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The Impact of Design Thinking Adoption on Decision-Making via Customer-Experience Innovation in Public Commercial Banks in Sebha, Libya

Igrirah, Abdalmunaem[1*]; Ali, Asma[2]; Al-Shahati, Shahid[2]
[1]Assistant Professor at the Department of Human Resource Management, Faculty of Commerce and Political Science, Sebha University, Sebha, Libya.
[2]Student at the Department of Business Administration Management, Faculty of Commerce and Political Science, Sebha University, Sebha, Libya.
Email: abd.igrirah@sebhau.edu.ly

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Abstract

This study investigates the relevance and applicability of Design Thinking (DT) adoption within the Libyan public banking sector. Design thinking adoption represents the cognitive decision and behavioral intention to accept this methodology within organizational workflows. This study identifies perceived benefits and barriers to its adoption, evaluates the influence of understanding, and applies Behavioral Reasoning Theory (BRT) to explain the behavioral dynamics affecting adoption. A quantitative, cross-sectional survey was conducted with 94 banking professionals from five public commercial banks in Sebha, Libya. Furthermore, the study used Partial Least Squares Structural Equation Modeling (PLS-SEM) to examine the structural pathways through which DT adoption influences decision-making, specifically integrating Customer-Experience Innovation (CEI) as a critical mediating variable.

The analysis reveals that perceived benefits significantly enhance understanding of DT, which serves as the primary antecedent to adoption. Although perceived barriers strongly predict resistance, the findings indicate that neither barriers nor resistance significantly impede adoption, implying that cognitive mastery of the methodology can supersede affective opposition in high constraint environments. Additionally, the results show that DT adoption does not directly improve decision-making but does so indirectly by promoting Customer-Experience Innovation. This study contributes to the limited empirical literature on innovation adoption in post-conflict economies and establishes CEI as the principal mechanism through which methodological adoption improves decision-making.

Keywords

Design Thinking.
Decision Making.
Behavioral Reasoning Theory (BRT).
Customer-Experience Innovation (CEI), Public Commercial Banks.
Sebha.
Libya.

أثر تبني منهجية التفكير التصميمي على عملية صنع القرار من خلال ابتكار تجربة العملاء في البنوك التجارية العامة في سبها، ليبيا

عبد المنعم قريره[1*]؛ أسماء علي[2]؛ شهد الشحاطي[2]
[1]أستاذ مساعد بقسم إدارة الموارد البشرية، كلية التجارة والعلوم السياسية، جامعة سبها، سبها، ليبيا.
[2]طالبة بقسم إدارة الأعمال، كلية التجارة والعلوم السياسية، جامعة سبها، سبها، ليبيا.

الملخص

تهدف هذه الدراسة إلى معرفة مدى ملاءمة تبني منهجية التفكير التصميمي في القطاع المصرفي العام الليبي. وتمثل تطبيق التفكير التصميمي القرار المعرفي والنية السلوكية لقبول هذه المنهجية ضمن سير العمل التنظيمي. وتحدد هذه الدراسة الفوائد والعوائق المتصورة أمام تطبيقها، وتقيّم تأثير الفهم، وتطبق نظرية الاستدلال السلوكي (BRT) لشرح الديناميكيات السلوكية المؤثرة على التطبيق. وقد أُجري مسح كمي مقطعي شمل 94 متخصصًا مصرفيًا من خمسة بنوك تجارية عامة في سبها، ليبيا. علاوة على ذلك، استخدمت الدراسة نمذجة المعادلات الهيكلية باستخدام المربعات الصغرى الجزئية–(PLS SEM)لدراسة المسارات الهيكلية التي يؤثر من خلالها تطبيق التفكير التصميمي على عملية صنع القرار، مع دمج ابتكار تجربة العملاء (CEI) كمتغير وسيط حاسم.

تبين النتائج أن الفوائد المتوقعة تعزز بشكل كبير فهم منهجية التفكير التصميمي، والذي يعد العامل الأساسي المسبق للتبني. على الرغم من أن العوائق المتوقعة تنبئ بقوة بالمقاومة، إلا أن النتائج تشير إلى أن العوائق أو المقاومة لا تعيق التبني بشكل كبير، مما يعني أن الإتقان المعرفي للمنهجية يمكن أن يتجاوز المقاومة في بيئات ذات قيود عالية. بالإضافة إلى ذلك،

الكلمات المفتاحية

التفكير التصميمي، اتخاذ القرارات، نظرية الاستدلال السلوكي، ابتكار تجربة العملاء، البنوك التجارية العامة، سبها، ليبيا.

تظهر النتائج أن تبني التقنيات الرقمية لا يحسن عملية صنع القرار بشكل مباشر، بل يحسنها بشكل غير مباشر من خلال تعزيز ابتكار تجربة العملاء. تساهم هذه الدراسة في إثراء الأدبيات التطبيقية المحدودة حول تبني الابتكار في اقتصادات ما بعد النزاعات، وتؤكد على أن ابتكار تجربة العملاء هو الآلية الرئيسية التي يحسن من خلالها تبني منهجيات عملية صنع القرار.

Introduction

Design thinking (DT) is an innovative problem-solving approach characterized by empathy, collaboration, and experimentation; it has emerged as a crucial strategic method for organizations seeking to navigate complex challenges and enhance customer experiences (Brown & Wyatt, 2010). Design thinking is rooted in cognitive science and systems theory, prioritizing user needs through iterative cycles of prototyping and testing (Cross, 2011), its five-stage model (empathize, define, ideate, prototype, test) aligns with Schön's (1992) reflective practice, enabling organizations to dynamically reframe problems (Schön, 1992).

The concept of DT is credited to H. A. Simon (1969) and Robert McKim (1973); later, David Kelley, founder of the global design and innovation company (IDEO) applied it for business applications in 1991. Executives previously approached design thinking not as a specific methodology, but rather as a general way of thinking. Consequently, design thinking has been influenced by many disciplines, including architecture, industrial design, management, software development, and engineering (including systems theory and design methodologies). Rather than relying solely on traditional analytical management paradigms, DT integrates these diverse disciplines. Therefore, it can be concluded that DT has multiple roots across fields and has evolved into an integrated methodology that combines creativity, empathetic design principles, and strategic management approaches to find innovative solutions to complex problems by focusing on user needs (Frisk & Bannister, 2022).

Making effective decision is often considered one of the most significant challenges facing management, particularly in environments characterized by complexity, uncertainty, and ambiguity (Dunne & Martin, 2017). Traditional decision-making (DM) techniques typically emphasize analytical reasoning and rely on familiar options, leading to limited creativity and suboptimal solutions. DT by contrast, encourages a more expansive and participatory approach; it brings together individuals with diverse perspectives, reframes problems through empathy, and systematically explores a wide array of potential alternatives (Micheli et al., 2019). In doing so, it broadens both the range of solutions considered and the depth of understanding of the problem space. Empirical research supports this. For instance, a multi-case field study in Swedish local governments found that applying DT in complex decision-making processes significantly increased the number of people consulted, diversified information sources, expanded the pool of solution options, and improved stakeholder buy-in (Frisk & Bannister, 2022). Furthermore, systematic reviews indicate that contextual conditions, such as leadership support, organizational slack, and innovation culture, can moderate the effectiveness of DT by influencing whether expanded decision alternatives translate into actual innovation outcomes (Rösch et al., 2023). Building on these findings, it becomes clear that DT not only enriches decision-making by increasing creativity and participation but also reshapes decision architectures in ways that traditional top-down processes may not accommodate. Specifically, the role of DT is to provide

more alternatives and broaden understanding of the problem by engaging individuals with different perspectives, negotiating among themselves, and evaluating the alternatives during the process (Frisk & Bannister, 2022).

In the banking industry, operating in an environment marked by rapid technological advancements and shifting consumer expectations, the application of design thinking can facilitate the development of solutions better aligned with customer needs and preferences (Kelley & Kelley, 2013). Considering its expanding role in decision-making, as discussed previously, it is important to examine how DT can address specific industry challenges. In the Libyan context, where the banking sector is undergoing significant transformation following the revolution, adopting design thinking offers an opportunity to address the unique challenges it faces.

1. Problem Statement:

Libya's banking sector is currently grappling with outdated technologies, regulatory constraints, and a lack of customer-centric service offerings. The ongoing political and economic uncertainties further complicate the current context, requiring banks to rethink their traditional operational models and to find innovative ways to engage with customers (Elhajji & Mihai- Yiannaki, 2025). As financial institutions strive to rebuild trust and improve service delivery, integrating design thinking methodologies can catalyze innovation, enabling banks to create products and services that resonate with the evolving demands of Libyan consumers (Almansour & Elkrghli, 2023; Etorbi, 2025). Few would dispute that the use of DT and its incorporation into organizations' innovation efforts creates value for customers and builds loyalty (Josemaria et al., 2017).

DT has emerged globally as a human-centered innovation framework with the potential to revitalize financial services; however, its application within Libyan banking remains limited. Although there are increasing calls for service innovation and customer centricity, Libyan banks, particularly in southern regions, face challenges in adopting design thinking due to institutional, technological, and cultural barriers (HEND R. IRHIAM & AND KANAE WATANABE, 2023; Elhajji & Mihai- Yiannaki, 2025). Moreover, there is a paucity of empirical research assessing how and why design thinking is (or is not) embraced within the unique Libyan banking environment. In this context, the research problem could be articulated as follows: **What is the Impact of Design Thinking Adoption on Decision-Making via Customer-Experience Innovation in Public Commercial Banks in Sebha, Libya?**

2. Research Objectives

This study aims to explore the impact of design thinking Adoption on decision-making in public commercial banks in Sebha:

1. To evaluate the direct influence of perceived benefits on understanding, barriers, and resistance toward DT adoption in Libyan public commercial banks.
2. To examine the structural pathways through which the adoption of DT influences decision-making.
3. To assess the mediating role of Customer-Experience Innovation (CEI) in the relationship between DT adoption and decision-making.

3. Research Questions

The research aims to answer the following questions:

1. How do perceived benefits and barriers predict the understanding and resistance to DT adoption?

2. What is the direct impact of DT adoption on CEI and decision-making?
3. To what extent does Customer-Experience Innovation mediate the relationship between DT adoption and decision-making outcomes?

4. Research model:

Decision-making in banking, especially in uncertain environments, traditionally relies on analytical logic and risk-avoidance, which often leads to incremental rather than innovative solutions (Dunne & Martin, 2017). Building upon the discussions of design thinking's evolving role, DT rooted in reflective practice (Carlgren et al., 2016) and systems thinking (Cross, 2011), introduces a human-centered problem-solving logic based on empathy, experimentation, and iterative reframing of problems (Brown & Wyatt, 2010; Frisk & Bannister, 2022). Unlike conventional decision-making approaches, DT broadens the range and depth of decision alternatives (Micheli et al., 2019), thereby improving decision quality and stakeholder buy-in (Frisk & Bannister, 2022).

This theoretical framework addresses the research question by examining how DT influences decision-making in public commercial banks in Sebha, Libya. Informed by the preceding discussion of DT's influence on decision processes, the model should therefore encompass (a) the adoption of design thinking, (b) how it influences decision-making processes, and (c) the factors that support or hinder this effect.

The instrument, adapted from (Jirli, 2024) conceptualizes DT through:

Reasoning For DT Adoption	Reasoning Against DT Adoption
Perceived Benefits	Perceived Barriers
Understanding of DT	Organizational Resistance
Adoption of DT	Missed Opportunities (optional)

This logic is derived from Behavioral Reasoning Theory (Westaby, 2005) and Diffusion of Innovation Theory (Bovey & Hede, 2001), where understanding and perceived usefulness are precursors to adoption, while constraints can inhibit or reverse adoption. However, this original structure did not fully explain how DT actually improves decision-making, nor did it specify under what conditions adoption leads to impact, particularly in Libya's fragile and digitally uneven banking environment; therefore, the model introduced by Jirli (2024) needs to be modified to align with these conditions.

4.1. Modification of Jirli's (2024) Model: Integrating Customer-Experience Innovation

While Jirli's (2024) adaptation of Behavioral Reasoning Theory (BRT) provides a robust foundation for understanding the antecedents of DT adoption, the specific context of the Libyan banking sector, characterized by high uncertainty and a pressing need for service differentiation, necessitates a theoretical refinement of the model's structural pathways. This study proposes two critical modifications to the original framework: the inclusion of Customer-Experience Innovation (CEI) as a moderator and the exclusion of the Missed Opportunities construct to enhance model parsimony.

4.1.1 The Inclusion of Customer-Experience Innovation (CEI) as a moderator

The original model posits a direct relationship between adoption and decision-making. However, from a management science perspective, adopting a methodology does not

inherently improve decision quality. Rather, it is the output of that methodology that informs better decisions. DT is fundamentally a human-centered problem-solving approach rooted in empathy and iterative prototyping (Micheli et al., 2019) (Brown & Wyatt, 2010). Its primary operational output in a service context is the generation of novel customer insights and reimagined service interactions, collectively conceptualized in the literature as Customer-Experience Innovation (CEI) (Lemon & Verhoef, 2016).

Therefore, we argue that CEI serves as the essential cognitive bridge between adopting DT tools and improved decision-making. By applying DT, banks generate superior qualitative data regarding customer pain points and preferences (Zomerdijk & Voss, 2010). This enriched information environment reduces equivocality, enabling managers to make more aligned decisions with market realities. Without the intermediate step of CEI, the link between DT adoption and decision-making remains a black box. Consequently, this study hypothesizes that DT improves decision-making indirectly by fostering CEI.

4.1.2. The Exclusion of Missed Opportunities for Theoretical Simplicity

In Behavioral Reasoning Theory (BRT), Westaby, (2005) distinguishes between Reasons Against and Global Motives (e.g., Resistance). In Jirli's (2024) initial framework, Missed Opportunities are included as a potential Reason Against adoption (representing anticipated regret or opportunity cost) (Jirli, 2024). However, contemporary organizational and statistical research strongly cautions against "construct proliferation"—the inclusion of conceptually overlapping variables that violate the law of theoretical parsimony and introduce severe empirical redundancy into structural models (Anvari et al., 2025; Howard et al., 2025).

In the highly constrained context of the Libyan banking sector, the fear of missed opportunities is not an independent or isolated factor; rather, it is a direct psychological byproduct of existing structural and functional impediments. Furthermore, recent applications of innovation resistance theory posit that resistance is overwhelmingly driven by primary functional barriers, such as incompatible workflows and infrastructural deficits (Hameed et al., 2025). Including 'Missed Opportunities' alongside 'Perceived Barriers' therefore creates conceptual redundancy and risks severe multicollinearity, which would artificially inflate standard errors and destabilize the PLS-SEM path estimations. By excluding this redundant construct, the modified model strictly adheres to the principle of parsimony required for robust structural equation modeling (Hair et al., 2022). Ultimately, this exclusion sharpens the model's analytical focus onto the most direct and practically relevant tension: the causal impact of severe structural impediments (Barriers) on behavioral opposition (Resistance).

The modified research model shifts the focus from a linear adoption process to a value-creation process. By inserting CEI, the model clarifies how Design Thinking creates value (through enhanced customer experiences) and why it matters for decision-making. Simultaneously, by streamlining the inhibitory constructs, the model offers a sharper lens for identifying the root causes of non-adoption in the Libyan banking context.

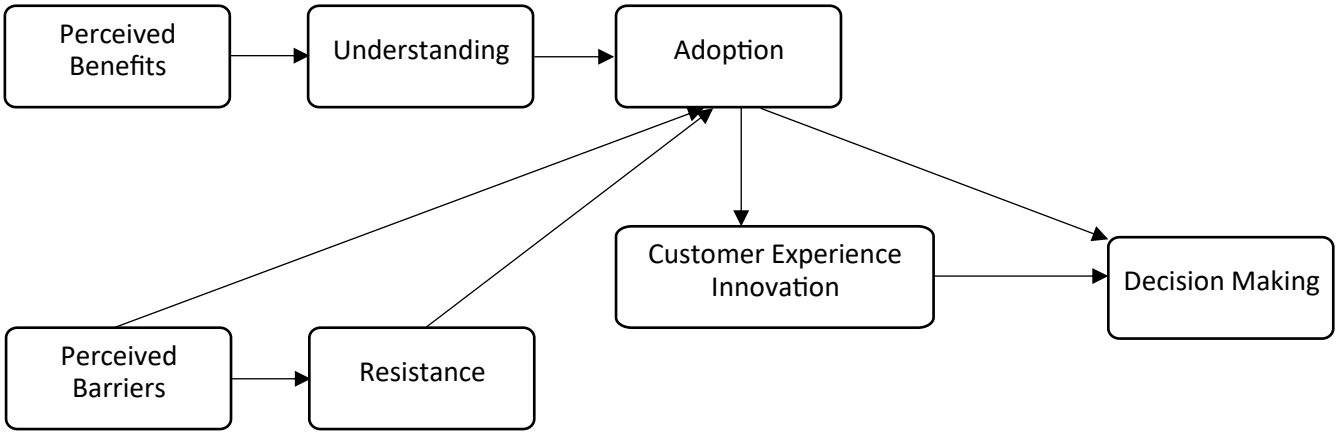

Figure 1. Research Model

5. Research Hypothesis

H1: A higher perceived benefit of DT is positively associated with greater understanding of DT among banking professionals in public commercial banks located in Sebha, Libya.
H2: A greater understanding of DT is positively associated with its adoption in public commercial banks located in Sebha, Libya.
H3: Perceived barriers are positively associated with resistance to DT in public commercial banks located in Sebha, Libya.
H4: Perceived barriers are negatively associated with the adoption of DT in public commercial banks located in Sebha, Libya.
H5: The adoption of DT has a positive and significant impact on decision-making in public commercial banks located in Sebha, Libya.
H6: The adoption of DT has a positive and significant impact on Customer-Experience Innovation in public commercial banks located in Sebha, Libya.
H7: Customer-experience innovation has a positive and significant impact on decision-making in public commercial banks located in Sebha, Libya.
H8: Customer-Experience Innovation mediates the relationship between the adoption of DT and decision-making in public commercial banks located in Sebha, Libya.
H9: Resistance to DT is negatively associated with the adoption of DT in public commercial banks located in Sebha, Libya

6. Research Significance

This study addresses a critical gap in innovation management literature by explicitly detailing how design thinking can be adopted in highly constrained environments. Its significance is twofold. Theoretically, the study advances Behavioral Reasoning Theory (BRT) by testing its boundary conditions within the extreme context of a post-conflict developing economy. While prior research often assumes a stable operational environment, this study demonstrates how severe infrastructural deficits and functional barriers interact with cognitive adoption pathways. Practically, the research provides a critical, evidence-based roadmap for policymakers and banking executives in emerging markets. It reveals that in environments marked by political instability and cultural conservatism, successful innovation adoption relies less on the immediate removal of immovable structural obstacles, and more on cultivating deep, localized cognitive mastery (Understanding) and prioritizing tangible service outputs (Customer-Experience Innovation).

7. Methodology

This study employs a quantitative, cross-sectional survey design, adapted from the instrument developed by (Jirli, 2024), to test the theoretical model grounded in Behavioral Reasoning Theory (BRT). Structural equation modeling (PLS-SEM) via SmartPLS 4 was used to analyze relationships among constructs.

8.1. Instrument and Measures:

The questionnaire was constructed based on tools adopted from three previous studies. The design thinking questionnaire was adapted from (Jirli, 2024), the CEI was adopted from (Mutambik, 2023), and the decision-making questionnaire was adopted from (Owda, 2018). The questionnaire consists of 40 questions, divided into three main parts that reflect the study's basic variables. The first part addresses 22 questions to assess participants' understanding of design thinking concepts and their impact on decision-making processes, the second part includes 15 questions on decision-making based on available information, and the last part includes 3 questions on Customer-Experience Innovation.

8.2. Sampling and Data Collection:

While probability sampling is often favored for broad population generalizability, purposive sampling is highly validated and frequently necessary in quantitative business research. Given that this study investigates design thinking, a methodology that fundamentally relies on cross-functional collaboration and deep empathy for the end-user, the sampling strategy deliberately targeted a cross-hierarchical segment of banking professionals. The inclusion criteria required participants to be actively involved in either strategic management or direct customer-facing operational workflows. Consequently, the purposive sample intentionally integrates department heads alongside front-line employees (who frequently possess less than 5 years of tenure but hold the most direct knowledge of customer pain points). By capturing this specific, multi-level operational perspective, the sample avoids the statistical noise of completely isolated administrative staff (e.g., security or facility maintenance) while ensuring the PLS-SEM algorithm evaluates a holistic, information-rich view of the bank's innovation readiness. A total of 130 questionnaires were distributed in person, and 94 valid responses were obtained (72% response rate).

8.3. Data Analysis:

SmartPLS 4 was used as the primary tool for data entry and analysis (only demographics obtained using SPSS V.27). PLS-SEM was chosen for its suitability with smaller samples and its ability to handle complex models (Hair et al., 2013). Analysis proceeded in two stages:

1. Measurement Model Assessment: Indicator reliability, internal consistency (Cronbach's α and composite reliability), convergent validity (average variance extracted, AVE ≥ .50), and discriminant validity (Fornell–Larcker criterion and HTMT ratio).
2. Structural Model Assessment: Path coefficients (β), t–values via bootstrap (5,000 subsamples), R^2, effect sizes (f^2), and predictive relevance (Q^2) were evaluated.

9. Previous Studies:

9.1. Frisk & Bannister, (2022): Applying Design Thinking to the Decision-Making Process: A Field Study in Swedish Local Authorities

The objective of this study was to investigate the impact of design thinking on improving complex decision-making processes within the context of local government. The research adopted a methodology that included non-participatory observations, semi-structured interviews, and questionnaires to analyze how design thinking contributes to expanding the range of possible solutions and enhancing stakeholder engagement in decision-

making. The findings showed that implementing design thinking facilitates more effective, innovative decision-making. Moreover, it provides a platform for active communication and collaboration between officials and citizens, thereby increasing societal acceptance and commitment to the decisions taken.

9.2. Jirli, (2024): Applying Design Thinking for Innovation in Banking Services

This study aimed to provide a comprehensive analysis of the adoption of design thinking and its role in fostering innovation and enhancing decision-making in the banking sector. A mixed-methods approach was used, combining bibliometric data analysis and modeling PLS-SEM to examine employees' perceptions in the banking sector regarding the benefits and barriers of implementing design thinking. The results indicated a positive correlation between employees' understanding of the importance of design thinking and increased innovation. They also showed that existing barriers significantly affect the adoption of this approach. The study recommended strengthening banks' culture of design thinking to promote adaptability and innovation amid rapid changes in the sector.

9.3. Owda, (2018): The Impact of Design Thinking Management on Decision-Making through Design Thinking: An Applied Study on Local NGOs in the Gaza Strip

This study aimed to explore the relationship between process design management and decision-making in local nongovernmental organizations (NGOs) operating in the Gaza Strip, with a particular focus on the mediating role of design thinking. The descriptive-analytical approach was employed, and a questionnaire was used to collect data from 78 local NGOs. The findings revealed the absence of a direct relationship between process design management and decision-making; however, they demonstrated that design thinking fully mediates this relationship. The study highlighted the organizations' interest in building a positive image within society and their possession of the necessary competencies to implement projects, emphasizing the importance of responding to beneficiaries' needs. It recommended developing process design management, encouraging creativity, and adopting a design thinking methodology to improve decision-making and enhance project sustainability. The study contributed to understanding operational mechanisms within NGOs operating in complex environments, underscoring the significance of design thinking in improving administrative performance.

9.4. Sweidat & Al-Shaikh, (2017): The Impact of Creative Thinking on the Effectiveness of Administrative Decision-Making: A Field Study from the Perspective of Senior and Middle Management in Jordanian Insurance Companies

The study examined the relationship between creative thinking and the effectiveness of administrative decision-making in Jordanian insurance companies. The researchers focused on five dimensions of creative thinking: fluency, flexibility, originality, elaboration, and problem sensitivity. To achieve its objectives, a questionnaire was designed and distributed to a sample of 218 employees in senior and middle management positions from 24 Jordanian insurance companies. The questionnaire included demographic variables and items measuring creative thinking and decision-making effectiveness. The findings

revealed a high statistically significant level of both creative thinking and decision-making effectiveness within the studied companies. These results indicate a positive relationship between creative thinking and managers' ability to make effective decisions. The researchers offered several recommendations, most notably the need for continuous training to enhance creative thinking skills among managers, involving different administrative levels in decision-making processes, and keeping employees updated on the latest developments in decision-making techniques.

9.5. Chou, (2018): Applying the Design Thinking Methodology in Social Entrepreneurship Projects: An Applied Study on International Institutions in the United States

This study presented the design thinking methodology and its application within the field of social entrepreneurship projects. It aimed to explore the fundamental components of design thinking within the context of social entrepreneurship and analyze relevant theories. The study examined the design thinking methodology, the process of designing social entrepreneurial projects, and the interrelationship between social entrepreneurship and design thinking, using case studies to support the effective application of design thinking in social innovation projects. The study demonstrated that effective collaboration between design experts and social entrepreneurs can contribute significantly to poverty reduction, as seen in the Heifer International Foundation and the Bill & Melinda Gates Foundation. It further showed that the Social Enterprise Institute at Northeastern University achieved notable impact by teaching design thinking in classrooms and applying it to real-world challenges. The study recommended encouraging social entrepreneurs to adopt design thinking methods to develop human-centered and innovative solutions.

9.6. Shapira et al., (2017): The integration of Design Thinking and Strategic Sustainable Development

The objective of this study was to explore potential contributors to projects, identify obstacles to implementing design thinking in development strategies, and propose a prototype of an integrated process that supports the achievement of sustainability goals. The research employed descriptive and analytical methodologies, including surveys and expert interviews, and developed an initial case study model as key tools. The results indicated that the proposed prototype could effectively contribute to achieving strategic outcomes and enhancing sustainable development goals. The authors recommended further exploration of the model, assessing its practical applicability, and examining potential challenges arising from integrating design thinking into sustainable development strategies.

9.7. Discussion of Previous Studies

A review of the literature on design thinking and its impact on decision-making shows a growing tendency to integrate its principles across institutions, both financial and non-financial, to enhance the efficiency and effectiveness of decision-making processes. These studies highlight the critical role of design thinking in promoting innovation, improving administrative performance, and increasing institutional agility in the face of challenges. For instance, (Owda, 2018) showed that design thinking positively influences decision-making efficiency within NGOs in the Gaza Strip, suggesting that these findings could be extended to financial institutions, including public commercial banks in Sebha. This underscores the potential value of incorporating design thinking

tools to improve institutional performance, particularly within complex environments such as the banking sector.

Despite the evident benefits reported in prior studies, the field still suffers from a research gap at both the broader academic level and more specifically within the Libyan context. At the general research level, there is a need for more studies examining the impact of design thinking on decision-making processes in financial institutions, especially in environments characterized by increasing complexities and challenges. In the Libyan context, this gap is even more pronounced, as at the time of this study, no research had directly examined the influence of design thinking on administrative decisions in Libyan financial institutions. This highlights the significance of the present study, which seeks to fill this research gap and analyze design thinking as an innovative tool for enhancing administrative decision-making amid the ongoing economic and political challenges in Libya.

10. Literature Review:

10.1. Decision Making:

Decision-making is universally recognized as a core transaction within organizational behavior and a fundamental executive responsibility (Grušovnik et al., 2017). Within the context of management, executive decisions exert a significant impact across operational and strategic domains, with successful organizations distinguishing themselves from competitors by making better, faster, and more frequently implemented decisions. The decision-making process itself is highly complex and multifaceted; it can manifest as a spontaneous, natural action or as an intricately planned sequence of evaluations (Abac, 2024).

Historically, classical economic models assumed strict rationality in these processes. However, contemporary research is heavily grounded in the theory of bounded rationality, which posits that decision-makers operate under significant limitations regarding computational capacity, memory, and available knowledge (Jordão et al., 2020). This bounded reality means that decision-making is a ubiquitous phenomenon that is highly susceptible to cognitive biases at the individual, group, and organizational levels. Furthermore, frameworks such as Prospect Theory challenge traditional expected utility models by demonstrating that managerial decisions made under conditions of uncertainty are heavily dictated by how potential gains and losses are framed (Doreswamy & Horstmanshof, 2023).

To counteract cognitive limitations and enhance performance, recent literature emphasizes the importance of structural support mechanisms, with a primary focus on ensuring information quality and effective data utilization. Empirical studies conducted within the banking sector confirm that the quality of available information serves as a critical determinant of decision-making effectiveness (Abumandil et al., 2016). This reliance on robust data has evolved into the paradigm of Data-Driven Decision-Making (DDDM), wherein strategic choices are based on empirical analytics rather than managerial intuition or expertise. The adoption of DDDM practices has been shown to yield measurable increases in organizational productivity, particularly within financial institutions navigating dynamic environments (Gul et al., 2023).

Finally, the quality of decision-making processes is deeply intertwined with organizational innovation. The successful establishment and management of a continuous innovation process rely heavily on the quality of the decisions executed at each consecutive developmental stage (Szutowski, 2020). However, this process remains highly

vulnerable to systemic errors stemming from a lack of information or its misuse, communication breakdowns, time constraints, and a lack of employee experience (Abac, 2024).

10.2. Design Thinking

DT is a human-centered approach characterized by iterative prototyping, multidisciplinary teams, and a focus on solving user problems. It has roots in creative disciplines (Xiao & Mazlan, 2025) and was popularized by IDEO and Stanford's d.school (Brown & Wyatt, 2010). In the banking sector, design thinking has been highlighted as a tool for innovation and improving the customer experience. (Gero & Milovanovic, 2020) found that banks practicing design thinking were better able to create novel financial services. By shifting focus to the end user and emphasizing empathy and experimentation, banks can identify unmet needs and co-create solutions. For example, design thinking workshops at a large European bank led to a redesigned mobile app that increased user satisfaction (Liedtka & Ogilvie, 2011). Empirical studies show that design thinking can improve operational efficiency, problem-solving, and customer satisfaction in financial services.

Traditional banks often rely on rigid processes and profit-driven metrics. In contrast, design thinking promotes learning and adaptability. Beckman & Barry, (2007) argue that innovation is best treated as a learning process, embedding design thinking into corporate routines. In banking, this means moving from a purely analytical mindset to one that combines analytical and intuitive thinking. For instance, Oliver Wyman's report on banking trends posits that design thinking is a useful tool for banks seeking growth amid fintech disruption. As noted by (Jirli, 2024), design thinking introduces a mindset that values experimentation and the acceptance of failure as part of the innovation process, which stands in sharp contrast to the risk-minimizing orientation that characterizes traditional banking operations.

Despite its promise, design thinking faces obstacles in banking. Cultural inertia, hierarchical decision-making, and skepticism about its rigor can impede adoption (Liedtka, 2018), (Brown & Wyatt, 2010). Liedtka & Ogilvie, (2011) and Brown & Wyatt, (2010) specifically note that organizational resistance is a formidable challenge when introducing design thinking into conservative environments. In practice, banks may lack skilled personnel or top management buy-in. A 2021 survey of Middle Eastern banks found that 70% cited internal culture as the main barrier to innovation adoption. These issues mirror general findings on innovation resistance in finance (Gerrard & Cunningham, 2004) and digital banking (Kaur et al., 2020). Understanding how such perceived barriers affect bankers' reasoning is critical to promoting design thinking.

10.2.1. Design Thinking in the Libyan Context

The Libyan banking sector has unique constraints. After years of conflict and economic instability, banks have often operated under state control with low profitability (IMF, 2023). Research on Libyan banking technology shows slow uptake; for example, (Abukhzam & Lee, 2010) report that although Libyan banks acknowledge the benefits of e-banking, adoption was limited by staff attitudes. (Khalfan & Alshawaf, 2004) observed that bank employees in the Arab world have faced conflicts with new technologies, delaying e-banking implementation. In Libya specifically, the Central Bank has encouraged modernization, but banks still primarily offer basic services (CBL, 2022).

These dynamics suggest that Libyan bankers' beliefs about innovation are pivotal. If managers perceive design thinking as an exotic, foreign concept, they may resist it. Conversely, if they see clear benefits, they may champion it. Thus, our study builds on prior Libyan banking literature by examining the psychological drivers (benefits/barriers) of design thinking adoption rather than focusing solely on technology acceptance (e.g. mobile banking adoption studies; see (Bouthahab & Elmansori, 2017).

10.3. Customer-Experience Innovation (CEI)

Customer experience (CE) has emerged as a top strategic priority for modern organizations seeking to navigate highly competitive markets (Lemon & Verhoef, 2016). In academic literature, CE is conceptualized as a multidimensional construct that encompasses a customer's cognitive, emotional, behavioral, sensorial, and social responses to all direct and indirect interactions with a firm across the entire customer journey (Lemon & Verhoef, 2016; Mishra, 2025). To effectively evaluate this complexity, scholars differentiate between static experiences, which analyze interactions during specific touchpoints at one point in time, and dynamic experiences, which assess how these perceptions and feelings evolve over time (Kranzbühler et al., 2018).

To elevate these interactions and establish competitive differentiation, organizations increasingly rely on Customer-Experience Innovation (CEI). CEI moves beyond the traditional focus on physical product features by emphasizing the design of experience environments that act as instruments for the co-creation of unique value for individual customers (Prahalad & Ramaswamy, 2003). Through this co-creation perspective, value-in-use is achieved by aligning firm offerings with customer expectations, resulting in superior customer experiences (Lemke et al., 2011).

Within the banking and financial services sector, CEI has gained critical attention due to rapid technological advancements and the emergence of agile financial technology competitors offering user-friendly solutions (Murinde et al., 2022). Contemporary financial literature distinguishes front-end Customer-Experience Innovation, which directly impacts user interfaces, service delivery, and customer touchpoints, from traditional back-end process automation (Murinde et al., 2022). The successful development and adoption of innovative financial products generate positive cognitive and affective responses from consumers, establishing the firm's technological leadership and enhancing overall market impact. Recent empirical evidence in modern banking contexts demonstrates that a firm's ability to innovate critically shapes the multidimensional customer experience, specifically influencing perceived value, ease of use, quality of support, and reliability, which ultimately determines customer loyalty intentions and strategic success (Mutambik, 2023).

10.4. Behavioral Reasoning Theory (BRT)

Behavioral Reasoning Theory, developed by (Westaby, 2005), extends earlier intention-behavior models by explicitly incorporating reasons as antecedents of attitudes and intentions. BRT posits that reasons for a behavior (motivations, anticipated gains) and reasons against (concerns, constraints) mediate the attitude-intention relationship. In essence, what people perceive as pros and cons shapes their decisions beyond abstract attitudes. For instance, in a consumer context, perceived enjoyment (reason for) strongly drives positive attitudes toward a technology, whereas privacy concerns

(reason against) can undermine it (Westaby, 2005); (Gupta & Arora, 2017).
In organizational settings, reasons can similarly influence strategic choices. For DT adoption in banking, perceived benefits serve as reasons for (support), whereas perceived barriers act as reasons against (contradict). Under BRT, strong reasons for should enhance positive attitudes (greater understanding and intention to use design thinking), while strong reasons against should heighten resistance. Prior studies that have applied BRT in financial contexts support this. Hanafizadeh et al., (2014) found that in mobile banking adoption, reasons in favor (perceived value) boosted intentions, whereas reasons against (perceived risk) had a more substantial negative impact on consumer attitudes.
Our conceptual model (Figure.1) integrates Behavioral Reasoning Theory (BRT) with design thinking constructs to explain adoption behaviors in Libyan banks. We hypothesize that perceived benefits will positively influence understanding of design thinking (H1), which in turn, will promote the adoption of the methodology (H2). Conversely, regarding reasons against adoption, perceived barriers are hypothesized to positively influence resistance (H3) and negatively impact adoption (H4) , with resistance also serving as a direct negative predictor of adoption (H9). Extending the model to strategic outcomes, we posit that adoption drives decision-making (H5) and facilitates Customer-Experience Innovation (H6). Finally, recognizing the role of value creation, Customer-Experience Innovation is expected to improve decision-making (H7) and mediate the relationship between adoption and decision-making (H8)
By framing these hypotheses within BRT, the study captures both the cognitive (understanding) and affective (resistance) aspects of bankers' reasoning. This approach is novel in that it examines organizational innovation adoption through the lens of behavioral psychology and situates it in the understudied Libyan banking environment.

11. Results:

11.1. Demographical Analysis:

Table1: Frequencies

		Frequency	Percent
Gender	Male	76	80.9
	Female	18	19.1
	Total	94	100.0
Age	Younger than 25 years	6	6.4
	25-30	22	23.4
	31-45 years	39	41.5
	Older than 45	27	28.7
	Total	94	100.0
Qualification	Intermediate Diploma	5	5.3
	Higher Diploma	24	25.5
	Bachelor's Degree	61	64.9
	Master	1	1.1
	PhD	3	3.2
	Total	94	100.0
Affiliation	National Commercial Bank	24	25.5
	Jumhouria Bank	17	18.1
	North Africa Bank	17	18.1
	Al Wahda Bank	18	19.1
	Sahara Bank	18	19.1
	Total	94	100.0
Job Title	Administration Manager	1	1.1
	Branch Manager	2	2.1
	Head of Department	26	27.7
	Head of unit	8	8.5
	Employee	54	57.4
	Deputy Director	2	2.1
	Clearing Officer	1	1.1
	Total	94	100.0
Duration of Experience	Less than 5 years	21	22.3
	5-10 years	21	22.3
	11-15 years	22	23.4
	More than 15 years	30	31.9
	Total	94	100.0

The demographic and occupational characteristics of the 94 study participants, as shown in Table 1, indicate a male dominated sample (80.9%). Regarding age, the 31-45 and over 45 categories were the most prevalent, accounting for 41.5% and 28.7% respectively. The participants' education is primarily at the Bachelor's level (64.9%) with many fewer having postgraduate degrees. The prescribed sample was taken from five different banks, out of which the National Commercial Bank formed the largest group (25.5%). Employees and departmental heads accounted for the largest share of the employed population at 57.4% and 27.7%, respectively. The range of professional experience is broad, but a considerable number have more than fifteen years of work experience (31.9%).

11.2. . PLS-SEM Results

To test the proposed research model, Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed with SmartPLS 4. PLS-SEM was selected for its suitability for exploratory research with complex models and its robustness in handling non-normal data distributions

and smaller sample sizes (N=94), which characterize the current study on Libyan banking professionals (Hair et al., 2022).

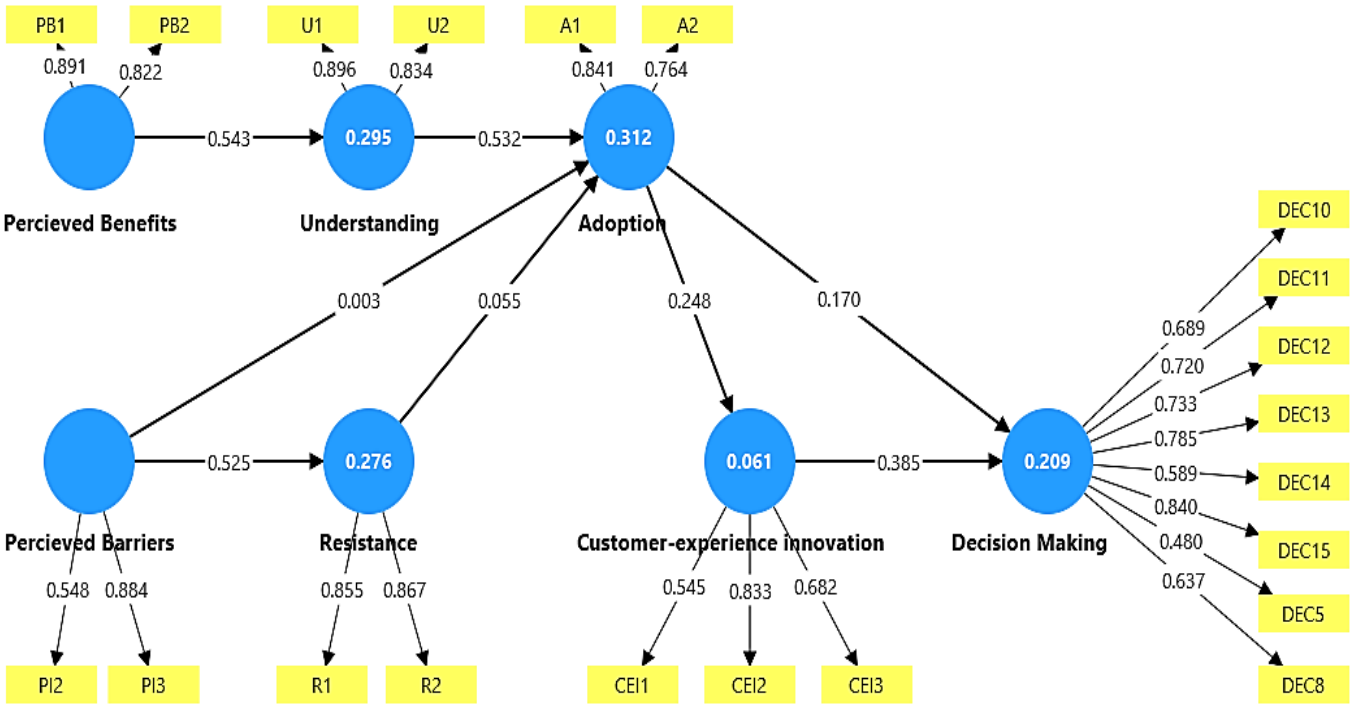

Figure 2. Structural equation model results showing the relationships among variables

11.2.1. Measurement Model Assessment

The study's measurement model was evaluated based on indicator reliability, internal consistency, and convergent validity (Table 2).

construct	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Adoption	0.453	0.461	0.784	0.645
Customer Experience Innovation	0.502	0.557	0.733	0.485
Decision Making	0.843	0.869	0.878	0.479
Perceived Barriers	0.170	0.202	0.690	0.541
Perceived Benefits	0.644	0.666	0.847	0.735
Resistance	0.651	0.652	0.851	0.741
Understanding	0.668	0.689	0.856	0.749

11.2.2. Internal Consistency and Reliability

The constructs Understanding, Perceived Benefits, and Decision Making demonstrated satisfactory internal consistency, with Composite Reliability (rho_c) values exceeding the recommended threshold of 0.70 (Hair et al., 2019). For instance, Decision Making reported a high rho_c of 0.878.

However, the Perceived Barriers construct exhibited a low Cronbach's alpha (alpha = 0.170). While values below 0.70 are typically cautioned against, PLS-SEM literature suggests that Cronbach's alpha is a conservative measure that can underestimate reliability in two-item scales or exploratory contexts (Hair et al., 2022). The Composite Reliability for Perceived Barriers was rho_c = 0.690, which approaches the acceptable threshold for exploratory research, justifying its retention for structural analysis.

11.2.3. Convergent Validity

Convergent validity was assessed using

the Average Variance Extracted (AVE). Most constructs met the standard criterion of AVE > 0.50. Two constructs, Decision Making (AVE = 0.479) and Customer-experience Innovation (CEI) (AVE = 0.485), fell slightly below this threshold. According to Fornell and Larcker (1981), if the AVE is less than 0.50 but the Composite Reliability is greater than 0.60, the construct's convergent validity is still considered adequate. As the rho_c values for both constructs were well above 0.70, convergent validity was accepted.

11.2.4. Discriminant Validity

Discriminant validity was examined using the Heterotrait-Monotrait ratio (HTMT) (Henseler et al., 2015). Most constructs demonstrated distinctiveness with HTMT values below 0.90. A notable exception was the relationship between Resistance and Perceived Barriers (HTMT = 1.454). This high value indicates substantial conceptual overlap, suggesting that, in the context of the Libyan banking sector, respondents perceive external barriers and internal resistance as inextricably linked constructs.

11.2.5. Structural Model Assessment

The structural model assessment examined the path coefficients (beta), significance levels (p-values), and the coefficient of determination (R^2). Bootstrapping with 5,000 subsamples was performed to determine significance **(Table 3).**

Table 3: Structural Path Results

Hypothesis	Path	β	p-Value	Result
H1	Perceived Benefits ⟶ Understanding	0.543	0.000	Supported
H2	Understanding ⟶ Adoption	0.532	0.000	Supported
H3	Perceived Barriers ⟶ Resistance	0.525	0.000	Supported
H4	Perceived Barriers ⟶ Adoption	0.003	0.978	Not Supported
H5	Adoption ⟶ Decision Making	0.170	0.119	Not Supported
H6	Adoption ⟶ CEI	0.248	0.068	Partially Supported
H7	CEI ⟶ Decision Making	0.385	0.000	Supported
H9	Resistance ⟶ Adoption	0.055	0.633	Not Supported

The model explains 31.2% of the variance in Adoption ($R^2 = 0.312$), primarily driven by Understanding. Furthermore, 20.9% of the variance in Decision Making ($R^2 = 0.209$) is explained, largely influenced by Customer-Experience Innovation.

12. Discussion

This study aimed to explore the impact of Design Thinking (DT) adoption on decision-making in Libyan public commercial banks, utilizing Behavioral Reasoning Theory (BRT) to understand the drivers and inhibitors of adoption.

12.1. The Affirmative Pathway:

The results provide strong empirical support for the affirmative pathway of the BRT model. Perceived Benefits significantly enhance Understanding (H1, beta=0.543), which in turn is the strongest predictor of Adoption (H2, beta=0.532). This aligns with previous findings by (Jirli, 2024), who noted that in the banking sector, knowledge and understanding serve as critical mechanisms for reducing uncertainty. For Libyan banking professionals, adopting Design Thinking is fundamentally a cognitive process; they must first perceive the methodology's utility before investing in understanding it. Once understood, the adoption of DT tools follows naturally.

12.2. The Resistance Paradox

Consistent with Innovation Resistance Theory (Ram & Sheth, 1989), Perceived Barriers strongly predict Resistance (H3, beta=0.525). This strong predictive relationship confirms the universal tenets of the theory; however, the specific nature of this resistance in our sample is deeply tied to the local context. In the highly constrained environment of Libyan banking, resistance is not merely driven by

a psychological reluctance to change, but is heavily fueled by severe, systemic impediments, namely outdated technologies and rigid regulatory constraints (Elhajji & Mihai- Yiannaki, 2025). However, contrary to H4 and H9, neither Barriers nor Resistance showed a significant negative impact on Adoption.

This null result presents a Resistance Paradox. It suggests that while employees are acutely aware of obstacles and may express resistance, these factors do not necessarily halt the adoption process if Understanding is present. This implies that Understanding acts as a buffer; in the Libyan context, cognitive mastery of the tool (DT) may override the affective resistance caused by institutional barriers.

12.3. Design Thinking and Decision Making: The Role of Innovation (H8)

A critical contribution of this study is the validation of the modified decision-making model.

• The direct link from Adoption to Decision Making was insignificant (H5, p=0.119).

• However, Adoption positively influences Customer-Experience Innovation (CEI) (H6, p=0.068), and CEI strongly predicts Decision Making (H7, beta=0.385).

These findings support the theoretical proposition that Design Thinking does not improve decision-making in a vacuum. Instead, as suggested by (Frisk & Bannister, 2022), DT facilitates more effective decision-making by expanding the range of alternatives and deepening problem understanding. In the Libyan banking context, this occurs through the mechanism of Customer-Experience Innovation (i.e. H8 supported). When banks adopt DT, they generate innovations in customer service (CEI), which provide the strategic data and insights necessary for improved decision-making. These findings align with those by (Owda, 2018), who found that design thinking mediates the relationship between process management and decision-making efficiency.

Recommendations

Based on these findings, Libyan public commercial banks should take the following steps:

- Train and educate staff on DT. Develop workshops and curricula to explain the design thinking process and its benefits for the banking industry. Since understanding strongly drives adoption, targeted training can build knowledge and reduce fear of the unknown.
- Communicate benefits clearly. Share case studies or pilot successes (local or international) that illustrate tangible gains from design thinking.
- Address barriers proactively. Identify internal obstacles (bureaucratic rules, lack of authority, risk policies) that staff cite as barriers. Adjust procedures to allow small-scale experimentation; create cross-functional teams to break down silos; involve middle managers early to reduce resistance. Align incentives with innovation goals.
- Start small with pilots. Implement pilot projects in one branch or department using design thinking. Monitor and publicize results to demonstrate its value. Even if initial outcomes are modest, successful projects build momentum and reduce anxiety about larger changes.
- Leverage external support. The Central Bank of Libya is pushing digital transformation; banks can align design thinking with these initiatives.

Limitations and Future Research

This study has several limitations. It is based on a cross-sectional survey of 94 employees from five public commercial banks in one Libyan city (Sebha), which limits generalizability. The sample skewed toward males and high

experience, and only public-sector banks were included. The PLS-SEM analysis used recoded survey constructs, which may obscure nuanced attitudes. Future research should expand both sample size and diversity; for instance, include private and Islamic banks, multiple regions, and a broader employee mix. Qualitative studies would be valuable for unpacking why design thinking is viewed skeptically and for identifying contextual enablers.

Future studies could incorporate additional factors. For example, organizational slack, leadership style, or regulatory factors might moderate DT adoption in this context. Longitudinal designs would track whether increased training or pilot programs actually translate into greater innovation outcomes over time. Comparing Libyan banks with those in neighboring countries or with those in countries with different organizational cultures would also clarify the role of culture and context. In sum, while this study highlights the current gap between the promise of DT and practice in Libyan banking, further work is needed to develop actionable roadmaps for embedding human-centered innovation in challenging environments.

Conclusion

The study concludes that Understanding is the primary driver of DT adoption in Libyan public commercial banks in Sebha, Libya. While structural and cultural barriers fuel resistance, they do not completely block adoption, provided that employees possess sufficient knowledge of the methodology. Furthermore, the impact of Design Thinking Adoption on Decision Making is indirect; it is realized only when adoption translates into tangible Customer-Experience Innovations.

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