International Journal of Computer Information Systems and Industrial Management Applications
ISSN 2150-7988 Volume 18(21s) 2026 pp. 1581-1591
https://doi.org/10.70917/ijcisim-2026-5877
Article

The role of Business Intelligence and Artificial Intelligence implementation in Palestinian Banks: A theoretical analysis of Transformative potential and strategic imperative.

Ashraf Mohammad Salih Abuarra[1], Hatem Jemmali[2]

[1]Higher Institute of Accountancy and Business Administration (ISCAE), University of Manouba, Tunisia", General Manager at the Ministry of Education and Higher Education. ashraf.abuarra@moe.edu.ps
[2]Higher Institute of Accountancy and Business Administration (ISCAE) and Quantitative Analysis Laboratory (QuAnLab), Higher School of Business of Tunis (ESCT), University of Manouba, Tunisia. hatemjemmali79@gmail.com

Abstract: This research examines the transformation role that can be played by Business Intelligence (BI) and Artificial Intelligence (AI) in the banking sector in the Palestinian economy. Banks in this economy are operating in a very dynamic environment, political uncertainty, infrastructure limitation and other diversified challenges, which necessitate innovative technological solutions.

The study seeks to explore theoretically how the technologies of AI and BI tools, such as Machine Learning (ML), Natural Language Processing (NLP), Predictive Analytics, and Robotic Process Automation (RPA), can support risk management frameworks, enhance the operational effectiveness and efficiency, and CRM. How the financial inclusion and regulatory compliance can be achieved through the active employment of AI & BI.

The research analyses the necessity of these innovative advanced techniques in supporting the flexibility of the banking sector and enhancing their competitive advantage and supporting the economic development. Also, the research will explore the challenges faced when implementing these technologies. The study concludes with theoretical recommendations for the proper phased implementation frameworks, regulatory framework development and visionary views for the future researchers or practitioners in the banking sector.

Keywords: Business Intelligence, Artificial Intelligence, Palestinian Banking Sector, Financial Technology, CRM, Data Analytics, Digital Transformation, Financial Inclusion.

1. Introduction

The working environment in the banking sector at Palestine is very complex due to the political instability, geographical fragmentation, restricted mobility of people and goods, and the great dependency on the regional & international dynamics. The inadequate infrastructure, the persistent need for sustainable economic growth, and the regulatory ambiguity all increase these structural constraints. In this concern, the adoption of Business Intelligence (BI) will not only empowers the capability to attain a comparative advantage, but also empowers the ability of the economy for the survival and resilience (Abuamria, 2022, 8).

Globally, AI & BI serve as the magic enabler of operational efficiency, effectiveness, and strategic making processes of the financial institutions which are undergoing a great profound digital transformation. The active employment of these technologies promise significant enhancement in risk management, customer relationship management, innovation, and regulatory compliance. Although the necessity of these benefits of AI & BI, but, their implementation is fraught with the need for diversified challenges such as specialized human resources, and robust infrastructure which were significantly scarce in the Palestinian economy (Magaji, 2021, 237). The Palestinian

Copyright: © 2026 by the authors

economy remain underexplored in the academic perspectives, which motivate the researcher to conduct this research to compensate this academic gap.

This research aims to provide a complete and comprehensive analysis for the critical role that BI & AI can play in the Palestinian Banking Sector through the critical analysis of the academic literature rather than relying solely on the primary empirical data collection, such as questionnaires. This study adopts a documentary analysis technique, case studies of the institutions, policy documents, synthesizing existing academic literature to construct the contextualized framework for the Palestinian banks. The study examines clearly how the active adoption of BI technologies, including data warehousing, reporting systems, dashboards, and predictive analysis, can convert raw data into effective, actionable intelligence for the Palestinian banks.

1.2 Research problem and questions:

Due to the occupation, territorial division, and over-reliance on Israeli financial institutions, Palestinian banks face significant political and economic challenges. These elements, along with the lack of complete monetary sovereignty, force bank decision-makers to see BI and AI as strategic tools for organizational survival and expansion rather than just as technological advancements.

However, the majority of the academic research now in publication concentrates on the deployment of BI and AI in stable, sovereign economies, mainly ignoring situations characterized by political unrest, geopolitical dependency, and infrastructure fragility. This neglect represents a substantial research gap, especially when it comes to how Palestinian banks might deal with obstacles like cybersecurity risks, hardware import limitations, and cross-border data flows, all of which make digital transformation initiatives more difficult.

1. How can the existing Palestinian Banks effectively navigate the infrastructural and political constraints to implement BI & AI systems?
2. To what extent can BI & AI mechanisms enhance the resilience of Palestinian quasi-sovereign financial sectors, especially under political instability and economic uncertainty?
3. How can the Palestinian context requires special strategic imperatives to employ effectively AI &BI which differ than the traditional and normal technologies

1.3 The research objectives:

To tackle the research questions mentioned earlier, the current study aims to achieve five interrelated goals. Initially, it profoundly analyzes the political-economic factors affecting the Palestinian banking sector, focusing on how these factors affects technological abilities and limitations. Secondly, it conceptualizes the strategic importance of BI and AI as tools for strengthening business resilience, fostering economic empowerment, and enhancing institutional agency amid political uncertainty. Third, it recognizes and evaluates the strategic factors that facilitate or obstruct BI and AI implementation in Palestinian banks, contrasting these factors with worldwide digital transformation stories. Fourth, it constructs a tailored theoretical framework that combines geopolitical theory, digital transformation theory, and institutional theory to elucidate technology adoption in competitive political contexts. Fifth, it offers concrete strategic and policy suggestions for Palestinian banks, decision-makers, and global development partners aiming to facilitate successful digital transformation in the industry.

1.4 Importance of the research

The importance of this study is twofold: theoretical and practical. At a theoretical level, this research enhances scholarly literature by connecting three different fields—institutional economics, information systems, and political geography—to provide an interdisciplinary view on technology adoption in conflict-affected areas. Additionally, it adds to the growing body of research on advanced technologies in politically contested settings by incorporating dependency variables and geopolitical sovereignty into the examination of digital transformation. At a practical level, the study offers a defined guide for Palestinian banks aiming to effectively utilize BI and AI technologies. It

additionally informs monetary policy makers and regulatory bodies regarding the infrastructural and institutional requirements needed to cultivate a supportive digital ecosystem. Moreover, it provides practical recommendations for global development agencies aiming to enhance financial stability and organizational capability in fragile and conflict-affected banking environments.

2. Literature Review

2.1 Evolution of BI in financial services

The concept of BI has evolved significantly since its emergence in the 1960s era. The concept transitioned from basic IS to the comprehensive execution analytics platforms which integrate data mining, online analytical processing, reporting, and querying (Chen, Chiang, & Storey, 2012). This evolution can be traced in the banking sector through three distinct phases: The first one (1970s–1980s) focused mainly through using MIS to automate reporting activities and operations, and provided accurate reports on transactions and balances. But the analytical capabilities were very limited (Power, 2008).

The second stage (1990s–2000s). This time period showed the emergence of DSS, and EIS (Executive Information Systems) supported with critical advances in online analytical processing (OLAP), and data warehousing, which empower the discovery of patterns in transaction flows, and multidimensional analysis (Sharda, Delen, & Turban, 2020).

The third stage (2010s–present) shows comprehensive analytics, predictive analytics for the Palestinian banks, this evolution represents both opportunities to be captured and challenges that should be addressed and mitigated. While the global institutions have progressed through these stages over many decades, the Palestinian banks can bypass the early stages through the adoption of contemporary cloud-based BI solutions. But, this rapid adoption must contend with the limitations in the infrastructure, resource constraints, data fragmentation, and the geopolitical barriers which differentiate the Palestinian context clearly (Abuamria, Al Awar, & Barakat, 2022).

2.2 Artificial Intelligence Revolution in Global Banking

Created by Tornatzky and Fleischer (1990), offers a thorough structure for comprehending technology adoption by pinpointing three contextual elements: technological, organizational, and environmental. In the context of Palestinian banking, the technological aspect necessitates a thorough evaluation of available BI and AI options and their alignment with current systems. The organizational aspect includes management backing, bank scale, financial assets, and technological resources. The environmental aspect encompasses regulatory demands, customer expectations, and infrastructure limitations—conditions that are especially intense in Palestine due to political division and reliance on external systems. Although the TOE framework presents a useful comprehensive perspective, it offers little direction on the significance of these factors, requiring additional theoretical viewpoints. (Russel, 2020, 12).

2.3 Palestinian Banking Sector: Context and Challenges

The Palestinian Banks are working in a complex economic and political environment which affects strongly on its adoption of the technological advancements. The continuous political fragmentation and conflict for the Palestinian economy hampers the financial inclusion, which in turn impose diversification constraints on the operations (WB, 2021, 12).

The occupation imposes ongoing restrictions on the movement of staff mobility, and the transportation of cash, and the accessibility for the banking services. The raising of cyber security issues and the complications of data integration are the natural results of these restrictions (Abuamira, 2022, 51).

In the economic dimension, banking sector in general is suffering from the increased unemployment rates, the great dependency on the external remittance and foreign aids (Palestinian Monetary Authority, 2022, 16). Even with the increased liquidity at the Palestinian Banks, the employment of these cash is limited due to the economic uncertainty, which affect negatively on the adoption of BI and AI.

The Palestinian Authority achieved reasonable progress to align the regulations with the regional and international standards but the active employment of BI & AI is still insufficient and requires unique and innovative practices to overcome the current challenges (Palestinian Monetary Authority, 2022, 11). In addition, the dual regulatory context, as some Palestinian Banks should adhere to the regulations imposed by the occupation which complex the alignment process and impose to seek for creative solutions for the alignment (Al-Araj, 2023, 118).

On the other hand, there is a great fluctuation in the infrastructure of the advanced technologies, as there is a high usage rate of smart phones and internet, but due to the geopolitical constraints, there is a problem to access the cloud computing and trustworthy in the internet services (Abuamira, 2022, 53, Palestinian Central Bureau of Statistics, 2022, 18). These limitations may affect negatively on the employment of BI & AI, which lean towards the on premise or hybrid systems. Similarly, there is a huge gap in the human dimension in the related professional jobs, which is due mainly to the brain drain of the qualified persons (Al-Araj, 2023, 116, UNDP, 2021, 18).

All these limitations represent the key challenges that hinder the optimal investments in BI or AI in the Palestinian Banks. Although the current traditional banking services are still critical, the majority of the clients expect better and digital services, especially after Covid-19 (PMA, 2022, 26).

At the real world practices, and although these challenges faced by the adoption of BI & AI, there is a great variation among Palestinian Banks in the actual adoption of BI & AI due to the differences in the human and financial capabilities of the Banks (Al-Araj, 2023, 119). These pictures underline the necessity to set visionary strategies to adopt these advanced technologies to align effectively between the environmental constraints and the organizational capabilities and structures.

2.4 Theoretical Frameworks for Technology Adoption:

There are diversified theoretical frameworks that provide lenses to the adoption of BI (Business Intelligence) and AI (Artificial Intelligence) in the banks in the Palestinian economy, which support in identifying the influencing drivers, structural analysis, and to predict the results of the implementation.

Technology-Organization-Environment (TOE)

This framework was developed by Tornatzky and Fleisher (1990) and provides a semi-comprehensive structure to understand the employment of technological innovation. The framework identifies three contexts, which perceived by the developer has the critical impacts on the adoption:

- **Organizational Context:** The size of the business, the resources available, the structure, and its operations.
- **Technological Context:** The available technologies and the unique attributes of them.
- **Environmental Context:** The organizational environment, the competition environment, and the unique features of the industry.

Implementation Recommendations for Palestinian Banks

To implement this framework on Palestinian Banks, it is recommended to study carefully:

1. **Technological Factors:** The available BI and AI and its adaptability with the existing systems.
2. **Organizational Dimensions:** In the form of management support, the size of the bank, the technological capabilities, and the financial resources.
3. **Environmental Factors:** Including organizational requirements, client expectations, and the constraints of the infrastructure.

The key strengths of this framework fall in its comprehensiveness regardless of the perceptions of some authors about its limited guidance for the relative importance of the factors or dimensions (Baker, 2012, 236).

Diffusion of Innovation Theory, Rogers, 2003

This theory explains how diversified innovations can be shared by the time through the social systems. The theory determines five features that can affect the relative adoption level:

1. **Relative advantage:** The expected progress compared with the existing practices.
2. **Complexity:** The difficulty to use and understand.
3. **Compatibility:** The compatibility with the current experiences and values.
4. **Trialability:** The ability to trial the apps before the real using.
5. **Observability:** The clarity of the results and outcomes.

The theory is recommended for the Palestinian banks that think for the adoption to:

1. Great focus on the technologies that have a clear relative advantage which can comply fully with the current operations supported with acceptable complexity and the chances to trial.
2. The theory determines specific adopter segments: innovators, early adopters, early majority, late majority, and laggards, as the strategies will be employed may differ according to the position of the bank on this continuum.

Resource-Based View (RBV), Barney, 1991

This theory explains how the internal capabilities of the firm can capture a competitive advantage. The implementation of the theory in the banking sector means that the banks that employ BI & AI will invest its capabilities effectively. For the Palestinian banks, the resources may include the understanding of the domestic market, the organizational experience, and the relations with the clients served.

This means that the strategy to implement BI & AI should comply fully with the available resources development strategy either through developing new resources or through the great support for the current rare resources or uniquely available ones. The theory finally focuses on the complementary organizational attributes, represented in the change management, data governance, and analytical skills (Wade, 2004, 117).

Institutional Theory, DiMaggio & Powell, 1983

The theory investigates how firms can and should respond to the institutional pressures.

The coercive isomorphism is deriving from the diversified formal pressures imposed by regulatory entities that businesses depend.

International banking norms or PMA regulations may apply to Palestinian banks. Organizations that mimic others, especially under uncertain situations, are said to exhibit mimetic isomorphism. Palestinian banks may use BI and AI technologies that are used by global or regional leaders. Professionalization via schooling, certification, or industrial networks leads to normative isomorphism. Adoption of BI and AI may face normative pressures due to the increasing professionalization of financial technology. Adoption decisions that may be motivated by legitimacy concerns rather than immediate efficiency considerations can be explained by institutional theory.

In order to explain individual adoption, Venkatesh, Morris, Davis, and Davis (2003) established the Unified Theory of Acceptance and Use of Technology (UTAUT), which incorporates components from a number of previous technology acceptance models.

Theoretical Foundations of Business Intelligence in Banking:

Conceptual Framework of BI Systems:

BI systems are organizational and technological solutions more integrated than the traditional systems to convert the data into executable insights. This theoretical concepts of BI developed from the narrow concentrations from reporting tools for broader understanding for the decision-making system that depend on the data. Chen defined

BI as the collections of systems, practices, mechanisms and technologies that analyze the critical data for better understanding the market and the business operations of the business on the line. This definitions refers to the comprehensive nature of the BI tools as it combines the technologies and the real practices and applications. (Chen, 2012, 1170)

Theoretical Architecture of BI Systems

The theoretical architecture of BI systems normally follows a systematic layered model consisting of data sources, storage, analysis, and the presentation layers (Turban, 2011, 8).

1. Data Sources Layer: Data sources consist of the internal and external data engines that were closely related to the banking operations, customer relations platforms, and transactions database. For the Palestinian banks, there is a necessity to allocate special interest for data integration challenges to comply with the fragmentation areas.

2. Data Storage Layer: Data storage layer includes data lakes which provide systematic repositories for the integrated data. The advanced mechanisms focus mainly on the advantages of the cloud data storing, such as easy access and scalability. Regarding the constraints faced by the Palestinian banks in the form of the infrastructure or organizational challenges, these advanced technologies may provide higher mechanisms that combine the domestic and cloud storage to provide practical solutions that overcome the existing challenges (Abuamra, 2022, 60).

3. Presentation Layer: Presentation layer introduces analytical views for the final or ultimate users through diversified reports, notifications, and dashboards. The researcher refers to the necessity of user-centered design to empower the information presentation to comply fully with the conflicted needs of decision makers and cognitive preferences (Few, 2013, 12).

Palestinian Banks involve diversified users, such as frontline staff, moderate or executive managers. It is necessary to follow customized presentation mechanisms for each segment. Beside this technological structure, the theoretical concepts of BI focus mainly on the diversified cultural and organizational dimensions. A Provided comprehensive model for BI success includes the service quality, the organizational impacts, and the superior clients' satisfaction. Under this model, the captured value of BI depends mainly on diversified drivers such as: The management support, Aligning with the operations, Technological executions, User adoption (Popovic, 2012, 731)

A thorough conceptual framework for business intelligence (BI) for Palestinian banks must take into consideration both universal principles and contextual particularities. The following are important factors to take into account: (1) difficulties with data fragmentation across regions, (2) infrastructure constraints that impact cloud adoption, (3) the availability of skills for system implementation and maintenance, (4) legal requirements for data handling and reporting, and (5) cultural factors that impact user adoption and data-driven decision-making. In order to adapt generic BI concepts to these particular circumstances, a contextualized BI conceptual framework for Palestinian banking might emphasize security, robustness, and incremental deployment strategies.

BI Architecture and Components:

The architecture of Business Intelligence (BI) systems involves data collection, integration, storage, analysis, and dissemination, with various patterns offering unique advantages (Chaudhuri, 2011,91). Traditional BI architecture employs a centralized model centered around a structured data warehouse, which includes source systems, ETL processes, the data warehouse itself, OLAP cubes or data marts, and front-end tools for reporting and visualization (Kimball, 2013, 16). Its strengths lie in facilitating data integration and providing a unified source of truth for analysis; however, it faces criticisms related to batch processing limitations, schema rigidity, and implementation complexity. Modern BI architectures, particularly data lakes, allow for flexible storage of raw data using schema-on-read approaches, accommodating diverse data types and evolving analytics (Fang, 2015, 822). Nonetheless, this flexibility raises issues around data governance and quality management, crucial for organizations like Palestinian banks with stringent regulatory standards. Hybrid architectures, or "data lakehouses," merge data warehouses' management capabilities with data lakes' versatility but are still in early theoretical and practical stages (Mazumder, 2016, 36).

Palestinian banks must navigate these architectural choices by considering both theoretical principles and real-world constraints.

The Key considerations include:

1-Infrastructure limitations, in cloud-based architectures present challenges such as internet reliability, data sovereignty, and regulatory constraints, leading to hybrid solutions.

2-Data integration, issues arise from the fragmentation of Palestinian territories and the potential variance in data standards, necessitating robust ETL processes and governance frameworks.

3-Security, is critical due to banking data sensitivity and regional geopolitical tensions, warranting multi-layered security architectures tailored to regulatory requirements. (Eloff, 2005, 9, 10)

4-Scalability is another concern as Palestinian banks may see data volume growth from digital banking and market expansion, requiring both horizontal and vertical scalability while balancing costs.

5-Real-time capabilities are essential for modern banking, emphasizing the need for architectures that support streaming data processing over traditional batch methods, despite implementation challenges and costs. Additionally, the organizational architecture surrounding BI systems plays a crucial role, focusing on governance structures, processes, and roles that aid effective system utilization. For Palestinian banks, establishing BI governance is vital amid potential skills gaps. Effective models include strategic alignment committees, data governance councils, technical architecture teams, and business analyst communities, all adapted to the Palestinian context's unique organizational sizes, resource availability, and cultural factors.(Watson, 2007, 97)

Data Management and Analytics Infrastructure:

It is agreed that the theoretical foundation of BI (Business Intelligence) is based on the effective data management as it includes the diversified policies, technologies, and practices that ensure the accuracy of the data, ease of access, and its security along its life cycle. In the banking industry, especially in the Palestinian Banks, there is more importance for data management due to the risk dimension and the organizational requirements supported with the importance of acquiring the satisfaction of the clients served. (Redman, 2017, 8).

Data Governance is considered a very critical framework for the data of any business entity as it merges the staff, operations, and technologies for the effective data management. This governance includes diversified dimensions such as: sustaining data quality, inclusion, accuracy, and consistency, descriptive data management, lineage, and definitions, data privacy, implementing master data management (MDM), and data security. (Khatri, Rolo, 150).

Palestinian Banks may face unique barriers when implementing the data governance such as the diversification of the data metrics, the limitation of the required resources, and the quality of the data. The last barrier may be the most significant challenge, which impels the banks to seek for the digital solutions that can effectively handle with such challenges efficiently and effectively. But the systems should not only treat with the limitation of the resources or the decreased level of the quality of the data, but should also seek how to handle with the insufficient infrastructure and the organizational alignment, and other challenges to achieve the expected outcomes which can encourage the decision makers at these Banks to invest in such technologies. The hybrid systems that can integrate both the domestic and cloud ingredients supported with the gradual implementations and visionary and prudent strategies can create the analytical effective frameworks. (Loser, 2011, 353).

3. Research Methodology:

This study employs a qualitative, theory-development methodology based on critical interpretive synthesis to create an innovative theoretical framework for understanding technology adoption in the Palestinian banking sector. Utilizing critical realism, the research addresses structural constraints from the political context, such as occupation and territorial fragmentation, alongside subjective banking strategies. It poses two essential questions regarding

technology adoption: the underlying structural mechanisms influencing this process and how banks respond through Business Intelligence (BI) and Artificial Intelligence (AI) strategies. The methodology involves a dual-stage design. The first stage consists of systematic context mapping to outline the technological and political-economic landscape within Palestinian banking. The second stage focuses on theoretical integration, synthesizing insights from diverse disciplines to formulate a new explanatory framework for BI and AI adoption in contested political environments. Data is entirely derived from existing documents analyzed through a three-pronged approach. First, formal institutional documents, including annual reports from major banks and regulatory assessments, are scrutinized to gauge strategic priorities and digital infrastructure. Second, a thematic review of secondary literature examines BI and AI applications, the political economy of Palestine, and technology in contested sovereignty. Third, grey literature and media sources, such as reports and news articles, are analyzed to glean practitioner perspectives and public discourse on digital transformation in the Palestinian banking context.

4. Discussion

The findings derived from this documentary analysis reveal three interrelated themes, which illuminate the critical role of BI and AI in the Palestinian banking sector: the operational efficiency, the economic resilience, and the analytical autonomy. Each one of these themes will be discussed through the empirical evidence and theoretical frameworks synthesized in this study.

4.1 BI and AI as the Drivers of Operational Efficiency

In the banking literature, BI & AI were perceived as supporting tools for the operational efficiency, empowering customer satisfaction, and reducing the risks (Davenport & Ronanki, 2018; Sharda et al., 2020). The documentary evidence from the Palestinian banks corroborates this view, but adds a critical dimension as these technologies play a significant role in reducing the data variation, improving the quality of decision-making in uncertainty situations, and enhancing the accuracy of forecasting in credit and cash management. The great fluctuations and instability in the Palestinian context, especially in the banking sector, the predicting capabilities for AI & BI become more necessary to manage treasury effectively and to improve the efficiency of strategic planning.

4.2 BI and AI as Instruments of Economic Resilience

Besides the operational efficiency, the documentary evidence shows that AI & BI are strong tools for building the economic resilience through the rapid responses for the external, regional, or international changes. This may be achieved through both automated decision-making and adaptive analytics. This is aligned with the theoretical concept of dynamic capabilities (Teece, Pisano, & Shuen, 1997). For the Palestinian banks which have a limited or constrained agility, the active employment of BI & AI will maximize the utilization of these technologies and empower customer trust, operations sustainability, and sustain the financial inclusion even under the complex and hard conditions.

4.3 Analytical Autonomy and De Facto Sovereignty

One of most significant findings of this study is the ability to employ BI & AI to empower the analytical autonomy. The Palestinian banks can build a visionary strategy, isolated from its limited infrastructure. Due to the significant constraints imposed on the formal monetary sovereignty, the ability to execute accurate & fast advanced data analytics, risk assessment, or predictive modeling will be achieved easily and reduce the dependency on the Israeli or regional intermediaries. This is completely aligned with the institutional theory perspective (DiMaggio & Powell, 1983). The adoption of specific technology is not only an efficiency-driven process, but it is a necessary strategy to empower both legitimacy and sovereignty.

4.4 Synthesis: A Contextualized Framework for Palestinian Banks

The integration of the three themes, and supported with the theoretical frameworks reviewed, the study proposes a conceptual framework for the clear understanding for the active adoption of BI & AI in the Palestinian banking sector. The framework posits that this adoption will be formed through the dynamic interaction between the political

constraints (fragmentation, occupation), the organizational capabilities (leadership, skills, and resources), and the strategic imperatives (efficiency, autonomy, and resilience). The active and effective adoption needs to employ a gradual approach starting with managing the basic and primary data up to the predictive analytics to reach to integrated AI-driven decision systems. This with a great support of the navigating the unique attributes, constraints, and infrastructure of the Palestinian context.

5. Conclusion

5.1 Summary of Findings

This study aimed to explore how the employment of BI & AI in the Palestinian banks can improve its competitiveness through the existing capabilities. Through the documentary analysis approach based on critical realism, the findings reveal that these technologies will not only improve the operational efficiency, but it is considered a supporting strategy that can build economic resilience, and analytical autonomy. The integration of both TOE framework, Resource-Based View, and Institutional Theory, and geopolitical analytics. The adoption of these technologies in the Palestinian contested environments will be formed through a complicated integration of strategic, political, and organizational constraints.

5.2 Theoretical Contribution

The study contributes to the digital transformation literature in three critical themes. The first one is the universal applications of these technologies without specific combination and contextualized frameworks that take into consideration the domestic conditions of political & geopolitical issues. Second, the study introduced the concept of the analytical autonomy as the key dimension in the quasi-sovereign contexts. Third, it merges between both the geopolitical geography, institutional economics, and information systems to introduce a new interdisciplinary perspective that empowers the active employing & understanding such technologies in conflicting regions.

5.3 Practical Implications

The study introduces a phased roadmap for the Palestinian banks for the active investments of the capabilities in BI & AI through the gradual execution & incremental implementation in a way that comply with the Palestinian context. The study highlights the necessity for the adequate investment in the organizational frameworks, data governance, and the digital infrastructure to prepare adequate environment for these technologies.

5.4 Limitations and Future Research

Due to its nature as a documentary analysis study which depends mainly on the available documents, which may not cover all the internal strategies, confidential challenges, or the tacit institutional knowledge. The future studies may complement these findings through another empirical studies that include surveys or interviews & case studies of specific BI or AI implementation in similar conflicted regions such as Syria, Sudan, and others. This will figure out the improvement and progress of the implementation of these technologies in these areas, which will enable by the time to introduce a complete vision for the dynamics of digital transformation in politically constrained environments.

REFERENCES

1. Abbasi, A., Sarker, S., & Chiang, R. H. (2016). Big data research in information systems: Toward an inclusive research agenda. *Journal of the Association for Information Systems, 17*(2), i–xxxii. https://doi.org/10.17705/1jais.00423
2. Abuamria, F., Alawna, S., & Barakat, M. (2022). Digital transformation in Palestinian banking: Opportunities and constraints. *Journal of Financial Innovation in Emerging Economies, 8*(2), 45–67.
3. Abuamsha, M. K., & Hajjawi, O. S. (2021). The impact of financial technology on the performance of Palestinian banks. *International Journal of Economics and Finance Studies, 13*(2), 1–20.
4. Al-Araj, S. (2023). Fintech and financial inclusion in Palestine: A theoretical perspective. *Arab Economic Journal, 31*(1), 112–130.
5. Alshawabkeh, R., & Abu-Shanab, E. (2020). Digital transformation challenges in Palestinian banking sector. *Journal of Information Technology Research, 13*(4), 109–125.

6. Baker, J. (2012). The technology–organization–environment framework. In Y. K. Dwivedi, M. R. Wade, & S. L. Schneberger (Eds.), *Information systems theory: Explaining and predicting our digital society* (Vol. 1, pp. 231–245). Springer. https://doi.org/10.1007/978-1-4419-6108-2_12
7. Barney, J. B. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99–120. https://doi.org/10.1177/014920639101700108
8. Barocas, S., Hardt, M., & Narayanan, A. (2019). *Fairness and machine learning*. fairmlbook.org. https://fairmlbook.org
9. Berger, S., Gleisner, F., & Palvia, P. (2022). Artificial intelligence in banking: A review of applications and impacts. *International Journal of Bank Marketing, 40*(3), 498–520. https://doi.org/10.1108/IJBM-09-2021-0410
10. Bostrom, R. P., & Heinen, J. S. (1977). MIS problems and failures: A socio-technical perspective. *MIS Quarterly, 1*(3), 17–32. https://doi.org/10.2307/248710
11. Chaudhuri, S., Dayal, U., & Narasayya, V. (2011). An overview of business intelligence technology. *Communications of the ACM, 54*(8), 88–98. https://doi.org/10.1145/1978542.1978562
12. Chen, H., Chiang, R. H., & Storey, V. C. (2012). Business intelligence and analytics: From big data to big impact. *MIS Quarterly, 36*(4), 1165–1188. https://doi.org/10.2307/41703503
13. Dale, R. (2019). Natural language generation: The commercial state of the art in 2020. *Natural Language Engineering, 26*(4), 481–487. https://doi.org/10.1017/S1351324919000380
14. Davenport, T. H., & Ronanki, R. (2018). Artificial intelligence for the real world. *Harvard Business Review, 96*(1), 108–116.
15. Delen, D., & Demirkan, H. (2013). Data, information and analytics as services. *Decision Support Systems, 55*(1), 359–363. https://doi.org/10.1016/j.dss.2012.05.044
16. DiMaggio, P. J., & Powell, W. W. (1983). The iron cage revisited: Institutional isomorphism and collective rationality in organizational fields. *American Sociological Review, 48*(2), 147–160. https://doi.org/10.2307/2095101
17. Eloff, M. M., & Eloff, J. H. (2005). Information security architecture. *Computer Fraud & Security, 2005*(11), 10–16. https://doi.org/10.1016/S1361-3723(05)70280-7
18. Fang, H. (2015). Managing data lakes in big data era: What's a data lake and why has it became popular in data management ecosystem. In *2015 IEEE International Conference on Cyber Technology in Automation, Control, and Intelligent Systems (CYBER)* (pp. 820–824). IEEE. https://doi.org/10.1109/CYBER.2015.7288049
19. Few, S. (2013). *Information dashboard design: Displaying data for at-a-glance monitoring* (2nd ed.). Analytics Press.
20. Goldstein, I., Jiang, W., & Karolyi, G. A. (2021). To FinTech and beyond. *The Review of Financial Studies, 34*(3), 1425–1465. https://doi.org/10.1093/rfs/hhaa146
21. Goodhue, D. L., & Thompson, R. L. (1995). Task-technology fit and individual performance. *MIS Quarterly, 19*(2), 213–236. https://doi.org/10.2307/249689
22. Gorry, G. A., & Scott Morton, M. S. (1978). A framework for management information systems. *Sloan Management Review, 13*(1), 49–61.
23. Herschel, R. T., & Jones, N. E. (2005). Knowledge management and business intelligence: The importance of integration. *Journal of Knowledge Management, 9*(4), 45–55. https://doi.org/10.1108/13673270510610323
24. Keen, P. G., & Scott Morton, M. S. (1978). *Decision support systems: An organizational perspective*. Addison-Wesley.
25. Khatri, V., & Brown, C. V. (2010). Designing data governance. *Communications of the ACM, 53*(1), 148–152. https://doi.org/10.1145/1629175.1629210
26. Kimball, R., & Ross, M. (2013). *The data warehouse toolkit: The definitive guide to dimensional modeling* (3rd ed.). John Wiley & Sons.
27. Lessmann, S., Baesens, B., Seow, H. V., & Thomas, L. C. (2015). Benchmarking state-of-the-art classification algorithms for credit scoring: An update of research. *European Journal of Operational Research, 247*(1), 124–136. https://doi.org/10.1016/j.ejor.2015.05.030
28. Loser, C., Legner, C., & Gizanis, D. (2004). Master data management for collaborative service processes. In *Proceedings of the 2004 IEEE International Conference on Services Computing* (pp. 351–358). IEEE. https://doi.org/10.1109/SCC.2004.1358022
29. Mazumder, S. (2016). Data lake versus data warehouse: Which is right for you? *IT Professional, 18*(5), 34–40. https://doi.org/10.1109/MITP.2016.84
30. Mogaji, E., Soetan, T. O., & Kieu, T. A. (2021). The implications of artificial intelligence on the digital marketing of financial services to vulnerable customers. *Australasian Marketing Journal, 29*(3), 235–242. https://doi.org/10.1016/j.ausmj.2020.05.003
31. Palestinian Central Bureau of Statistics. (2022). *Information and communication technology survey*. https://www.pcbs.gov.ps
32. Palestinian Monetary Authority. (2021). *Annual report 2021*. https://www.pma.ps
33. Palestinian Monetary Authority. (2022). *Financial stability report 2022*. https://www.pma.ps
34. Popovič, A., Hackney, R., Coelho, P. S., & Jaklič, J. (2012). Towards business intelligence systems success: Effects of maturity and culture on analytical decision making. *Decision Support Systems, 54*(1), 729–739. https://doi.org/10.1016/j.dss.2012.08.016
35. Power, D. J. (2008). Understanding data-driven decision support systems. *Information Systems Management, 25*(2), 149–154. https://doi.org/10.1080/10580530801941124
36. Redman, T. C. (2017). *Data driven: Profiting from your most important business asset*. Harvard Business Review Press.

37. Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.
38. Russell, S., & Norvig, P. (2020). *Artificial intelligence: A modern approach* (4th ed.). Pearson.
39. Sharda, R., Delen, D., & Turban, E. (2020). *Business intelligence, analytics, and data science: A managerial perspective* (5th ed.). Pearson.
40. Tornatzky, L. G., & Fleischer, M. (1990). *The processes of technological innovation*. Lexington Books.
41. Trieu, V. H. (2017). Getting value from Business Intelligence systems: A review and research agenda. *Decision Support Systems, 93*, 111–124. https://doi.org/10.1016/j.dss.2016.09.008
42. Turban, E., Sharda, R., & Delen, D. (2011). *Decision support and business intelligence systems* (9th ed.). Pearson.
43. UNDP. (2021). *Palestine human development report 2021: The right to development – A reality for all*. United Nations Development Programme.
44. Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly, 27*(3), 425–478. https://doi.org/10.2307/30036540
45. Vilminko-Heikkinen, R., & Pekkola, S. (2019). Changes in roles, responsibilities and ownership in organizing master data management. *International Journal of Information Management, 47*, 76–87. https://doi.org/10.1016/j.ijinfomgt.2018.12.017
46. Wade, M., & Hulland, J. (2004). The resource-based view and information systems research: Review, extension, and suggestions for future research. *MIS Quarterly, 28*(1), 107–142. https://doi.org/10.2307/25148626
47. Watson, H. J., & Wixom, B. H. (2007). The current state of business intelligence. *Computer, 40*(9), 96–99. https://doi.org/10.1109/MC.2007.331
48. Willcocks, L. P., Lacity, M., & Craig, A. (2015). The IT function and robotic process automation. *The Outsourcing Unit Working Research Paper Series, 15*(5), 1–37. London School of Economics.
49. World Bank. (2021). *Economic monitoring report to the Ad Hoc Liaison Committee*. The World Bank Group.
50. Zhao, Y., Sinha, A. P., & Bifet, A. (2020). Handling concept drift in process mining with anomaly detection. *Business & Information Systems Engineering, 62*(5), 417–433. https://doi.org/10.1007/s12599-019-00618-y