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CASE STUDY RESEARCH PAPER

Designing an Applied Artificial Intelligence Model for Developing Support Services at Rafidain Bank Branches in Iraq

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ABSTRACT

Given the expanding role of digital technologies and the increasing significance of AI in enhancing operational efficiency and service quality within the banking sector, the purposeful application of these technologies can substantially improve productivity, accelerate service delivery processes, and increase customer satisfaction. Accordingly, this research was conducted with the goal of identifying key influencing factors and presenting an applied model for AI-based support service development at Rafidain Bank in Iraq. This study is applied in terms of purpose and adopts a mixed-methods research design. In the qualitative phase, data were collected through semi-structured interviews with 15 experts in banking, information technology, and artificial intelligence. Qualitative data were analyzed using Grounded Theory through coding stages, with MAXQDA software employed for data organization. The qualitative phase yielded a conceptual model comprising causal conditions, contextual conditions, intervening conditions, the core phenomenon, strategies, and consequences. In the quantitative phase, the statistical population comprised employees and managers of Rafidain Bank branches. A sample of 384 participants was selected using simple random sampling based on Cochran's formula. The data collection instrument was a researcher-developed questionnaire derived from qualitative phase components. Structural Equation Modeling using Partial Least Squares (PLS-SEM) was employed for hypothesis testing, with analyses conducted in SPSS and SmartPLS software. Findings revealed that causal, contextual, and intervening conditions exert a significant positive effect on the core phenomenon of AI-based support service development. The proposed strategies yield outcomes including enhanced operational productivity, improved banking service quality, reduced human error, and elevated customer satisfaction. Model evaluation results demonstrate adequate fit and strong explanatory power.

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INTRODUCTION

The rapid proliferation of intelligent information systems and their attendant challenges across all domains of contemporary life have compelled nations and institutions alike to equip themselves with the most advanced technologies and smart applications, thereby aligning their strategic frameworks with the transformative demands of artificial intelligence a paradigm now reshaping the very landscape of computing (Raiter, 2021). Given the pivotal role of the banking sector as the cornerstone of national development, and the relentless technological advances permeating every dimension of the modern business environment, banks of all types have been impelled to embrace these innovations. The banking sector has consequently been obliged to transition from traditional methodologies toward modern technological approaches, thereby enhancing operational efficiency in alignment with global technological progress (Abu Bakr Khawad et al., 2019). To remain abreast of these rapid transformations, the banking industry has come to regard AI applications as an indispensable competitive differentiator one that enables the delivery of superior banking services meeting the evolving needs and expectations of customers (Hesham et al., 2020). Many banks have relied heavily on AI strategies integrated into various banking services to achieve customer satisfaction and attract new clientele. Notable examples include Ally Bank in the United States, which introduced an AI-powered chatbot to respond to customer messages and requests, while numerous other major US banks and institutions across diverse countries have similarly adopted AI technologies. Consequently, investment in AI-related banking technologies has surged and is expected to continue its significant upward trajectory, primarily driven by the fundamental shifts these technologies have catalyzed in the patterns of customer interaction with the banking sector (Seifollahi et al., 2020). With respect to the banking sector's contribution to national

economic growth, the efficiency and effectiveness of a banking system and the quality of its financial products serve as meaningful gauges of the degree of economic advancement in any given society. Given the accelerating advances in financial technology and artificial intelligence, Rafidain Bank branches in Iraq face considerable challenges in developing and improving their support services to meet customer needs and deliver a superior banking experience. The core problem lies in the insufficient utilization of modern AI technologies to enhance operations and offer innovative services that meet customer expectations. This study therefore aims to design an applied model that leverages AI technologies to improve operational efficiency, deliver differentiated services, and strengthen security and privacy thereby advancing support service development at Rafidain Bank and achieving higher levels of customer satisfaction.

MATERIALS AND METHODS

Artificial Intelligence in the Banking System

The adoption and implementation of technological innovations in financial institutions is a complex process requiring multidimensional understanding of organizational and cross-sectoral variables. In this regard, the Technology–Organization–Environment (TOE) framework, first articulated by Tornatzky and Fleischer (1990), stands as one of the most robust theoretical pillars in the analysis of digital transformation. This model rests on the principle that success in deploying emerging technologies is not merely a product of technical attributes, but rather the outcome of the interplay among three pivotal dimensions: first, the technology dimension, referring to characteristics such as relative advantage, compatibility, and complexity; second, the organizational dimension, encompassing components such as top management support, innovation culture, and infrastructural readiness; and third, the environmental dimension, addressing competitive pressures, regulatory requirements, and stakeholder expecta-

tions (Borhani & Estakhrifer, 2023). Within the banking industry, this framework enables more precise analysis of how intelligent systems may be integrated into support services, since even the most advanced AI algorithms are destined to fail without appropriate organizational maturity and enabling regulatory conditions (Arjun et al., 2021). A review of recent research reveals a broad paradigmatic shift toward leveraging AI to attain competitive advantage. In studies conducted within the regional banking context, Naghma Abdul Amir and Hussein Kalor (2025), examining the experience of Al-Rafidain Bank, found that AI significantly increases banks' market share through cost optimization and marketing capability development. This finding aligns with the results of Al-Issawi (2024), who demonstrated that AI applications at First Iraq Bank (FIB) not only enhance financial reporting transparency but also minimize operational risks by reducing human error. Meanwhile, Sara Abdulridha Al-Lahaibi (2024) emphasizes the mediating role of AI in marketing performance, arguing that weak marketing performance in public-sector banks is rooted in inadequate adoption of intelligent technologies. Other scholars have focused on behavioral and qualitative dimensions: Inas Jamal Al-Safarini (2024) and Huda Buhniq (2024) confirm AI's positive impact on service quality while advocating for rigorous regulations to build customer trust and the integration of robotic systems into Customer Relationship Management (CRM). At the international level, broad consensus prevails among researchers regarding the transformative functions of AI. Hamid and Noor (2024), focusing on risk management, identify machine learning as a vital tool for predicting loan defaults and reducing credit risk in Iraqi banks. Naga Simhadri Aparao Polerdi (2024) contends that AI and ML are redefining the entire financial ecosystem, with human replacement in sensitive tasks such as risk assessment and quantitative trading appearing inevitable. Madhi et al. (2024) describe AI as the primary driver of a digital services rev-

olution at Rafidain and Rashid Banks. Notwithstanding these advances, challenges such as data privacy, algorithmic bias, and ethical concerns persist as significant obstacles (Ben Aycha et al., 2024). In sum, while the existing literature abundantly addresses AI's general effects on financial efficiency and service quality (Hunt, 2020; Johnson et al., 2020), a conspicuous research gap remains in the design of indigenous, applied models for branch-level support services particularly in government-owned banks. Most prior studies, including those of Krouch et al. (2020) and Al-Toumi (2017), have focused on the broader information technology context with scant attention to providing an integrated operational framework grounded in the TOE model for AI implementation. Future research must therefore adopt a systemic perspective that integrates organizational and environmental variables to chart a more precise strategy for digital transformation within bank support units.

Methodology

The success of any scientific inquiry depends on meticulous planning and systematic guidance toward its stated objectives. This research, designed to develop an applied AI model for improving support services at Rafidain Bank branches in Iraq, is classified as "applied" in terms of purpose, since its primary focus is on resolving practical challenges and improving operational processes through the provision of an indigenous, industry-grounded model. In terms of nature and method, the study employs a "qualitative and exploratory" approach guided by the Grounded Theory strategy. This approach was selected in response to existing theoretical gaps in the application of AI within Iraq's banking structure, allowing the researcher to extract dimensions, components, and inter-phenomena relationships grounded in the lived experiences and perceptions of experts, rather than imposing pre-established Western models. The statistical population in the qualitative phase

comprised senior managers, support service specialists at Rafidain Bank branches, and IT and AI professionals with relevant expertise in the banking system. Participants were selected through purposive sampling, with inclusion criteria including a minimum of five years of specialized experience and demonstrated knowledge of digital developments. Engagement with these experts was conducted through in-depth semi-structured interviews, continuing until theoretical saturation was achieved: after 15 interviews, no new data emerged that would alter existing categories or reveal new dimensions. All sessions were recorded with informed consent and transcribed verbatim to serve as raw material for the coding process. Qualitative data analysis was conducted in accordance with the systematic Strauss and Corbin (1998) model across three main stages open, axial, and selective coding MAXQDA specialized software. In the open coding stage, interview texts were disaggregated into the smallest meaningful units to extract initial concepts. In the axial coding stage, these concepts were categorized by semantic affinity and the relationships among them were elucidated within the paradigmatic model framework (encompassing causal conditions, contextual conditions, intervening conditions, strategies, and consequences). In the selective coding stage, all findings were integrated through identification of the core phenomenon, culminating in the final conceptual model. This iterative process between data and theory yielded an indigenous model that, unlike quantitative hypothesis-driven approaches, achieves maximum alignment with the environmental conditions and operational needs of Iraqi banks on their path toward digital transformation. To safeguard the authenticity of findings and ensure research quality, the four criteria of Lincoln and Guba, credibility, dependability, confirmability, and transferability were applied as qualitative-paradigm equivalents of validity and reliability. Credibility was achieved through member checking, whereby extracted

results were reviewed and confirmed by participating experts. Dependability was ensured by meticulously documenting all coding stages and researcher decision-making processes to enable external audit. To strengthen reliability, a subset of interviews was independently coded by a second researcher, and inter-coder agreement rates were calculated to confirm analytical consistency. Finally, through rich description of the research context and sample characteristics, transferability of findings to analogous settings was maximized, producing a model that may serve as a strategic reference document for banking industry policymakers. In the quantitative phase, the statistical population consisted of employees and managers of Rafidain Bank branches in Iraq. A sample of 384 participants was selected using simple random sampling based on Cochran's formula. The data collection instrument was a researcher-developed questionnaire derived from components identified in the qualitative phase. Structural Equation Modeling with Partial Least Squares (PLS-SEM) was used for hypothesis testing, with analyses performed in SPSS version 27 and SmartPLS version 3.

DISCUSSION AND FINDINGS

Qualitative Phase Results: Axial Coding

In the qualitative data analysis process, secondary and axial coding was performed to systematically organize concepts extracted from interviews and specialized texts. Based on open coding results, multiple concepts were consolidated into eleven primary categories, each representing a macro-dimension of AI application in Iraq's banking support system. These categories, clustered into five conceptual groups, reflect causal, contextual, and strategic interrelationships among the constituent elements of the proposed model. (Tab. 1)

Causal Conditions

Causal conditions represent the ensemble of requirements, obligations, and prerequisites gov-

erning the implementation of the subject matter under study. These conditions serve as the foundation for analysis, decision-making, and

performance evaluation, and their fulfillment is indispensable to achieving the expected outcomes. (Tab. 2 and Fig. 1)

Table 1: Axial Coding and Category Determination

No.	Category (Axial Coding)	Open Coding
1	Causal Conditions	Operational pressures to improve services Drivers motivating AI adoption
2	Contextual Conditions	Current state of support services Enabling contexts at Rafidain Bank
3	Intervening Conditions	Organizational facilitating factors for transformation Barriers and limitations
4	Strategies	Proposed strategies
5	Consequences	Consequences of AI implementation

Table 2: Causal Conditions

No.	Category	Open Codes
1	Operational pressures to improve services	Customer dissatisfaction with services; Competitive pressure to improve services; Innovation necessity to retain customers; Rapid growth of digital technologies; Rising customer expectations; Growth in banking data volume; Pressure to reduce operational costs; Intensified competition in financial markets
2	Drivers motivating AI adoption	Growth in number of bank customers; Data capacity for AI development; Need to formulate digital strategy; Economic incentive for AI use; Analytical value of customer data; Increased transaction volume; Increasing complexity of financial services; Growing demand for digital services; Digital banking growth; Necessity of intelligent technology; Increased branch visits during peak hours; Need for intelligent management tools; Need for digital training; Importance of reducing operational costs; Role of digital transformation in AI adoption; Necessity of change management; Training role; Orientation toward new technologies; Competitive advantage through technology

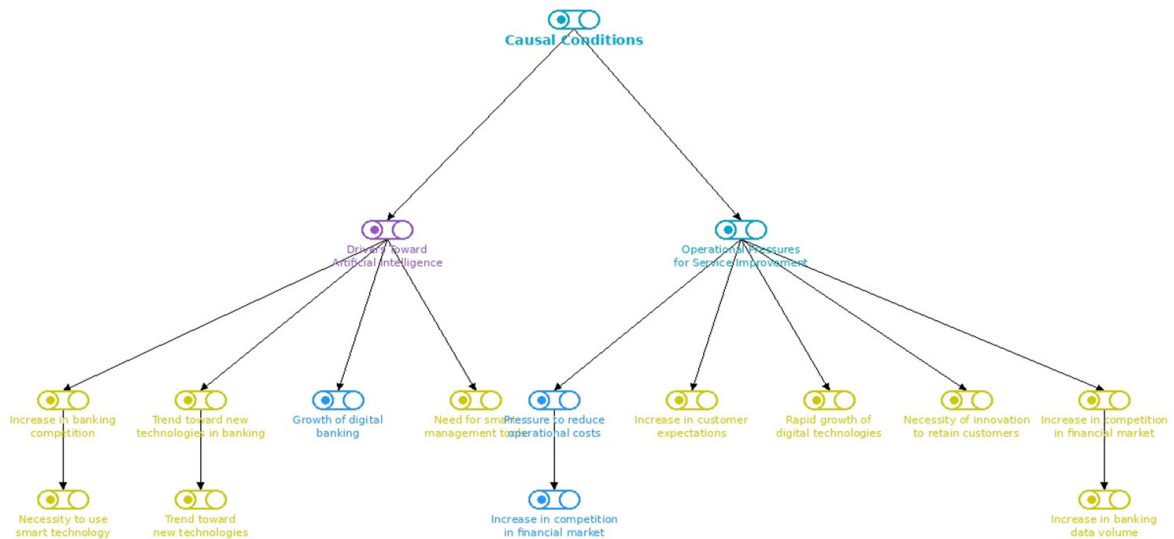


Figure 1: Causal Conditions

Core Phenomenon

The core phenomenon in this research is "AI-based Support Service Development at Rafidain Bank." This constitutes the central focus around

which all other categories causal, contextual, intervening, strategic, and consequential are organized and interrelated. (Tab. 3 and Fig. 2)

Table 3: Core Phenomenon

No.	Category	Open Codes
1	Development of bank support services using AI	Role of AI digital assistant; Rapid customer information retrieval; Fast data presentation and analysis; Intelligent request management; Intelligent data analysis capability; Intelligent recommendations; Smart response capability; Customer needs prediction; Precise AI responses; Accelerated response via AI; Improved response quality; Improved customer interaction quality; AI as employee support tool; Strengthened data management; Increased employee productivity; Automation of simple repetitive processes; Role of individual skills in service quality; Personalization of banking services; Use of AI algorithms for decision-making; Identification of customer behavioral patterns; Diversification of banking services; Use of chatbots in banking services

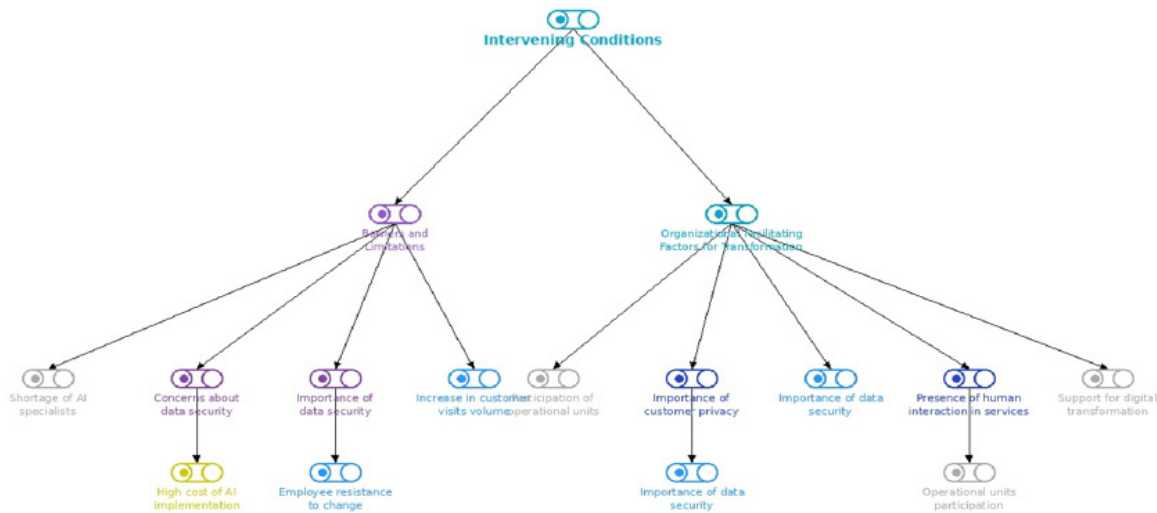


Figure 2: Core Phenomenon

Intervening Conditions (Micro-Environment)

Intervening conditions denote events that alter the intensity of causal conditions' influence. These conditions emerge in a contingent and unexpected manner, and responses to them are similarly contingent and context-dependent. Intervening conditions explain why some actors

repeat an experience multiple times while others engage with it only once. They constitute the micro-environment the structural conditions inherent to the phenomenon and affect the action/interaction strategies of that phenomenon. (Tab. 4 and Fig. 3)

Table 4: Intervening Conditions

No.	Category	Open Codes
1	Organizational facilitating factors for transformation	Existence of human interaction in services; Privacy preservation importance; Participation of operational units; Data security importance; Management support for digital transformation

2	Barriers and limitations	Difficulty accessing customer information; Increased volume of customer visits; Employee resistance to change; Employee concerns regarding technology; Weak information coordination across branches; Reduced response speed; Employee focus on complex issues; Complexity of banking services; Employee unfamiliarity with technology; High implementation costs of AI; Data security concerns; Shortage of AI specialists
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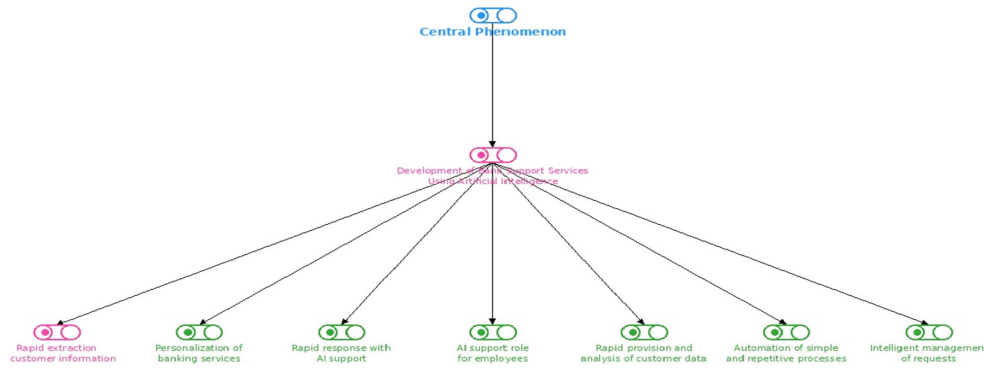


Figure 3: Intervening Conditions

Contextual Conditions (Macro-Environment)

Contextual conditions constitute a specific set of characteristics pertaining to the phenomenon under study, providing the backdrop against which it unfolds and exerting influence on be-

haviors and actions. These are stable patterns intertwined with particular times and places, giving rise to a set of situations within which actors and organizations respond. (Tab. 5 and Fig. 4)

Table 5: Contextual Conditions (Macro-Environment)

No.	Category	Open Codes
1	Current state of support services	Lack of information system integration; Fluctuating service accuracy; Difficulty implementing technology in branches; Central role of employees in services; Queue formation in branches; Need for data integration; Weak data management; Impact of congestion on service quality; Digital maturity evaluation; Absence of intelligent systems; Dependency on employee experience; Traditional nature of support services; Non-uniformity of service quality; Instability of customer experience; Increased employee workload; Extended wait times during peak hours; Dependency on in-person visits; Manual execution of most operations
2	Enabling contexts at Rafidain Bank	Need to update systems; Instability of service speed; Use of banking database; Existing banking network infrastructure; Inequality of branch technology infrastructure; AI-exploitable data capacity; Employee skill dependency; Branch access to digital systems; Slow customer information access; Analytical exploitability of data; Existing IT infrastructure; Financial sector technology transformation; Direct employee-customer interaction; Existing organizational information systems; E-banking infrastructure; Capacity for AI model development from banking data; Digital transformation capacity; Prior experience with new technologies; Inter-branch communication network; Extensive transactional data; Customer information data; Customer database; Relative AI infrastructure readiness

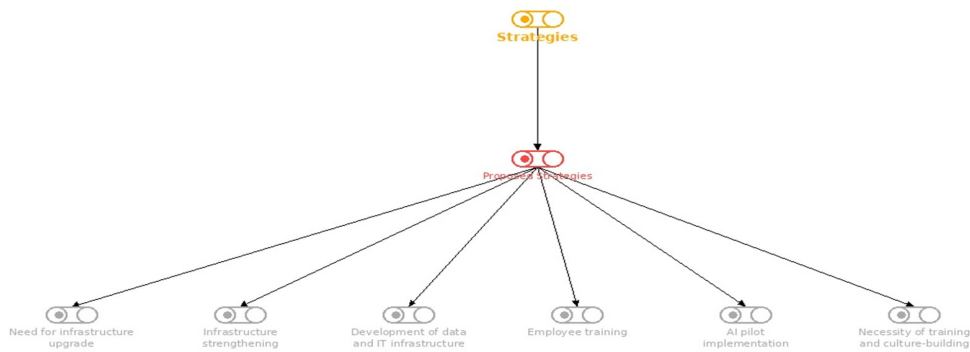


Figure 4: Contextual Conditions

Strategies

Strategies generally represent responses that lead to problem resolution. Based on interview analysis, the proposed strategies for AI-based

support service development at Rafidain Bank are presented in the following table. (Tab. 6 and Fig. 5)

Table 6: Strategies for Support Service Development

No.	Category	Open Codes
1	Proposed strategies	Business process reengineering; Creating integrated data infrastructure; Defining AI's strategic position; Using data analysis specialists; Phased system development; Service process analysis; Identifying processes amenable to intelligent automation; Investment in data infrastructure; System evaluation and correction; Management role in technology implementation; Use of specialized consultants; Data analysis utilization; Pilot evaluation; Process improvement through pilots; Necessity of AI implementation planning; Development of analytical systems; Tailoring AI solutions to processes; Necessity of technology policy-making; Support service needs assessment; Need to upgrade technology infrastructure; Need to strengthen data management; Need to upgrade data systems; Employee training and culture-building; Assessment of bank's technology readiness; Necessity of managing implementation challenges; Redesign of support service processes; Phased project execution; Necessity of formulating AI strategy; Risk reduction via pilot implementation; Pilot AI execution; Data infrastructure strengthening; Formation of specialized technology team; Collaboration with technology companies; Employee training; Development of digital skills; Development of data and IT infrastructure

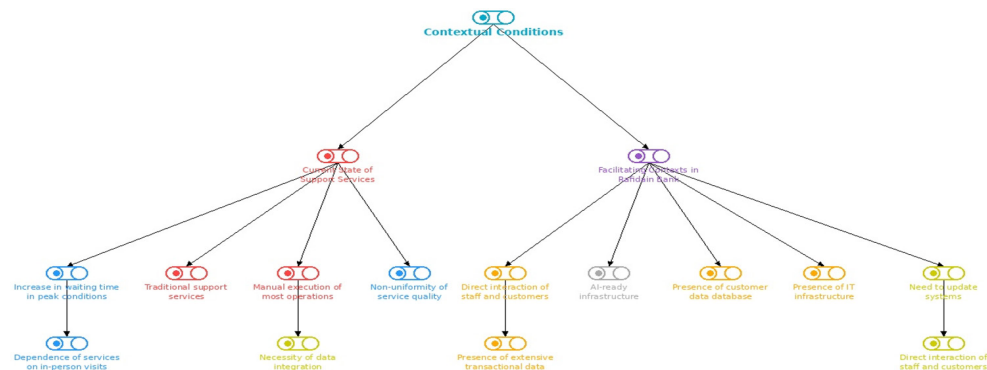


Figure 5: Strategies

Consequences

Table 7: Consequences of AI Application in Support Service Development

No.	Category	Open Codes
1	Consequences of AI implementation	Elimination of employee repetitive tasks; Increased operational productivity; Reduced need for in-person visits; Reduced branch congestion; Decreased employee workload; Attraction of new customers; Accelerated information retrieval; Expansion of electronic banking; Accelerated support services; Reduction of human error; Improved banking service quality; Customer satisfaction improvement; Competitive advantage enhancement; Service personalization; Predictive customer service

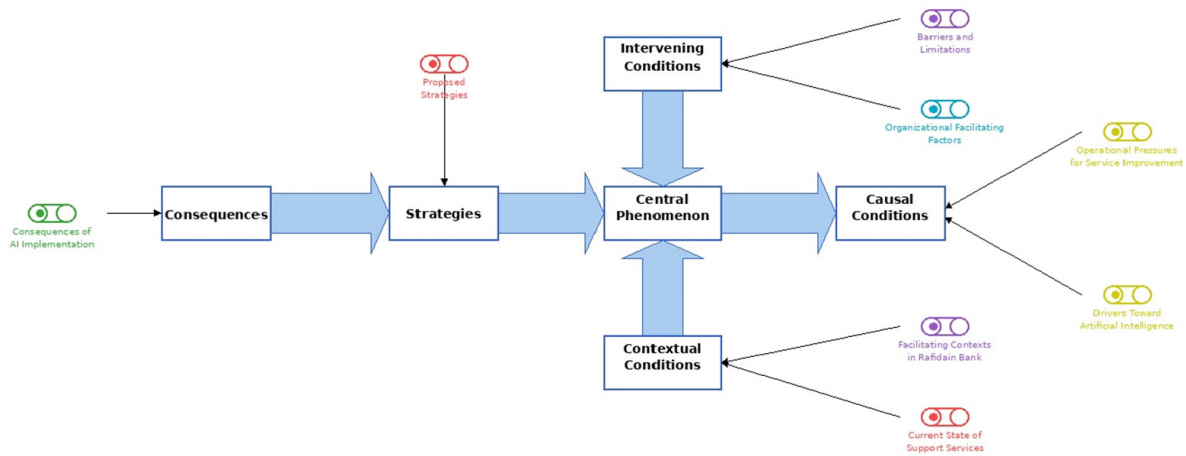


Figure 6: Consequences Strategies

Paradigmatic Model

Per Creswell (2005), a grounded theorist may present their theory in three possible forms: as a diagram, as a narrative/story, or as a set of propositions. In this study, the exploratory model is presented both as a diagram and as a narrative. The paradigmatic model illustrates the flow of

processes and activities occurring within the study context, and constitutes one of the main pillars of Grounded Theory (the Strauss and Corbin method). This model comprises causal conditions, contextual conditions, intervening conditions, the core category, strategies, and consequences. (Fig. 7)

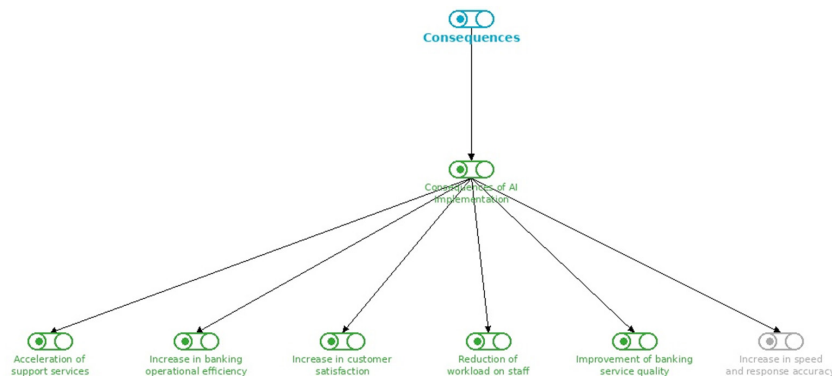


Figure 7: AI Application Model in Rafidain Bank Support Services

Quantitative Phase Results

Data analysis is of paramount importance for examining the validity of research hypotheses. In this chapter, raw data collected via the research instrument are analyzed using SPSS ver-

sion 27 and SmartPLS version 3, and the results are presented as processed information. This chapter encompasses two sections: descriptive statistics and inferential statistics. (Tab. 8)

Descriptive Statistics

Table 8: Descriptive Statistics of Research Variables

Variable	N	Min	Max	Mean	Std. Dev.
Causal Conditions	384	2.000	5.000	3.497	0.770
Core Phenomenon	384	1.000	5.000	3.705	0.671
Current State of Support Services	384	1.000	5.000	3.565	0.844
Enabling Contexts at Bank	384	1.000	5.000	3.103	0.908
Contextual Conditions	384	1.000	4.900	3.334	0.673
Facilitating Factors	384	1.250	5.000	3.216	1.109
Barriers and Limitations	384	1.000	5.000	3.088	0.868
Intervening Conditions	384	1.425	5.000	3.152	0.705
Strategies	384	1.667	5.000	3.437	1.039
Consequences	384	1.714	5.000	3.447	1.042

Inferential Statistics

Kolmogorov–Smirnov Test

The Kolmogorov–Smirnov test was used to examine the normality of variable distributions. As shown in Table 9, the significance level for all

variables is below 0.05, leading to rejection of the normality assumption. Consequently, Structural Equation Modeling via SmartPLS was employed for hypothesis testing. (Tab. 9)

Table 9: Kolmogorov–Smirnov Test Results

Variable	N	Test Statistic	Sig. Level
Causal Conditions	384	0.110	0.000
Core Phenomenon	384	0.082	0.000
Current State of Support Services	384	0.142	0.000
Enabling Contexts at Bank	384	0.097	0.000
Contextual Conditions	384	0.111	0.000
Facilitating Factors	384	0.129	0.000
Barriers and Limitations	384	0.113	0.000
Intervening Conditions	384	0.077	0.000
Strategies	384	0.168	0.000
Consequences	384	0.145	0.000

Reliability Assessment

Reliability (or dependability) is one of the technical characteristics of a measurement instrument—the extent to which it produces consistent results under identical conditions. The

reliability coefficient ranges from zero to one; the closer to one, the greater the reliability. Values above 0.70 indicate acceptable reliability, while values below 0.70 are considered unsatisfactory. (Tab. 10)

Table 10: Questionnaire Reliability Results

Main Variable	Component	Cronbach's α	CR	Cronbach's α (Composite)	CR (Composite)
Causal Conditions	Causal Conditions	0.722	0.807	-	-
Core Phenomenon	Core Phenomenon	0.748	0.818	-	-
Contextual Conditions	Current State of Support Services	0.731	0.817	0.727	0.802
Enabling Contexts at Bank	0.753	0.836			
Intervening Conditions	Facilitating Factors	0.850	0.890	0.714	0.795
Barriers and Limitations	0.720	0.827			
Strategies	Strategies	0.863	0.912	-	-
Consequences	Consequences	0.894	0.914	-	-

Since Cronbach's alpha and composite reliability coefficients for all questionnaire variables exceed 0.70, it can be concluded that the questionnaire demonstrates good reliability.

Validity Assessment of the Measurement Model

To confirm the validity of the measurement instrument, face validity, construct validity, convergent validity, and discriminant validity were examined. Face validity was established

through expert consultation to ensure alignment between measurement indicators and existing literature. Construct validity was assessed using confirmatory factor analysis (CFA). Items with factor loadings exceeding 0.50 and t-statistics greater than 1.96 confirm that the selected indicators provide appropriate factor structures for measuring the study constructs at the 95% confidence level (Chin, 2003). (Tab. 11)

Table 10: Confirmatory Factor Analysis Results

Variable	Item	Factor Loading	T-Statistic	SE	Sig.
Causal Conditions	a1	0.545	8.105	0.067	0.000
	a2	0.788	25.956	0.030	0.000
	a3	0.717	17.015	0.042	0.000
	a4	0.776	21.992	0.035	0.000
	a5	0.838	35.946	0.023	0.000
	a6	0.600	11.298	0.053	0.000
	a7	0.868	44.770	0.019	0.000
Core Phenomenon	b1	0.573	9.253	0.062	0.000
	b2	0.681	15.855	0.043	0.000
	b3	0.774	27.993	0.028	0.000
	b4	0.873	39.327	0.022	0.000
	b5	0.623	11.397	0.055	0.000
	b6	0.851	39.412	0.022	0.000
	b7	0.593	11.490	0.052	0.000
Current State of Support Services	c1	0.616	13.232	0.047	0.000
	c2-c5	0.744-0.769	>20	<0.035	0.000
Enabling Contexts at Bank	c6-c10	0.595-0.822	>11	<0.060	0.000

Facilitating Factors	d1-d4	0.634–0.914	>14	<0.044	0.000
Barriers and Limitations	d5-d9	0.717–0.891	>20	<0.036	0.000
Strategies	e1-e6	0.545–0.858	>9	<0.058	0.000
Consequences	f1-f7	0.664–0.893	>15	<0.043	0.000

Since t-statistics exceed 1.96 and factor loadings exceed 0.50 in all cases, the selected items provide appropriate factor structures for measuring the study constructs.

indicators of each construct should be highly correlated with one another. Average Variance Extracted (AVE) was used as the convergent validity criterion; values above 0.50 indicate that at least 50% of a construct's variance is captured by its indicators. (Tab. 12)

Convergent and Discriminant Validity

Convergent validity refers to the principle that

Table 12: Convergent Validity Results (AVE)

Main Variable	Component	AVE
Causal Conditions	Causal Conditions	0.550
Core Phenomenon	Core Phenomenon	0.517
Contextual Conditions	Current State of Support Services	0.527
Enabling Contexts at Bank	0.507	
Intervening Conditions	Facilitating Factors	0.674
Barriers and Limitations	0.652	
Strategies	Strategies	0.522
Consequences	Consequences	0.604

Discriminant validity was assessed using the Fornell and Larcker (1981) criterion, which requires that the square root of AVE for each con-

struct exceed its correlations with all other constructs. (Tab. 13)

Table 13: Discriminant Validity Matrix (Fornell-Larcker)

	CC	CP	CSS	ECB	FF	BL	Str	Cons
Causal Cond.	0.742							
Core Phenom.	0.493	0.719						
Curr. State	0.595	0.386	0.726					
En. Contexts	0.438	0.525	0.238	0.712				
Facil. Factors	0.371	0.302	0.397	0.337	0.821			
Barriers	0.541	0.476	0.417	0.556	0.326	0.807		
Strategies	0.350	0.261	0.517	0.419	0.407	0.348	0.722	
Consequences	0.488	0.493	0.451	0.209	0.487	0.554	0.203	0.777

Note: CC=Causal Conditions, CP=Core Phenomenon, CSS=Current State of Support Services, ECB=Enabling Contexts at Bank, FF=Facilitating Factors, BL=Barriers and Limitations, Str=Strategies, Cons=Consequences. Diagonal values

(bold) represent the square root of AVE.

Model Fit and Structural Model

The research model is presented in Figures 8 and 9. Path coefficients between latent and manifest variables (factor loadings) indicate the

contribution of each indicator to measuring its respective construct. Path coefficients between latent variables are used for hypothesis testing;

these are considered significant when the absolute t-statistic exceeds 1.96. (Fig. 8 and 9)

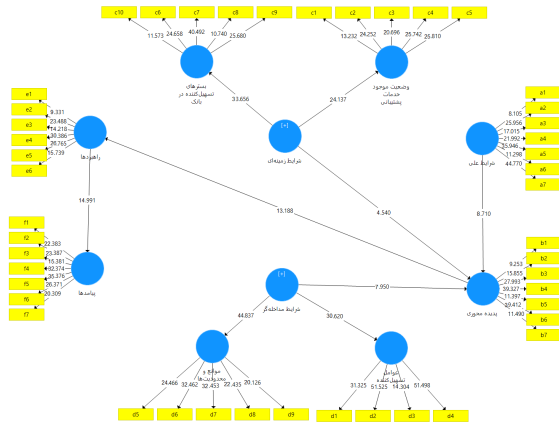


Figure 8: Standardized Factor Loadings and Path Coefficients

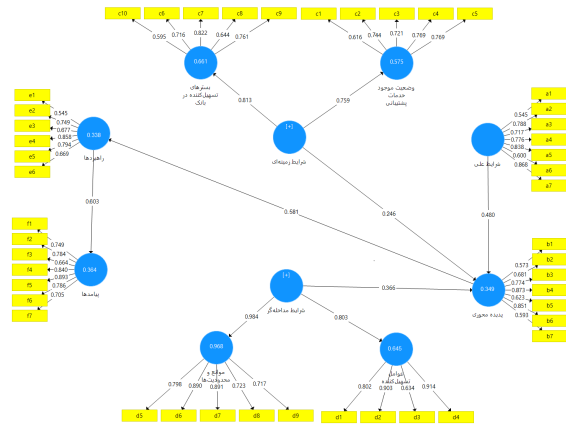


Figure 9: Significance of Factor Loadings and Path Coefficients (T-Values)

The predictive power of the model was analyzed using the coefficient of determination (R^2) for dependent variables. Three benchmark values 0.19 (weak), 0.33 (moderate), and 0.67 (strong

serve as criteria. The Q^2 predictive relevance statistic was also used; values of 0.02, 0.15, and 0.35 indicate weak, moderate, and strong predictive power, respectively. (Tab. 14)

Table 14: Coefficient of Determination and Q^2 Values

Variable	R^2	Q^2
Core Phenomenon	0.349	0.179
Current State of Support Services	0.575	0.247
Enabling Contexts at Bank	0.661	0.313
Facilitating Factors	0.645	0.263
Barriers and Limitations	0.968	0.497
Strategies	0.338	0.152
Consequences	0.364	0.198

Model fit was assessed using the Goodness of Fit (GOF) index for PLS:
 $GOF = \sqrt{(\text{mean AVE} \times \text{mean } R^2)} = \sqrt{(0.575 \times 0.543)} = 0.558$

Given benchmark values of 0.01 (weak), 0.25 (moderate), and 0.36 (strong), the obtained GOF value of 0.558 indicates strong model fit (Tenenhaus et al., 2005). (Tab. 15)

Table 15: Final Results of Hypothesis Testing

Hypothesis	Path Coefficient	T-Statistic	Result
H1: Causal conditions have a significant positive effect on the core phenomenon.	0.480	8.710	Supported

H2: Intervening conditions have a significant positive effect on the core phenomenon.	0.366	7.950	Supported
H3: Contextual conditions have a significant positive effect on the core phenomenon.	0.246	4.540	Supported
H4: The core phenomenon has a significant positive effect on strategies.	0.581	13.188	Supported
H5: Strategies have a significant positive effect on consequences.	0.603	14.991	Supported

RESULTS AND CONCLUSION

The applied AI model for developing support services at Rafidain Bank branches, built on the systematic integration of qualitative findings and empirical quantitative validation, has taken the form of a multidimensional paradigmatic pattern that explicates the digital transformation process from its origins to its outcomes. Study findings indicate that the starting point of this transformation causal conditions with a path coefficient of 0.480 encompasses environmental pressures such as exponential data growth, intense competition in financial markets, and customer dissatisfaction with slow traditional services, which have compelled Rafidain Bank to adopt intelligent technologies. These results align with the findings of Naghma Abdul Amir and Kalor (2025) and Al-Issawi (2024), confirming that AI is not a luxury choice but a strategic necessity for survival in the current ecosystem. Within this model, contextual conditions (path coefficient 0.246) and intervening conditions (path coefficient 0.366) function as catalysts or impediments: the bank's IT infrastructure and data maturity on one hand, and organizational resistance or management support on the other, are the decisive factors in the success of the core phenomenon—the implementation of AI in support services. The model ultimately leads, through strategies such as process reengineering and digital skills development, to tangible outcomes including accelerated response times and enhanced competitive advantage, with the high path coefficient of 0.603 reflecting the profound impact of these strategies on the bank's

ultimate performance.

The validity of the proposed model was established through a rigorous two-stage process. In the qualitative phase, Lincoln and Guba's credibility criteria were applied to ensure that extracted categories accurately reflect Rafidain Bank's operational challenges. In the quantitative phase, SmartPLS analyses confirmed adequate reliability (Cronbach's alpha and composite reliability) and validity (convergent and discriminant) across all constructs. The statistical significance of t-statistics across all model paths confirms that the defined relationships among drivers, strategies, and outcomes hold at a high confidence level, positioning the model as a scientifically grounded roadmap for digital transformation in Iraq's banking system. This research contributes several key innovations to the existing literature by providing an indigenous framework for Iraqi banking. The first contribution is the specialized focus on "branch support services" rather than a general overview of electronic banking, leading to the precise identification of operational bottlenecks. The second innovation is the multidimensional explanation of influencing factors within a paradigmatic model framework, demonstrating that AI success is not merely a technical matter but is rooted in cultural and managerial factors. Furthermore, the combination of Grounded Theory methodology with Structural Equation Modeling lends double validity to the model and distinguishes it from purely descriptive studies. The identification of operational strategies such as "process reengineering" and "creation of in-

tegrated data infrastructure” and their linkage to strategic outcomes such as “service personalization” transforms this research into a valuable executive document for banking managers that goes beyond theoretical discourse to address real industry challenges. Based on model findings, it is recommended that senior managers at Rafidain Bank prioritize the formulation of an “AI Strategy Document” and establish specialized data analysis units within the organizational structure, thereby converting environmental pressures into opportunities for digital transformation. Given the critical role of contextual conditions, investment in database integration and customer information security is a non-negotiable prerequisite. To overcome intervening barriers, the implementation of continuous employee training programs and the creation of an innovation culture to reduce resistance to technology are strongly recommended. At the operational level, the bank should pilot intelligent applications such as smart chatbots and predictive customer needs systems in selected branches to assess model effectiveness before full-scale deployment. Finally, collaboration with fintech companies and knowledge-based firms can accelerate AI knowledge transfer to the bank and meaningfully improve the customer experience. For further enrichment of this field, future researchers are encouraged to empirically examine the implementation of this model on a larger scale across other public and private banks in Iraq, enabling comparative analysis. Investigating the role of psychological and behavioral variables such as “customer digital trust” and “employee psychological readiness” can reveal hidden dimensions of AI adoption. Independent study of the impact of emerging technologies such as Natural Language Processing (NLP) on response quality, as well as examination of ethical and legal implications of algorithmic decision-making in banking, represents additional avenues for advancing knowledge and contributing to the creation of smarter, more human-centered banking systems.

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