

Reimagining Service Systems in the Levant: The Role of Comprehensive Big Data Analytics, Business Analysis, and Artificial Intelligence

Abstract

This article develops a theoretical conceptual framework linking the invention of comprehensive big data analytics (BDA), business analysis (BA), and artificial intelligence (AI) to the configuration of service and service advantage in the Levant region, encompassing Jordan, Lebanon, Syria, and Palestine. Building on the resource-based view (RBV) and service-dominant logic, the paper proposes that AI-augmented analytics and business-analysis practices function as strategic resources and infrastructural layers that reconfigure public and private-sector service ecosystems. The analysis is grounded in regional empirical and case-study evidence from Jordan and Lebanon, illustrating how AI-driven analytics generate service improvement and institutional advantage in practice. The paper contributes a novel conceptual-theoretical model that situates AI-enhanced analytics as governance-relevant capabilities embedded in Levantine service systems, and outlines implications for policy, institutional design, and future research.

Keywords: Artificial intelligence; Big data analytics; Business analysis; Service advantage; Levant region; Resource-based view; Service-dominant logic; AI-driven analytics; Digital transformation

Introduction

The Levant region occupies a distinctive place in contemporary debates on digital transformation, combining structural fragility with growing ambitions for technological modernization (Mohammed & Laib, 2025). Across Jordan, Lebanon, Palestine, and Syria, service systems operate within institutional environments shaped by political uncertainty, uneven infrastructure, external pressures, and rising citizen expectations, rendering the modernization of service delivery both a developmental imperative and a governance priority (Traxler, 2018; Alameddine et al., 2019; Mahayosnand et al., 2021). In this context, services are not merely economic activities but also mechanisms of social

inclusion, public legitimacy, and administrative continuity (Dupuy & Defacqz, 2022; Rosenbloom et al., 2022).

Within this setting, the emergence of comprehensive big data analytics (BDA), business analytics (BA), and artificial intelligence (AI) has begun to reshape the logic by which services are designed, managed, and improved (Al-Sai et al., 2022; Deliu & Olariu, 2024; Ashal & Morshed, 2024; Bteibt, 2026). Comprehensive data analytics refers to the systematic integration of descriptive, predictive, and prescriptive analytics into organizational decision-making processes, whereas business analysis focuses on identifying requirements, process structures, stakeholder needs, and value flows that translate information into actionable decisions (Bizri et al., 2021; Bteibt et al., 2024; Alslaibi et al., 2024). AI extends both domains by enabling advanced pattern recognition, automation, natural language processing, and adaptive decision support, thereby transforming analytics from a retrospective reporting function into a forward-looking, service-shaping capability (Hashem, 2012; Landis, 2012; Alslaibi et al., 2024).

This transformation is particularly significant in the Levant, where service sectors increasingly rely on digital tools to alleviate capacity constraints, enhance service responsiveness, and address institutional gaps (Refaat & Mohanna, 2013; Bizri et al., 2021; Alslaibi et al., 2024). In Jordan, the national AI strategy explicitly links AI adoption to improvements in digital government services, employment, education, health, and public-sector efficiency (Majdalawi et al., 2015; Al-Onizat et al., 2025). In Lebanon, recent policy debates and practitioner discourses position AI and predictive analytics as instruments for rebuilding trust, modernizing governance, and streamlining public services through citizen-centric platforms, digital ID systems, and e-payment infrastructures (Halabi, 2021; Dagher & Nehme, 2021). In Palestine, research on ICT and telecommunications organizations indicates relatively strong readiness for digital transformation; however, expansion remains constrained by political and structural barriers, suggesting that service innovation is possible but unevenly institutionalized (Abu Afifa & Abu-Assab, 2023; Shehada & Burhanuddin, 2025; Naser-Karajah & Awwad, 2026). In Syria, government strategy documents and digital transformation debates similarly frame ICT modernization as a means to improve citizen services, institutional productivity, and long-term administrative reform, even though implementation is limited by data availability, infrastructure deficits, and capacity gaps (Alhaj Saleh & Alyaseen, 2022; Digital Watch Observatory, 2024; Levant24, 2025).

Against this background, the present article develops a theoretical and conceptual argument rather than an experimental or hypothesis-testing study. **Its first aim** is to explain how AI-augmented analytics and business analysis practices reconfigure service systems in the Levant by embedding intelligence into operational, managerial, and policy-making processes. **Its second aim** is to advance a conceptual understanding of how these capabilities generate service advantage at multiple levels: at the organizational level

through enhanced efficiency and responsiveness, at the institutional level through improved coordination and accountability, and at the regional level through strengthened digital competitiveness and service innovation capacity.

Literature Review and Theoretical Foundations

Big Data Analytics, AI, and Service Advantage

The contemporary literature on big data analytics (BDA) and artificial intelligence (AI) in services emphasizes that AI-driven analytics generate greater performance gains than analytics implemented without AI, because AI expands both the depth and scope of actionable insights (Bag et al., 2021; Bag et al., 2023). A meta-analysis of the service industry shows that AI-enhanced analytics positively affect operational efficiency, customer satisfaction, and competitive positioning, especially when integrated into organizational learning and decision-making routines (Bag et al., 2023; Sharmin Akter et al., 2025).

From a resource-based view (RBV) perspective, AI-driven analytics and business-analysis capabilities qualify as strategic resources when they are valuable, rare, inimitable, and organizationally embedded (Barney, 1991; Mele & Della Corte, 2013). In the Levant, where public-sector services dominate everyday life, the ability to deploy AI-augmented analytics can constitute a source of institutional advantage, enabling governments to improve responsiveness, transparency, and service quality in crisis-prone environments (Arezki & Senbet, 2020; Alkhaldi et al., 2024; Khosravi et al., 2024; Bornu, 2025).

Service-Dominant Logic and AI-Mediated Services

Service-dominant (S-D) logic reframes competitive advantage as co-created value emerging from service-to-service exchange networks (Vargo & Lusch, 2016). In this view, AI-driven analytics can be conceptualized as service-operating mechanisms that embed intelligence into customer interactions, back-office processes, and ecosystem coordination (Ayala et al., 2025; Zhou, 2025; Bteibt, 2026). AI-powered chatbots, recommendation engines, and prescriptive analytics dashboards function as service systems that generate value by continuously sensing, interpreting, and adapting to user behavior (Wirtz et al., 2021). A business-analytic lens further emphasizes that AI-driven analytics are embedded in enterprise architectures, process workflows, and stakeholder expectations (Gavrilova, 2022). This means that the theoretical contribution of this article lies in integrating RBV, S-D logic, and business-analysis theory to explain how AI-augmented analytics become institutionalized capabilities rather than isolated technologies.

Conceptual Framework

This section develops a **novel conceptual framework** that explains how the invention of comprehensive data analytics, business analysis, and AI translates into service and service advantage in the Levant region. **The framework is composed of four interrelated components:** (1) AI-augmented BDA infrastructure, (2) business-analysis embedding, (3) service-system reconfiguration, and (4) institutional and regional advantage, **see figure 1.**

AI-Augmented Analytics Infrastructure

The framework posits that **AI-augmented analytics in the Levant** can be structured as a layered architecture (Yassine et al., 2021; Alslaibi et al., 2024; Bteibt, 2026):

- Descriptive analytics, which map historical service patterns (e.g., patient flows, visa applications, transport demand).
- Predictive analytics, which forecast demand peaks, service bottlenecks, or customer churn using statistical and machine-learning models.
- Prescriptive and autonomous analytics, where AI systems propose or execute optimal service configurations (e.g., dynamic pricing, resource allocation, or route optimization).

This architecture is treated as an infrastructural layer that mediates service delivery across multiple organizations and sectors. **Theoretically**, this aligns with the notion of AI infrastructuring—where AI becomes a taken-for-granted, embedded layer in socio-technical systems (Bowker, 1991; Digital Watch Observatory, 2024).

Business-Analysis Embedding as a Governance Mechanism

The framework further argues that business analysis practices play a pivotal role in mediating the translation of AI-augmented BDA into coherent, actionable strategies that can be implemented across public-sector and service organizations. Business analysis defines and documents processes, stakeholder requirements, and value flow models, thereby ensuring that analytic outputs are not treated as isolated technical artefacts but are systematically aligned with institutional mandates, performance objectives, and service quality standards (Bizri et al., 2021; Alslaibi et al., 2024). In practical terms, this involves specifying how data are collected, transformed, and interpreted; clarifying decision rights and accountability structures; and articulating the expected value propositions for different stakeholder groups.

In the Levant, this governance role of business analysis is particularly salient given high levels of institutional fragmentation, overlapping regulatory frameworks, and frequent capacity constraints. These conditions make it necessary to explicitly map data flows, delineate stakeholder responsibilities, and design risk-mitigation and compliance

mechanisms to accompany the deployment of AI-driven analytics (Bizri et al., 2021; Alslaibi et al., 2024; Di Giulio & Vecchi, 2025). Accordingly, the framework conceptualizes business analysis capability not merely as a technical or procedural function but as a governance and coordination mechanism that embeds AI-driven analytics into institutional routines, policy-making processes, and broader architectures of public accountability.

Service-System Reconfiguration

The framework proposes that the combined use of AI-augmented analytics and BA transforms service systems by moving them away from static and bureaucratic models toward intelligent, context-sensitive ecosystems. This transformation can be understood through three interrelated dimensions. **First**, the temporal dimension reflects a shift from retrospective reporting toward real-time monitoring and predictive service management enabled by AI-driven BDA and decision-support systems (Akter & Kudapa, 2024). **Second**, the spatial dimension highlights the integration of BDA across ministries, municipalities, and private-sector actors, creating interconnected, interdependent service networks supported by digital platforms and smart-governance infrastructure (Mencütek, 2018; Das, 2024). **Third**, the institutional dimension emphasizes the incorporation of analytics into the legal, regulatory, and ethical frameworks that shape data governance and the deployment of AI technologies, reflecting the broader emergence of algorithmic governance in public administration (Tsourapas, 2019; Engin & Treleven, 2019; Tamimi et al., 2024). **Collectively**, these dimensions illustrate how AI-augmented BDA and BA contribute to the development of adaptive, data-driven service ecosystems capable of improving responsiveness, coordination, and service quality in complex governance environments (Adewusi et al., 2023)

Institutional and Regional Advantage

The framework concludes that when AI-augmented BDA and BA capabilities are institutionally embedded, they create service advantage at three interconnected levels. At the organizational level, these capabilities enhance efficiency and responsiveness within public agencies. **At the institutional level**, they strengthen trust in state services and improve the quality of policymaking. **At the regional level**, they help position the Levant as a knowledge-based, AI-augmented service economy within the broader Middle East (Bizri et al., 2021; Alslaibi et al., 2024). **This perspective is consistent with the concept of AI-powered service innovation capability**, which conceptualizes service advantage as a multidimensional capability shaped by data-governance maturity, technical AI expertise, and organizational agility (Bowker, 1991; Adaileh & Alshawawreh, 2021; Digital Watch Observatory, 2024; Alhosani & Alhashmi, 2024).

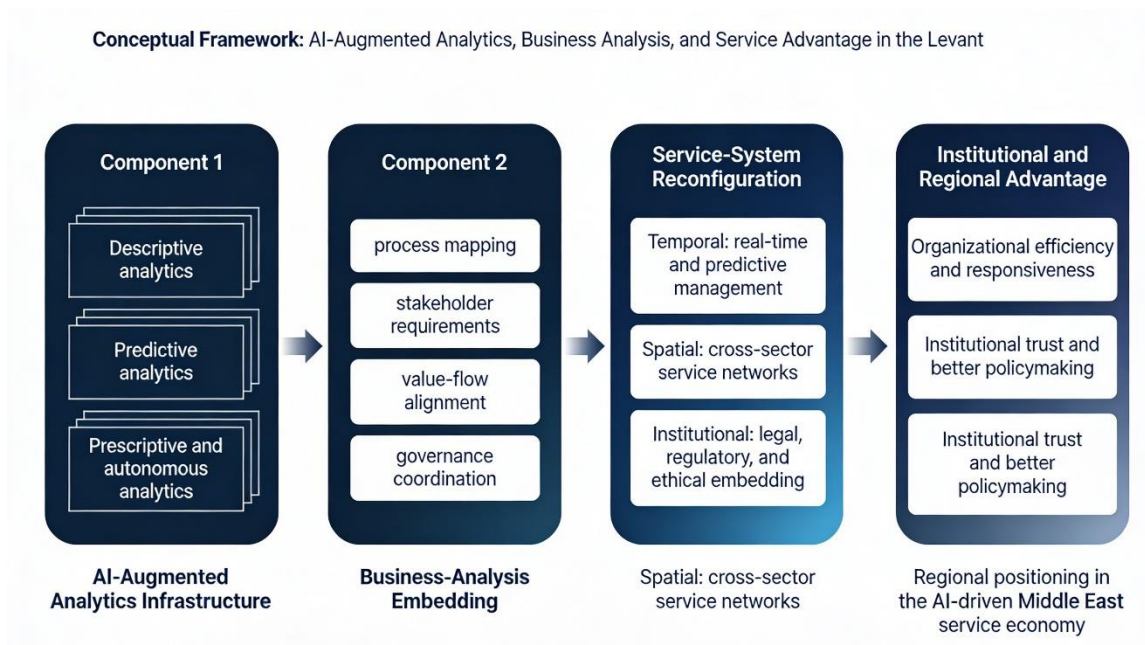


Figure 1: Conceptual Framework of AI-Augmented Analytics, Business Analysis, and Service Advantage in the Levant

Discussion: Levantine Empirical Context and Case-Based Illustrations

Regional Studies and Empirical Grounding

Although this paper is **theoretical**, it is informed by empirical and case-based evidence from the Levant and the wider Middle East. Existing research shows that governments and organizations across the region are increasingly adopting digital technologies, big data analytics, and artificial intelligence to improve service delivery, decision making, and operational efficiency. In Jordan, studies indicate that emerging technologies, including blockchain and AI-enabled platforms, can enhance information management, service accessibility, and coordination among public institutions (Mathani et al., 2024; Al-Onizat et al., 2025). Practitioner evidence also suggests that the Jordanian government is exploring data analytics and AI to strengthen public-service delivery, digital governance, and data-driven policy development (Alia & Jaradat, 2025; Al-Onizat et al., 2025; Asouli et al., 2026).

Similar trends are evident in wider public administration research. Studies on e-government systems show that digital service platforms and ICT infrastructures are increasingly integrated into public administration in Jordan and other regional economies, although implementation gaps and institutional constraints remain substantial (Abu-Shanab et al., 2010; Abu Rumman & Szilágyi, 2018; Hanandeh et al., 2024). In Lebanon, recent research suggests that data science and AI-driven analytics can support more

evidence-based policymaking, improve service responsiveness, and enhance transparency in governance (Moussawi & Kawass, 2024; Abu Salem & Saade, 2025).

At the regional level, research on digital governance in the Middle East and North Africa indicates that e-government initiatives and digital transformation programs can improve government effectiveness, transparency, and administrative modernization when supported by institutional reform and digital skills development (Dhaoui, 2021; Sahi, 2025; Guergah, 2026). At the same time, these processes are constrained by governance complexity, regulatory fragmentation, and limited administrative resources (Bteddini, 2016).

Taken together, this evidence suggests that the Levant is not merely adopting AI as a technical tool, but is gradually positioning AI-augmented analytics as a core element of service-system redesign. However, the literature also shows that fragmented data infrastructures, uneven institutional capacity, and evolving regulatory frameworks continue to shape the extent to which AI and analytics can produce sustained service advantages in public-sector and service ecosystems.

Case Example: Jordan's Data and AI-Driven Public-Service Transformation

A key Levantine example illustrating the conceptual framework is the Government of Jordan's use of BDA and AI to improve public service delivery (Abu-Shanab et al., 2018; Al-Araj et al., 2022; Mathani et al., 2024; Al-Onizat et al., 2025). The National Software Quality Assurance Centre (NSQAC) uses AI-augmented analytics to quality-assure public service websites and portals, focusing on user experience by mapping and covering all possible user scenarios and interface paths. This application of descriptive and scenario-based analytics improves service accessibility and reduces user frustration, translating directly into a service-quality advantage (National Software Quality Assurance Centre [NSQAC], n.d.; Digital Watch, 2023).

The Securities Depository Center leverages AI-driven BDA to provide investors with timely insights while preserving data security and privacy. From a business analysis perspective, this represents a service design innovation in which analytics are embedded into investor service workflows (Gov AI Summit Jordan, n.d.).

The Amman Chamber of Industry employs big data analytics to accelerate the transition to smart manufacturing, supporting industrial firms in improving efficiency, compliance, and environmental performance (Gov AI Summit Jordan, n.d.).

The Ministry of Labor uses data analytics to understand and manage employment trends, guiding youth toward in-demand occupations (Gov AI Summit Jordan, n.d.; Jordan Times, 2025).

Theoretically, the Jordanian case illustrates how AI-augmented BDA and business analysis can reconfigure public services as intelligent, data-driven systems rather than static, bureaucratic processes (Digital Watch, 2023).

Case Example: **Lebanon's Digital Leap and AI-Enhanced Governance**

Another key Levantine case is Lebanon's "digital leap" agenda, which seeks to modernize governance and public-service delivery through AI-driven analytics and citizen-centric platforms. The government's AI-driven governance reforms include (Ben Hassen, 2018; El Ammar & Profiroiu, 2020; OECD, 2020; El Hajj et al., 2023; Harb, 2026)

- Predictive analytics for service optimization.
- Agentic AI models that automate administrative tasks.
- Data-science-based policy frameworks for public-sector transformation.

Theoretically, Lebanon's approach exemplifies how AI-powered analytics and business-analysis frameworks can be used to reconfigure the state itself as a service-oriented institution.

Conclusion and Future Research Directions

This article has developed a conceptual framework that links comprehensive big data analytics (BDA), business analysis, and artificial intelligence to service development and service advantage in the Levant region. Central to this framework is the argument that AI-augmented BDA should be understood not merely as instruments for operational efficiency, but as infrastructural and governance-related capabilities deeply embedded within the institutional fabric of Levantine service systems. By situating these capabilities within the resource-based view (RBV) and service-dominant (S-D) logic perspectives, the article advances a theoretically grounded account of how AI-driven analytics reconfigure the design, management, and delivery of services across multiple organizational and institutional levels.

Empirical and case-based evidence from Jordan and Lebanon has further illustrated the practical relevance of this framework. These cases demonstrate that AI-driven analytics have the potential to reshape public service ecosystems, strengthen institutional trust and accountability, and contribute to the region's strategic positioning within the broader Middle Eastern AI-driven service economy. At the same time, they underscore the importance of governance structures, business-analysis capabilities, and institutional readiness as enabling conditions for sustained service advantage.

Building on this foundation, **several directions for future research** merit scholarly attention. **First**, researchers should examine how AI-augmented BDA affects state-citizen relationships in conflict-prone and post-crisis contexts, where the social legitimacy of data-driven governance is particularly consequential. **Second**, future studies should investigate the institutional conditions—including regulatory frameworks, organizational culture, and leadership capacities—that enable or constrain the integration of AI-driven analytics into public-sector routines. **Third**, the conceptual framework advanced here should be operationalized and empirically tested through quantitative and comparative studies across Levantine countries, enabling the identification of context-specific patterns

and cross-national variations. **Finally**, future research should address the ethical dimensions of AI deployment in public services, particularly regarding data privacy, algorithmic transparency, and equitable access to AI-enhanced services.

Overall, **this article suggests** that the Levant's future service advantage will increasingly depend on how effectively, equitably, and responsibly AI-augmented BDA and business analysis are integrated into its service ecosystems—not only as technical solutions but also as governance instruments capable of fostering inclusive, adaptive, and resilient public service systems.

Ethical Approval and Consent to Participate:

This study did not involve experiments on humans or animals, and no identifiable personal data were collected; therefore, ethical committee approval and informed consent to participate were not required.

Consent for Publication:

Not applicable. This study does not include any identifiable data, images, or personal information that would require consent for publication.

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