strong governance of AI and resource utilizations for the organizations. However, there is an absence of practical implementation for the suggested framework and regression testing. Therefore, there is a need for adopting the framework and aligning it with the NORA framework (Wang & Zhao, 2025).

Critical Analysis

Every study has a contribution in understanding how Enterprise Architecture can the digital experiences within e-governance, yet several issues remain presented. The Guideline for the National Overall Reference Architecture defines a strong governance guideline, but it's conceptual and lacks the implementation of AI. The paper Artificial Intelligence in Enterprise Architecture: Innovations and Challenges, highlights the advantages of adopting EA framework in the government sector but remains theoretical. In contrast, the third study, AI-Driven Enterprise Architecture presents the advantages of adopting EA in private-sector environments. The fourth study provides strong practical evidence of integrating EA into digital readiness, yet it is only practice in private sector. The fifth paper introduces an insight into interoperability but has not been tested or verified in the real world. Lastly, the sixth paper introduces a futuristic conceptual model, but it lacks the verification aspects making the results questionable. Overall, those papers and guidelines provide a progressive act in modernizing EA but lacks the testing and the verification within the Saudi Enterprise Architecture framework NORA.

Connections

- **Enterprise Architecture contribution:** All the papers focus on the power of implementing Enterprise Architecture (EA) frameworks and how it can contribute to organizational efficiency, governance, and digital transformation.
- **Standard framework:** All papers present the same idea of a standard structured governance, compliance across government and non-government sectors.
- **AI implementation within EA:** All papers agreed on the positive impact of embedding automation and analytical capabilities within EA for better decision making and agility.

Conflicts Between the Findings

- **Theoretical vs. experimental nature:** The NORA Guideline provided by DGA (Digital Government Authority) is mainly theoretical, while the paper Enterprise Architecture's Effects on Organizations' Ability to Adopt AI: A Resource-Based Perspective took a practical, data-based approach
- **Saudi e-government:** Most of the paper discuss the implementation of AI within EA from non-Saudi rather a global perspective, while NORA context requires generalization and Saudi-specific implementation.

Synthesis Matrix for Literature Review

#	Study	Author	Year	Research Design	Key Findings	Methodology	Weaknesses / Limitations
1	Guideline for the National Overall Reference Architecture (NORA)	Digital Government Authority (DGA)	2024	Framework Guideline (Official)	Defines the six architecture layers (Business, Application, Data, Technology, Integration, Security) and sets governance and compliance standards for Saudi digital government.	Data collection: Official government publication. Analysis approach: Structural and policy review. Model / framework: NORA reference layers.	Scope: No mention of AI integration. Validation: Conceptual only. Context: Limited to Saudi public sector standards.
2	Artificial Intelligence in Enterprise Architecture: Innovations and Challenges	Bakar, N., Ali, S., & Khan, R.	2024	Systematic Literature Review	Reviews how AI supports automation, analytics, and compliance within EA frameworks (TOGAF, Zachman). Identifies challenges such as data governance and model validation.	Data collection: Peer-reviewed literature. Analysis approach: Thematic and comparative synthesis. Model: AI-enabled EA framework.	Scope: No application in government architecture. Validation: Theoretical synthesis. Context: Non-Saudi experiments.
3	AI-Driven Enterprise Architecture: Transforming Frameworks and Decision-Making in the Age of AI	Engin, T., et al.	2025	Conceptual and Applied Research	Introduces a hybrid model integrating AI agents and analytics into EA governance for better decision-making and transparency.	Data collection: Case-based modeling. Analysis approach: Simulation and framework mapping. Model: AI-augmented EA governance framework.	Scope: Tested on international case studies only. Validation: No Saudi implementation. Context: Limited empirical results.
4	Enterprise Architecture's Effects on Organizations' Ability to Adopt AI:	Schmidt, M., & Müller, J.	2020	Quantitative Study (Survey & Regression Analysis)	Finds a strong correlation between EA maturity and successful AI adoption across industries.	Data collection: Survey of 112 organizations. Analysis approach: Regression analysis.	Scope: Pre-GenAI context. Validation: Non-public sector data.

	A Resource-Based Perspective					Model: Resource-based EA maturity model.	Context: Not focused on government frameworks.
5	AI Agentic Workflows and Enterprise APIs: Adapting API Architectures for the Age of AI Agents	Hernandez, R., et al.	2025	Technical Design Paper	Proposes adaptive API frameworks to support AI agents and automate integration layers within EA ecosystems.	Data collection: Prototype system development. Analysis approach: Architecture simulation and workflow testing. Model: AI-driven integration layer for EA.	Scope: Limited scalability testing. Validation: Prototype only. Context: No national-scale evaluation.
6	Enterprise Architecture as a Dynamic Capability for Scalable and Sustainable Generative AI Adoption	Wang, Y., & Zhao, L.	2025	Conceptual Framework	Presents EA as a “dynamic capability” that enables scalability and sustainability for GenAI systems across organizations.	Data collection: Secondary sources (45+ AI-EA studies). Analysis approach: Conceptual modeling. Model: Dynamic capability mapping.	Scope: No empirical testing. Validation: Conceptual only. Context: Requires adaptation to Saudi NORA model.

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