

**HIGHER SCHOOL OF MANAGEMENT AND DIGITAL
ECONOMY**



H.S.M.D.E

**A Thesis Submitted in Partial Fulfillment of the Requirements for
the degree of Masters**

Specialty: E-business

Title:

**The Impact of Digital Transformation on
Data Privacy and Customer Relationship in
Algerian Banks**

CASE: BEA 013 DE KHEMIS MILIANA

Submitted by:

MS: Yousra FERRAH

Supervised by:

DR: AZZAZ Rachid

Promotion:

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Dedications

First, I thank Allah for all His facilitations in this work since the very first step. I dedicate this thesis to myself and my thesis supervisor, for whom words are not enough to express my gratitude for his excellent work. I want to thank me for believing in me and my abilities. Celebrate now yousra, you have accomplished it.

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List of abbreviations:

Symbols & Abbreviations	Meaning	Apparitions
BEA	"Banque Extérieure d'Algérie" which translates to "External Bank of Algeria"	P:2,3, 21,23...
RIB	"Relevé d'Identité Bancaire" in French, which translates to "Bank Identification Statement" in English.	P:56
HRD	Human Resources Direction	P:51
ATD	"Avis à Tiers Détenteur," which translates to "Third Party Notice" in English	P:54
CRM	Customer Relationship Management	
CIB	"Carte Interbancaire." This refers to "interbank card"	P:26
DGA	"Direction Générale Adjointe" in French, which translates to "Deputy General Directorate"	P:52
URL	Uniform Resource Locator	P:43
CNAS	"Caisse Nationale d'Assurance Sociale" in French, which translates to "National Social Security Fund"	P:28
SAA	"Société Nationale d'Assurance," which translates to "National Insurance Company"	P:22
CAAR	"Compagnie Algérienne d'Assurance et de Réassurance," which translates to "Algerian Insurance and Reinsurance Company"	P :22
BAADR	"Banque de l'Agriculture et du Développement Rural" in French, it translates to "Bank of Agriculture and Rural Development"	P :22
CPA	"Crédit Populaire d'Algérie" which translates to "Popular Credit of Algeria"	P:22
CNEP	"Caisse Nationale d'Épargne et de Prévoyance" in english "National Savings and Provident Fund"	P :28
BNA	Banque nationale d'Algérie in english algerian national bank	P :28
BDL	Banque de développement local in english local development bank	P :28
BNP	"Banque Nationale de Paris" (National Bank of Paris)	P :67
SGA	Société général Algérie	P :67
AGB	Gulf bank algeria	P :67
SPSS	Statistical Package for the Social Sciences	P:72...

Abstract

This research aims to explore how technological, social, and individual factors influence Algerian user's perceptions of security and privacy in digital banking, impacting their intention to continue using digital banking applications. Analyzing data from 226 respondents, the research reveals a direct connection between perceived mobile transaction security and the security of mobile banking apps. It emphasizes the influence of security perception on user's intent to continue using digital banking apps. Additionally, social factors, privacy awareness, and the effectiveness of privacy policies collectively shape perceived privacy risks in Algerian digital banking. The study provides insights for Algerian digital banking users, enhances understanding of digital banking practices in the country, and offers guidance to banking institutions and app developers in improving security and addressing privacy concerns for Algerian users.

Key words: Privacy, Security, Costumer Relationship, Digitization, E-banking.

Résumé

Cette recherche vise à explorer comment les facteurs technologiques, sociaux et individuels influencent les perceptions des utilisateurs algériens en matière de sécurité et de confidentialité dans la banque numérique, impactant leur intention de continuer à utiliser les applications de banque numérique. En analysant les données de 226 répondants, la recherche révèle un lien direct entre la sécurité perçue des transactions mobiles et la sécurité des applications de banque mobile. Elle met l'accent sur l'influence de la perception de la sécurité sur l'intention des utilisateurs de continuer à utiliser les applications de banque numérique. De plus, les facteurs sociaux, la sensibilisation à la confidentialité et l'efficacité des politiques de confidentialité contribuent conjointement à façonner les risques perçus en matière de confidentialité dans la banque numérique en Algérie. L'étude fournit des informations pour les utilisateurs algériens de services bancaires numériques, améliore la compréhension des pratiques de la banque numérique dans le pays et offre des orientations aux institutions bancaires et aux développeurs d'applications pour améliorer la sécurité et répondre aux préoccupations en matière de confidentialité des utilisateurs algériens.

Mots clés : Confidentialité, Sécurité, Relation client, Numérisation, Banque en ligne.

خلاصة

يهدف هذه البحث إلى دراسة كيفية تأثير العوامل التكنولوجية والاجتماعية والفردية على تصورات مستخدمي البنوك الرقمية في الجزائر بشأن الأمان والخصوصية، مما يؤثر على نيتهم في مواصلة استخدام تطبيقات البنوك الرقمية. من خلال تحليل البيانات من 226 مشارك، تبين وجود ارتباط مباشر بين الأمان المتصور لعمليات التداول عبر الهواتف المحمولة وأمان تطبيقات البنوك المحمولة. مما يؤكد تأثير تصورات الأمان على نية المستخدمين في مواصلة استخدام تطبيقات البنوك الرقمية. بالإضافة إلى ذلك، تساهم العوامل الاجتماعية والوعي بالخصوصية وفعالية سياسات الخصوصية في تشكيل المخاطر المتصورة بشأن الخصوصية في البنوك الرقمية في الجزائر. تقدم هذه الدراسة رؤى لمستخدمي البنوك الرقمية في الجزائر وتعزز فهم ممارسات البنوك الرقمية في البلاد، وتقدم إرشادات للمؤسسات المصرفية ومطوري تطبيقات البنوك في تحسين الأمان ومعالجة مخاوف الخصوصية للمستخدمين الجزائريين

الكلمات المفتاحية: الخصوصية، الأمان، علاقة العملاء، التحول الرقمي، الخدمات المصرفية عبر الإنترنت.

General introduction

Human civilization is currently facing a digital revolution that has touched almost every corner of the world. It is important to observe that the process of migrating from manual to digital systems in various areas has been occurring by stages; but more than that the process has been seeming to rub off on certain industries. Nonetheless, it remains worth noting that it took the entirely unexpected turn of events related to coronavirus pandemic to gain the momentum which made everybody stand in awe.

Despite the development in digitalization, this tragedy highlighted the need of its presence in all transactions. Specifically, banks.

Banks are increasingly using technological advancements to make their services better and meet their customer's changing requirements. Adoption of mobile banking applications has been a major part of this technology change. These applications offer convenience, accessibility, and flexibility, allowing users to manage their finances on-the-go. However, the success of mobile banking is intrinsically linked to its security, which is a paramount concern for both banks and their users.

Banks are seeking to investigate how they can adjust and improve their services for their client's betterment in a safer manner. Digitization is no longer a choice but a must for them to keep in touch with clients and meet changing expectations.

In today's competitive age, it is crucial for any bank to offer faster and easier services through integration of digitalization into its system

With this shift towards the digital era, the importance of data privacy has been deeply appreciated. The protection of clients data and the keeping of their information confidential is compulsory. The bank has an obligation of making sure that it has established a safe environment for all its clients enabling them to rely on the bank without worrying about data confidentiality.

In the digital age, a robust banking sector desires to improve their customer's experience while fulfilling their expectations through personalization and effective communication. Furthermore, they aim at achieving the right equilibrium between digital technology and protecting customer data privacy.

Algerian banks have begun implementing digitalization as well as undergoing digital transformation within their financial sectors although the rate seems slow so far with this particular change touching significant parts in this sector. Among these efforts are the provision of online banking services, the ability to pay electronically, and the launch of mobile banking applications. Furthermore, there are efforts to enhance security measures to protect customer information and secure electronic transactions.

Nonetheless, regulatory hurdles and existing banking laws continue to pose challenges to digitization processes in Algerian banks.

This clash between customer data privacy and digital sector in Algerian banks brings us to the following question:

What is the impact of digital transformation on Algerian banks in terms of customer relationships and data privacy?

Implementing my training at the BEA bank holds significant strategic value to study the impact of digital transformation on Algerian banks, especially in the context of customer relationships and data privacy. Adopting digital transformation by the BEA, in addition to its continued presence as a public institution since ancient times, let's say it ensures access to the information and insights to be gained.

To answer the previous problematic, we suggest the following sub-questions:

- What is the current status of digitization within traditional Algerian banks?
- How does digitization impact the system of traditional Algerian banks, customer perceptions, and behavior?
- How does digital transformation affect data privacy, and what is the relationship between these two?

In order to answer these sub-questions, we encountered a set of hypotheses:

- There is a moderate development in the field of digitization, including the adoption of digital technologies and improvements in online services, along with challenges in providing advanced services on a wide scale.

- Digital transformation, accompanied by enhanced security measures and data protection, ensures the confidentiality of information and safeguards it from potential threats.
- There is a link between privacy and security perceptions and the overall customer satisfaction on the intent to continue using digital banking.

This research aims to determine:

- Assess the level of digitization within traditional Algerian banks, focusing on the adoption of digital technologies and improvements in online services.
- Investigate the impact of digitization on Algerian bank's systems, including its effects on customer perceptions and behavior towards banking services.
- Evaluate the influence of digital transformation on data privacy within Algerian banks, examining the relationship between technological advancements, security and the protection of customer information.

For better understanding of our subject, we structured our research work into two chapters:

- The first chapter (theoretical Chapter): we discuss theoretical aspects related to our subject, including the concept of digital transformation, its impact on the banking sector, the evolution of digitalization in Algerian banks, the importance of data privacy, legal frameworks governing data protection, and customer perceptions and concerns regarding data privacy.
- The second chapter (practical chapter): delves into the practical implementation and analysis of our research findings. This includes presenting an overview of BEA Algeria and the agency 013, examining its history and organizational structure, conducting an empirical study to gather data, and analyzing the collected data to draw conclusions and make recommendations for future work.

Chapter I: Digital Transformation in Banking: Concepts, and Data Privacy Considerations

This chapter serves as an introduction to the fundamental concepts of digital transformation and its significant implications for the banking sector, with a particular emphasis on data privacy considerations. It examines the overarching global trends driving this transformation and highlights the associated challenges and opportunities. Additionally, the chapter zooms in on the Algerian banking landscape, offering insights into the evolving digital banking landscape within the country. By laying this groundwork, the chapter paves the way for a more comprehensive examination of digital transformation in the next chapter.

I. Section 01: Digital Transformation and its impact on the Banking sector

In this section, we delve into digital transformation, differentiating it from digitalization and outlining its core concepts and definitions. We explore global trends driving this transformation, highlighting key innovations and challenges. Our aim is to provide a foundational understanding of digital transformation and its impacts on the banking sector and beyond.

I.1. Digital Transformation

1. Digitalization or digital transformation?

"Digitalization" is a more commonly used term compared to "digital transformation," although the latter has been in existence for a longer time. "Digitalization" typically pertains to specific areas like processes or jobs. In contrast, "digital transformation" is applied to comprehensive entities like businesses, governments, or societies, where a profound and paradigm-shifting change challenges established beliefs, organizational structures, and practices (1,2).

Digital transformation encompasses changes brought about by new technologies, directly impacting a business and its interactions (3). Additionally, it could be defined generally as: *"The process that aims to improve a unit by bringing about essential changes in its structure through combining information, information technology, communications, and connectivity technology"* (4). Thus, the digital transformation includes a broad concept of banking, namely: digitization of documents, an electronic signature for transactions, e-learning, teleconference, online trading platforms, digital stores, e-statements and m-payments (5).

Digital transformation within the banking industry encompasses the assimilation of digital technologies and forward-thinking approaches into the realm of financial services. Its primary objectives are to elevate operational efficiency, enrich the quality of customer interactions, and

¹ Digital Conseil Définition de la digitalisation, <https://www.digitall-conseil.fr/definitiondigitalisation>, Nov 03, 2023.

² Idem.

³ Riemer, K., Brunk, J., Gal, U., Gilchriest, B., & Ord, R. (2013), Australian Digital Commerce : A commentary on the retail sector.

⁴ G. Vial. (2019), understanding digital transformation, cleaner production 174, 118-144.

⁵ Yip, A. B. (2019), sustainable business model archetypes for the banking industry j clean prod, j clean prod, 150-169.

align with the ever-changing dynamics of the market environment. Banks have evolved from digital reluctance and reliance on paper-based processes to fiercely competing in a disruptive digital market. Despite progress, they haven't been at the forefront compared to other industries. With the surge in online shopping and mobile app usage, banks must adapt their operations for a competitive edge. This adaptation entails a comprehensive digitization strategy, covering aspects from customer engagement to intricate back-end operations.

2. Concepts and definitions:

For a deeper exploration and better understanding of the subject, we tried to explore fundamental concepts and terms in that are in relation with digital transformation:

Table 1: Digital transformation related definitions

Digital Banking	The use of digital technology to provide banking and financial services, including online account management, electronic transfers, and digital payment methods ⁽¹⁾ .
Digital Transformation	The process of integrating digital technologies into a bank's operations and services to enhance efficiency and customer experience ⁽²⁾ .
Online Banking	The provision of banking services through the internet, allowing customers to access their accounts, make transfers, and conduct financial transactions online ⁽³⁾ .
Mobile Banking	A subset of digital banking that involves the use of mobile applications to perform banking transactions via smartphones and tablets ⁽⁴⁾ .
E-Banking	Electronic banking that encompasses all banking activities conducted online, which can include account management, payments, and online customer service ⁽⁵⁾ .

Digital transformation is intricately linked with the integration of emerging technologies, including fintech, cybersecurity, and blockchain, among others. These technologies play a vital

¹ HDFC BANK, <https://www.hdfcbank.com/personal/resources/learning-centre/digital-banking/what-is-digital-banking>, October 29/2023.

² Maya Lawrence, P. M. (2022, MARS 24), supra banking, <https://www.soprabanking.com/insights/what-is-digital-banking/>, October 29/2023.

³ Maya Lawrence, P. M, opcite.

⁴ Maya Lawrence, P. M, opcite.

⁵ Schaechter, A. (2002, march 1), IMF Policy Discussion Papers, <https://www.imf.org/en/Publications/IMF-Policy-Discussion-Papers/Issues/2016/12/30/Issues-in-Electronic-Banking-An-Overview-15689#>, October 29/2023.

role in reshaping the banking landscape. The table below showcases some of the most prominent technologies driving this transformation.

Table 2: Digital transformation related Technologies

Fintech (Financial Technology)	Technology-driven companies that provide innovative financial services, often partnering with traditional banks to enhance digital offerings ⁽¹⁾ .
Digital Wallet	A secure digital tool that stores payment card information, allowing customers to make electronic transactions through their smartphones or computers ⁽²⁾ .
Cybersecurity	The practice of protecting digital systems and data from theft, damage, or unauthorized access, which is crucial in the context of digital banking ⁽³⁾ .
Blockchain	A decentralized and secure digital ledger technology used for recording financial transactions and ensuring transparency and security ⁽⁴⁾ .
Biometric Authentication	The use of unique biological characteristics like fingerprints, facial recognition, or voice patterns for secure identification and access to banking services ⁽⁵⁾ .

Among the related concepts, two noteworthy ones are Open Banking and RegTech (Regulatory Technology).

Open Banking	A system that allows banks to provide access to their customer data to third-party financial service providers through secure APIs, fostering innovation and competition ⁽⁶⁾ .
RegTech (Regulatory Technology)	Technology solutions designed to help banks and financial institutions comply with regulatory requirements efficiently and accurately ⁽⁷⁾ .

¹ Ya, S. L. (2020), Prospects and Risks of the Fintech Initiatives in a global banking industry, Проблемы экономики, (1 (43)), 275-282.

² corporate finance institute, (2022), <https://corporatefinanceinstitute.com/resources/cryptocurrency/digital-wallet>, October 29/2023.

³ Schiliro, F, (2023), toward a contemporary definition of cybersecurity, arXiv, 1-2.

⁴ CHUI, M, (2022), WHAT IS BLOCKCHAIN, McKinsey and company, 1-3.

⁵ DIN, A, (2021), What Is Biometric Authentication? Advantages & Disadvantages of Biometric Authentication Use Cases and How Popular Biometric Methods Work, Heimdall security.

⁶ Maya Lawrence, P. M, opcite.

⁷ I, A. (2018), Fintech and regtech: impact on regulators and banks, icon bus, 7-25.

I.2. Global Trends in Digital Transformation

In order to explore the global trends in digital transformation it is necessary to comprehend how they influence diverse sectors worldwide. Digital transformation reshapes industries and changes the way things are done in fields such as higher education, banking and manufacturing. Here are some important developments in different areas:

1. Global Trends by sector:

- **In higher education institutions:** Digital transformation has been given a lot of importance by higher education institutions (HEIs) because they realize it is present in all academic and administrative functions. This includes teaching, learning, research and operational processes which also involve the use of digital devices for both new infrastructures as well as newer version additions. In this transformation, new infrastructures get constructed while the use of digital media and technologies gradually increases concerning teaching and learning, research, support services, administration, and communication. On the other hand, the need for students and staff in their current and future work places involves developing new digital skills¹.
- **In manufacturing:** Digital Transformation aims at making it possible to produce things more efficiently at lower cost and adjust to changing conditions in the world market with technologies such as Industry 4.0 and Internet of Things².
- **In the banking industry:** Digital transformation is at the heart of leading to more idea, efficiency and improved customer experiences in the banking industry. Major developments include mobile banking apps, online payment systems, AI for managing customers and blockchain for secure transactions. The customer's constantly changing needs force banks to concentrate on providing individualized digital experiences coupled with omnichannel solutions³.

¹ Kaputa Vladislav, Loučanová Erika, and Fernando A. Tejerina-Gaite (2022). Digital Transformation in HEIs as a Driver of Social Oriented Innovations in Social Innovation. Innovation, Technology, and Knowledge Management. Bloomsbury Publishing. New York USA.

² Butler John, Digital Transformation in Manufacturing: Adapting to Industry 4.0 and Beyond, <https://www.automate.org/industry-insights/digital-transformation-in-manufacturing-adapting-to-industry-4-0-and-beyond> , 9 May 2024.

³ Grinberg David, Digital Banking Trends: Get Ready for 2024, <https://www.techmagic.co/blog/digital-banking-> , 9 May 2024.

2. Global Innovation Trends:

Global innovation trends in digital transformation continue to evolve as technology advances and the business landscape changes. An example of some key innovation trends in digital transformation as follow:

- **Artificial Intelligence (AI) and Machine Learning:** AI and machine learning continue to be at the forefront of digital transformation. AI by ingesting large amounts of labeled training data, analyzing the data for correlations and patterns, and using these patterns to make predictions about future states. data analysis, AI can be used for predictive maintenance, customer service, and more¹. Machine learning algorithms are improving, allowing businesses to make more accurate predictions and automate tasks such as data preprocessing, feature development, modeling, neural network design, post-processing, and result analysis².
- **5G Technology:** The rollout of 5G networks is accelerating, enabling faster and more reliable connectivity. This is driving innovations in IoT, augmented reality (AR), virtual reality (VR), and other areas that require high-speed, low-latency connections³.
- **Internet of Things (IoT):** IoT devices are becoming more prevalent in various industries. These devices provide real-time data that can be used to improve operations, maintenance, and customer experiences⁴.
- **Edge Computing:** Edge computing involves processing data closer to the source of data generation. It reduces latency and allows for faster decision-making. It's crucial for applications like autonomous vehicles and smart cities⁵.
- **Blockchain Technology:** Blockchain is being used for secure and transparent transactions. It has applications in supply chain management, finance, and even voting systems¹.

¹ Laskowski Nicole, Tucci Linda, what is artificial intelligence (AI)? Everything you need to know, <https://www.techtarget.com/searchenterpriseai/definition/AI-Artificial-Intelligence> , 9 May 2024.

² Vasilchenko Alex, TOP 12 Machine Learning Technology Trends To Impact Business in 2024, <https://mobidev.biz/blog/future-machine-learning-trends-impact-business> , 9 May 2024.

³ Van Loon Ranold, 5G-Powered Digital Transformation: Driving the Global Digital Economy Forward, https://nl.linkedin.com/in/ronald-van-loon-5411a?trk=article-ssr-frontend-pulse_publisher-author-card , 9 May 2024.

⁴ Burge Simon, What is IoT & Why IoT is Important, https://internationalsecurityjournal.com/why-iot-is-important/#Real-Time_Data_Decision-Making , 9 May 2024.

⁵ Herman Kim, What Is Edge Computing and Why Is It Important? <https://blog.seeburger.com/what-is-edge-computing-and-why-is-it-important/> , 9 May 2024.

- **Cybersecurity Innovations:** With the increasing digitization of businesses, cybersecurity innovations are essential. This includes advancements in threat detection, zero-trust security models, and AI-driven security solutions².
- **Cloud Computing:** Cloud services are evolving to provide more than just storage and processing power. They now offer AI capabilities, serverless computing, and offer immense scalability, flexibility, and cost-effectiveness to businesses and individuals alike³.
- **Digital Health and Telemedicine:** The healthcare industry is embracing digital transformation with telemedicine, wearable health devices, and electronic health records. The COVID-19 pandemic accelerated these innovations⁴.
- **Robotic Process Automation (RPA):** RPA involves using software robots or "bots" to automate repetitive tasks. It's being adopted in industries like finance, HR, and customer service⁵.
- **Augmented Reality (AR) and Virtual Reality (VR):** Training, product visualization, and immersive experiences are some of the ways in which AR and VR are being applied. They have applications in gaming, education, health care, design, and industry⁶.
- **Digital Twins:** Digital twins, as a core part of digital transformation, are virtual replicas of physical objects or systems result in improved decision-making, enhanced operational efficiency, predictive maintenance, and optimised resource utilisation. By leveraging the

¹ Hayes Adam, Blockchain Facts: What Is It, How It Works, and How It Can be used, <https://www.investopedia.com/terms/b/blockchain.asp#toc-drawbacks-of-blockchains> , 9 May 2024.

² Eckel Robert, <https://www.aware.com/innovations-in-cybersecurity-what-investors-need-to-know/#:~:text=Cybersecurity%20innovations%20are%20improving%20the,%2C%20privileged%20data%2C%20and%20employees.> , 9 May 2024.

³ Jha Rajoo, what is Cloud Computing and AI Service Models? | Cloud Computing 2.0: Evolution Towards Intelligent, Decentralized, and Sustainable Cloud Services, <https://www.linkedin.com/pulse/what-cloud-computing-ai-service-models-20-evolution-towards-rajoo-jha-ehqmc> , 10 May 2024.

⁴ Abraham Sanjay, Transforming Healthcare Through Digital Innovation: The Path to a Healthier Future, <https://community.sap.com/t5/sap-for-healthcare-blogs/transforming-healthcare-through-digital-innovation-the-path-to-a-healthier/ba-p/13580627> , 10 May 2024.

⁵ Valleskey Brianna, Robotic Process Automation (RPA): A Complete Overview, <https://www.inscribe.ai/robotic-process-automation> , 10 May 2024.

⁶ Pete Peranzo, Applications of AR and VR [Explained with Examples], <https://imaginovation.net/blog/ar-and-vr-applications/#:~:text=These%20technologies%20transport%20us%20to,AR%20and%20VR%20are%20limitless.> , 10 May 2024.

twins, companies can drive digital transformation and achieve significant business outcomes, including increased revenue, reduced costs, and improved user experiences¹.

3. Digital Transformation Challenges:

Organizations face several challenges when undergoing a digital transformation. These challenges include the need for persistent upskilling and knowledge update to keep up with the ever-expanding advancement of technology⁽²⁾. Resources, organizational and talent issues are key challenges that organizations need to address⁽³⁾. Information security is also a major concern, with challenges such as financial constraints, risk of security breaches, reduced productivity, and lack of expertise⁽⁴⁾. Employee behavior and resistance to change can also hinder the transformation process⁽⁵⁾. Additionally, organizations need to understand the basic building blocks of digital transformation and identify the enablers to smoothen the transformative process⁽⁶⁾. These challenges, should be addressed by organizations to successfully navigate the digital transformation implementation and success.

I.3. The Impact of Digital Transformation on the Banking Sector:

In this part, we will explore the impact of digital transformation on the banking sector. We'll highlight how this transformation can reshape the customer experience and what is their expectations, to cloture we'll see what is the opportunities and challenges of this transformation for banks.

1. Digitalization in The Banking sector:

Digital transformation in the banking sector represents a significant evolution from traditional paper-based processes to a modern, technology-driven approach. Historically, banks have been

¹ Mads Gudim Burheim, Why Digital Twins are Central to Digital Transformation, <https://www.aize.io/blog/digital-twins-central-digital-transformation> , 10 May 2024.

² MEGHA BATOLA. (2019), Digital Transformation of Indian Organizations: An Empirical Study of Challenges and Opportunities for Management, PSYCHOLOGY AND EDUCATION, 56(1), p (231).

³ Boris, Gebhardt. (2023), Challenges and Strategies for Organizations and Talent in Digital Transformation, Frontiers in artificial intelligence and applications.

⁴ Bemenet, Kasahun, Gebremeskel., Gideon, Mekonnen, Jonathan., Sileshi, Demesie, Yalew. (2023). Information Security Challenges During Digital Transformation. Procedia Computer Science.

⁵ Ashraf, Elsafty., Amal, Mahmoud, Yehia. (2023). Digital Transformation Challenges for Government Sector. Business and management studies, 9(1):11-11.

⁶ Harish.V, Mansurali. A, Krishnaveni.D (2023). Digital Transformation for Business: Enablers, Framework and Challenges. 203-218.

slow to embrace digital advances, but the rise of online shopping and smartphone apps has forced them to adapt quickly to stay competitive. Unlike other industries that have always led the way in digital innovation, banks were a late starter. However, it is now implementing comprehensive digital strategies that include customer engagement and improving back-end processes. This comprehensive approach is essential to ensure banks remain relevant and competitive in today's fast-paced, digital marketplace¹.

Digital transformation in the banking sector involves incorporating technology into various aspects of banking operations, resulting in significant shifts in how banks operate and provide value to their customers. Successful implementation enables banks to enhance their competitive edge in a saturated market².

2. The impact of digital services offered by banks on customer convenience and accessibility:

Banks offer a wide range of digital services to enhance customer convenience and accessibility. Some of the various digital services provided by banks include:

- **Digital payments:** Digital payment refers to the process of making financial transactions electronically, without the need for physical cash or checks. It involves using digital platforms, such as mobile banking apps, online payment gateways, or digital wallets, to transfer money from one party to another³.

With digital payment, you can make various types of transactions, such as paying bills, transferring funds to friends or family, making online purchases, or even paying for goods and services at physical stores using your smartphone or other digital devices. Digital payment methods offer convenience, speed, and security. They allow transactions anytime and anywhere, without the hassle of carrying cash or writing checks. Plus, they often

¹ Jim Marous, Digital Banking Transformation Trends for 2023, <https://thefinancialbrand.com/news/digital-transformation-banking/digital-banking-transformation-trends-for-2023-157279/>, 19 May 2024.

² Kazim Washija, The Rise of Digital Transformation in Banking: Why It Matters, <https://www.g2.com/articles/digital-transformation-in-banking#shift>, 28 Feb 2024.

³ BLAKELY-GRAY RACHEL, Digital Payments Are a Staple in Friendships, but What About Business? <https://www.patriotsoftware.com/blog/accounting/digital-payments/> 28 Feb 2024.

come with built-in security measures, such as encryption and authentication, to protect customer's financial information¹.

- **ATM services:** Automated Teller Machines (ATMs) provide various banking services (withdraw cash, check the account balance, transfer funds, and deposit money. ATMs are available 24/7, making them convenient for banking transactions outside of regular banking hours².
- **Mobile check deposit:** Mobile check deposit is a digital banking feature that enables users to deposit checks using their smartphones. By capturing clear images of the front and back of the check through their bank's mobile app, users can securely submit the check for processing. This convenient method eliminates the need to visit a physical branch or ATM, saving time and providing flexibility for banking transactions. It's a modern solution that simplifies the check deposit process for individuals on the go³.
- **SMS Banking:** SMS Banking is a service offered by banks that allows customers to access their account information and perform banking transactions through text messages (SMS) on their mobile phones. By sending specific commands or keywords to a designated SMS Banking number, customers can check their account balances, view transaction history, transfer funds, and receive alerts or notifications. It provides a convenient and accessible way for customers to manage their finances using simple text messaging⁴.
- **E-Statement:** electronic statement, is a digital version of a traditional paper statement provided by banks to their customers. It is a secure and convenient way for customers to receive and view their account statements electronically, usually through their online banking portal or mobile banking app. E-statements contain the same information as paper statements, including transaction history, balances, and other account details. By opting for e-statements, customers can reduce paper waste, access their statements

¹ Idem.

² What is ATM Definition & Uses, <https://paytm.com/blog/atm/what-is-atm-full-form-definition-uses/> , Mar 1, 2024.

³ Ryley Amond, What is mobile check deposit and which banks offer it?, <https://www.cnbc.com/select/what-is-mobile-check-deposit/> Mar 1, 2024.

⁴ What Is SMS Banking: Enhancing Convenience and Security, (JULY 21, 2023), from imperial bank group <https://www.imperialbankgroup.com/sms-banking/>, Mar 1, 2024.

anytime and anywhere, and easily store and retrieve them digitally. It's a modern and eco-friendly approach to managing financial statements¹.

- **Biometric authentication:** refers to the use of unique physical or behavioral characteristics of an individual to verify their identity. It involves using biometric data, such as fingerprints, facial recognition, voice recognition, or iris scans, to authenticate and authorize access to banking accounts or perform financial transactions².

Biometric authentication offers a higher level of security compared to traditional methods like passwords or PINs. Since biometric data is unique to each individual, it is difficult for someone to replicate or forge. This helps prevent unauthorized access and protects against identity theft or fraudulent activities.

When using biometric authentication for banking services, individuals need to enroll their biometric data with their financial institution. This data is securely stored and used for comparison during the authentication process. For example, when accessing a banking app or making a transaction, users may be prompted to scan their fingerprint or use facial recognition to verify their identity³.

The use of biometric authentication in banking services provides a convenient and secure way for customers to access their accounts and conduct transactions. It eliminates the need to remember complex passwords and reduces the risk of unauthorized access. However, it is important to note that biometric data should be handled with utmost care and stored securely to maintain user privacy and protect against potential data breaches⁴.

- **Digital wallets:** also known as e-wallets or mobile wallets, are digital platforms that securely store payment information, such as credit card details, bank account information, or digital currency. They provide a convenient and secure way for users to make electronic transactions, both online and in physical stores⁵.

¹ JUSTIN CRESSWELL, Electronic Bank Statements 101: What is an E-Statement?, <https://blog.firstnewyork.org/electronic-bank-statements-101-what-is-an-e-statement/>, Mar 1, 2024.

² BIOMETRICS IN BANKING the era of convenience with biometrics in payments, <https://www.idenfy.com/blog/biometrics-in-banking/#:~:text=Biometrics%20in%20banking%20is%20the%20use%20of%20unique,recognition%2C%20voice%20recognition%2C%20fingerprint%20scans%2C%20or%20retina%20recognition.> 10 Mar 2024.

³ Idem.

⁴ Idem.

⁵ LIZ HUND and RENE BENNET, Digital wallets: A beginner's guide to how they work, <https://www.bankrate.com/banking/what-is-a-digital-wallet/>, 10 Mar 2024.

Digital wallets typically come in the form of mobile applications that can be installed on smartphones or other digital devices. Users can add their payment information to the wallet, which is then encrypted and stored securely. When making a purchase, users can simply select their preferred digital wallet and authorize the transaction using authentication methods like passwords, PINs, or biometric data¹.

Digital wallets offer several benefits. They streamline the payment process by eliminating the need to carry physical cards or cash. They also provide an added layer of security, as user's payment information is not directly shared with merchants during transactions. Additionally, digital wallets often offer features like transaction history tracking, loyalty program integration, and the ability to store digital receipts².

Digital wallets can be used for various types of transactions, including online shopping, in-app purchases, peer-to-peer payments, and contactless payments at physical stores. Popular examples of digital wallets include Apple Pay, Google Pay, Samsung Pay, and PayPal.

Overall, digital wallets provide a convenient, secure, and efficient way for users to make electronic transactions, making them increasingly popular in today's digital economy³.

3. Changing Customer Expectations

While the banking sector is going through an ongoing digital revolution, customer expectations have gone through tremendous change. The expectations list below expounds on this rapidly changing scenario, stressing the changing dynamics around how customers interact with financial institutions as well as the increasing standards required from their banking experiences.

A. Convenience and Accessibility:

- **24/7 Access:** Digital transformation has enabled banks to provide services round the clock, allowing customers to access their accounts, make transactions, and seek information at any time⁴.

¹ Idem.

² Idem.

³ Idem.

⁴ Subrahmanya Bhat, January 2019, EXPLORING THE IMPACT OF DIGITAL TRANSFORMATION ON THE BANKING SECTOR: OPPORTUNITIES AND CHALLENGES, International Journal of Management (IJM), n°(1-2), vol(10), pp(138)

- **Online and Mobile Banking:** The rise of online and mobile banking has made it possible for customers to manage their finances from the convenience of their homes or on the go. This has greatly improved accessibility and reduced the need for physical branch visits ¹.

Banks are currently undergoing a revolution, which is made possible by the digital evolution taking place in the entire world. The change is pushed forward by consumer demands as they seek better services while the principal factors influencing it are numerous. Key among them is the shift in customer's engagement with banks as well as the higher levels of excellence required by people who use these institutions for their banking needs.

B. Real-Time Transactions (Immediate Processing):

In the current era of digital transformation, there is an emerging demand for immediate transactions that people are increasingly becoming used to performing quickly payments, transfers or any other kinds of financial transactions thus challenging conventional banking timings resulting into impulse².

C. Enhanced Security Measures (Emphasis on Security):

As the use of online transactions continues to grow, consumers are placing more importance on data security now than they have ever done. They are demanding advanced security protocols to ensure the safeguard of their personal and financial data, several options can enhance security such as biometric authentication and multi-factor authentication processes³.

D. Omnichannel Banking (Consistent Multichannel Experience):

Consumers want a consistent experience across various channels, including online platforms, mobile apps, and physical branches. The ability to start a transaction on one channel and seamlessly complete it on another is increasingly becoming an expectation⁴.

¹ Idem.

² Kreger Alex, What Are The Digital Banking Customer Expectations From Financial Services, [³ Idem.](https://theuxda.com/blog/banking-should-meet-customer-expectations#:~:text=Digital%20banking%20customer%20expects%20an,such%20as%20smartphones%20and%20la, 11 May 2024.</p></div><div data-bbox=)

⁴ Buddendick Christian, Gnauer Walther, Müller Nicolai, Omnichannel banking and its implications for bank management, <https://www.bankinghub.eu/innovation-digital/omnichannel-banking>, 10 Mar 2024.

E. Customer Service Excellence (Digital Customer Support):

With the rise of digital interactions, consumers expect responsive and efficient customer service through digital channels. This includes chatbots, AI-driven support, and timely responses to queries made through digital platforms¹.

F. Social Responsibility (Ethical Banking Practices):

Consumers are placing greater emphasis on social responsibility. They expect banks to demonstrate ethical business practices, environmental consciousness, and a commitment to social causes, aligning with their values².

G. Fully digital consumption:

Younger consumers prefer full digital interactions, avoiding direct engagement with business representatives. They excel in multitasking across various digital channels, emphasizing the importance of leveraging these channels to reach and engage them. The demand for notifications in service apps is high, reflecting the need for extensive use of digital platforms. Their innovation-centric lifestyle values real-time experiences, prompting financial services to adopt hyper-personalization through trend monitoring. Shifting from traditional advertising to tech-native formats is crucial for financial institutions. However, a Deloitte study reveals that only 34% of banks globally implemented fully digital processes during pandemics, highlighting the challenge of achieving a seamless mobile banking experience. To meet consumer expectations, banking must become omni-digital, avoiding annoying notifications. Many banks still invest in outdated channels, while users increasingly desire fully online transactions. Adapting to new trends may pose challenges, but those succeeding will access a vast audience, securing a promising future in a cashless society³.

H. Total transparency:

The current generation, accustomed to sharing private information, prefers total transparency and streamlined services with open IDs. Millennials prioritize service quality

¹ Ailleron, Customer support in the digital banking world, <https://bankautomationnews.com/allposts/core-cloud/customer-support-in-the-digital-banking-world/>, 10 Mar 2024.

² Kreger Alex, Research of Digital Customer Expectations from Banking and Fintech Services, page 5 https://www.researchgate.net/publication/361959618_Research_of_Digital_Customer_Expectations_from_Banking_and_Fintech_Services, 10 Mar 2024.

³ Ibid, page 2 to 3.

and are willing to share personal data for more personalized interactions. This contrast with previous generations highlights a shift in attitude towards privacy. While leveraging their data can enhance financial services, users also demand honesty and transparency, indicating that privacy is becoming a relic in the digital world¹.

Banks are making significant investments in order to meet the ever-changing needs of consumers by advancing the digital transformation. This necessitates revitalization of current systems, adopting latest technologies and putting more emphasis on customer centric strategies to ensure that the needs of above the norm tech-savvy persons are not just met but exceeded. For banks to stay ahead and keep lasting customer loyalty amidst ever- changing digital banking landscape it is important that they adapt to this kind of environment.

4. Challenges and Opportunities for Banks:

Digital transformation entails both challenges and opportunities for the banking industry. This section explores some key challenges and opportunities banks experience during their digital transformation journey.

4.1 Challenges:

In this part, we will explore the different challenges faced in digital banking transformation. These challenges span a range of critical areas, including data security, digital information security, human resource management, communications network architecture, and regulatory compliance. Each challenge presents unique hurdles that financial institutions must overcome to successfully adapt to digital demands.

- a. **Data Leakage Risk:** Data leaks which happen more in the digital age especially in financial systems require measures that provide protection, prevention, and mitigation².
- b. **Cyber Attack:** In order to effectively combat cybercrime, a special cyber security team should be established for the purpose of applying measures that can prevent cyber-attacks¹.

¹ Idem.

² Nurjanah Siti, Shalshabilla Vilza, Adinda Tri Widya Wulan Dari. (2023), DIGITAL TRANSFORMATION IN THE BANKING INDUSTRY CHALLENGES AND OPPORTUNITIES, International Journal of Accounting, Management and Economics, Num 1 Vol. page 66.

- c. **Human Resources:** Organizing human labor for forthcoming change through direction, counseling and coaching to guarantee that they have the relevant skills for the digital age and can grasp digital transformation when it arrives².
- d. **Communication Network Infrastructure:** It is crucial for modern banking operations that communication networks be designed in a manner which they will be supportive of accelerating digital change through facilitating online communication³.
- e. **Regulatory Framework:** There is compliance with legal frameworks regarding digital shift which entail regulations and laws that determine how such a shift would take place as well as the assistance given by government agencies regarding this issue⁴.

By understanding and addressing these challenges, organizations can effectively adapt to the demands of the digital age and ensure seamless implementation of digital banking initiatives.

4.2 Opportunities:

In this section, we will explore the opportunities presented by digital transformation for banking institutions. These opportunities include a range of aspects that enable banks to innovate, improve efficiency and enhance customer satisfaction. By adopting technology and digital strategies, banks can revolutionize customer interaction, streamline operations, and enhance risk management practices.

- a. **Enhance customer interaction:** Digital transformation in banks gives them the opportunity to interact with customers in new and meaningful ways. Banks can build stronger customer relationships through personalized experiences, self-service options, and omnichannel interactions. Banks can leverage data analytics, artificial intelligence, and machine learning to provide personalized

¹ Idem.

² Idem.

³ Idem.

⁴ Idem.

recommendations, targeted promotions, and proactive customer support, increasing customer satisfaction and loyalty¹.

- b. **Operational efficiency:** Digital bank transformation streamlines operations, standardizes operations, and reduces operational costs. By eliminating administrative paper, reducing manual errors, and improving the efficiency of operations, banks improve resource allocation, reduce operational expenses, and improve profitability. Automation, digital workflow, and data-driven decision making contribute to operational efficiency².
- c. **Improve risk management:** The digital transformation of banks allows financial institutions to enhance their risk management practices. Banks can more effectively detect and respond to fraud by exploiting advanced analytics, artificial intelligence and machine learning, accurately assessing credit risk, and identifying distortions in real time. It enables active risk management, enhances compliance with regulatory requirements, and reduces financial and reputational risks of the organization³.

By capitalizing on these opportunities, banks can provide themselves with opportunities for sustainable growth and competitive advantage in the digital age.

¹ Kwartalnyi Nazar, Digital Transformation in Banking: How Technology Is Reshaping Financial Services, <https://inoxoft.com/blog/digital-transformation-in-banking-how-technology-is-reshaping-financial-services/> , 19 May 2024.

² Idem.

³ Idem.

II. Section 02: Digital Transformation in the Algerian Banking Sector

II.1. Overview of Algerian Banking Landscape

Algeria serves as a stage for a banking sector witnessing transformations and developments. The Algerian banking landscape comprises a variety of banks and financial institutions offering diverse financial services. Here is a general overview of some prominent aspects:

1. Institutional Structure:

With the launch of the new bank the National Housing Bank, approved on December 29, 2022, the Algerian banking system had, at the end of December 2022, a total of 28 banks and financial establishments, all with their head office in Algiers. It is important to note that of the 20 existing banks, 12 offer Islamic finance products and services.

Banks and financial institutions are divided as follows according to their nature of activity:

- Seven (7) public banks.
- Thirteen (13) private banks with foreign capital, including one with mixed capital.
- Two (2) public financial institutions.
- Five (5) leasing companies, three (3) of which are public.
- One (1) mutual agricultural insurance company approved to carry out banking operations, having opted for the status of financial institution since the end of 2009.

At the end of 2022, the Algerian banking network had 1,626 branches, including 1,226 for public banks and 400 for private banks¹.

¹ Chapter V: Banking Intermediation and Infrastructure, Annual Report 2022: Economic and Monetary Evolution, Bank of Algeria, Page 53.

2. Digital Transformation:

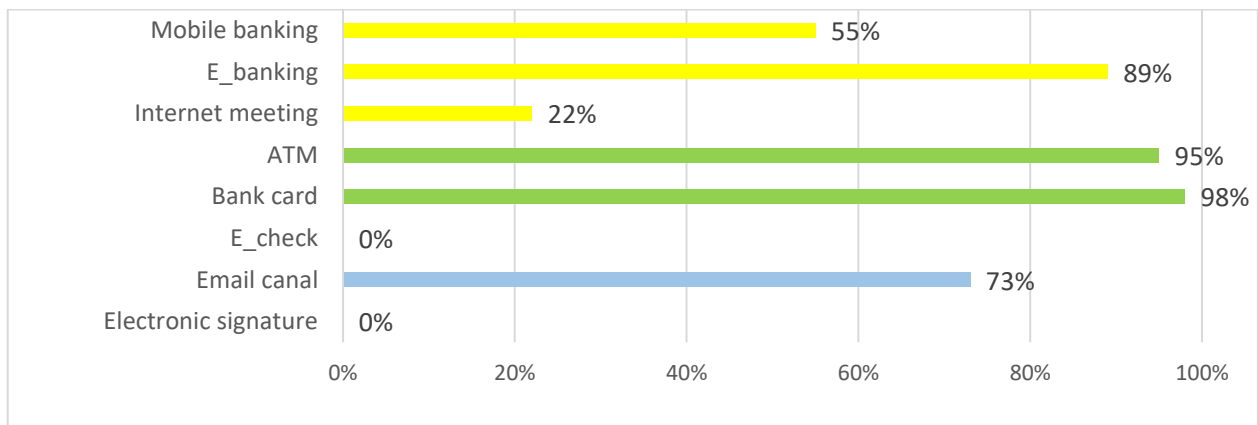
The digital transformation of the banking sector in Algeria is steadily advancing as banks equip themselves with automated technologies, such as chip cards and ATMs. Moreover, they specialize in offering diverse products and services through online platforms. In November 2021, Yacine Oualid, the delegate minister overseeing startups, announced the implementation of the legislative card to introduce virtual banks, reflecting the Algerian government's intention to usher in an era of 100% digital banks. This suggests that the government is working on a new monetary law aimed at facilitating the entry of new payment service providers into the market. This signals an ongoing evolution and commitment to embracing and integrating digitalization in the financial sector. Along the same lines, Algerians have embraced digital connections in their daily lives. Algerian banks must adapt to emerging market trends through digital transformation rather than simply being influenced by more developed countries.¹

3. The state of digitalization in Algerian banks:

The state of the banks including the level of digitalization is analyzed by many authors, one important demarche is by analyzing available digital tools and practices in Algerian banks ⁽²⁾

- **Digital tools and software used:**

Figure 1: Digital tools in Algerian banks



Source: BOUACHERIA KEBIR Ibtissem & SALHI Tarik ⁽¹⁾

¹ BOUACHERIA KEBIR Ibtissem & SALHI Tarik, dec 04,2022, The Algerian public banks in the era of the digital transformation, international journal of economic performance, Vol (05), P (102)

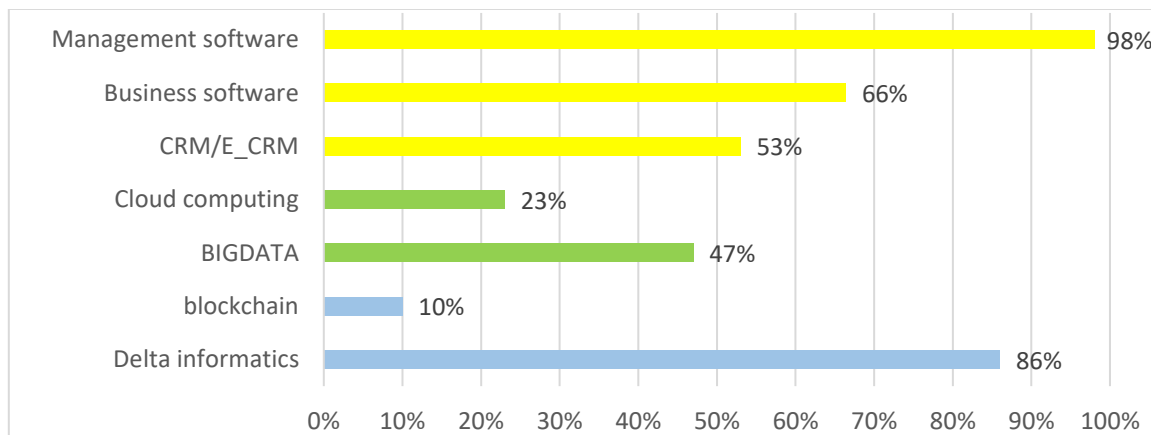
<https://www.asjp.cerist.dz/en/downArticle/640/5/2/206514>.

² Idem.

As part of their digital transformation initiatives, public banks have streamlined their remote and online banking services, introducing dedicated platforms for enhanced accessibility. Results indicate that every visited bank already offers both distant and online banking services. An overwhelming 98% of these banks acknowledge the widespread use of bank cards, encompassing nearly all institutions studied.

While the majority of banks utilize automated teller machines (ATMs), the adoption of mobile applications is selective, confined to specific banks. Notably, only BEA currently employs online meetings as part of its service offerings. However, electronic check and electronic signature functionalities have yet to be integrated into the services provided by the examined banks.

Figure 2: The used software in Algerian banks



Source: BOUACHERIA KEBIR Ibtissem & SALHI Tarik ⁽²⁾

A notable 98% of banks affirm the utilization of management software in their operations. However, the adoption of business software is constrained, with only 66.40% of banks restricting its usage to specific staff categories. Approximately 53% employ Customer Relationship Management (CRM) and electronic CRM tools for customer management. Strikingly, the incorporation of Cloud computing is exclusive to BEA, signaling a limited overall embrace of this technology.

¹ Ibid, P (103).

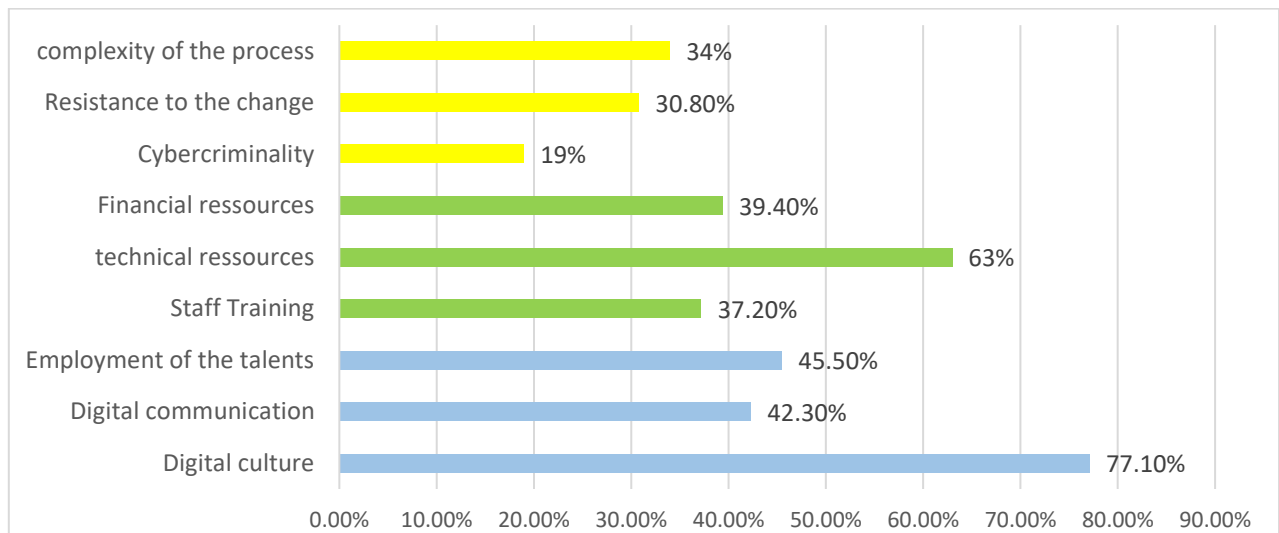
² BOUACHERIA KEBIR Ibtissem & SALHI Tarik, dec 04,2022, The Algerian public banks in the era of the digital transformation, International journal of economic performance, Vol(05), P(102)
<https://www.asjp.cerist.dz/en/downArticle/640/5/2/206514>.

Concerningly, only 18% of banks have integrated Big Data into their operations, reflecting insufficient implementation. The presence of Blockchain technology stands at a mere 10%, with the majority found in larger banks, indicating a notably low adoption rate. This deficiency is significant given the crucial role these advanced digital tools play in effective management. It is apparent that Algerian public banks currently exhibit limited engagement with sophisticated digital tools

A. The obstacles of the digital transformation:

After identifying the different tools used in the Algerian public bank’s digitalization, we shall pass to the evaluation of the obstacles of the digital transformation.

Figure 3: The obstacles of digital transformation in Algerian banks



Source: BOUACHERIA KEBIR Ibtissem & SALHI ⁽¹⁾

Despite the numerous advantages it offers, the digital transformation in Algeria encounters several obstacles, particularly within public banks. The primary challenge, identified by 77.1% of respondents, is the absence of a digital culture. Establishing and disseminating this culture among collaborators is deemed crucial for successfully navigating the complexities of digital transformation. A digital culture is seen as essential for comprehending and attributing meaning to the transformative changes impacting the functioning of banks.

¹ BOUACHERIA KEBIR Ibtissem & SALHI Tarik, dec 04,2022, The Algerian public banks in the era of the digital transformation, international journal of economic performance, Vol (05), P (102) <https://www.asjp.cerist.dz/en/downArticle/640/5/2/206514>.

The second obstacle is the insufficiency of technical resources, notably evident in 63% of the surveyed sample, where a lack of reliable internet connections hampers progress. Additionally, 45.5% of banks face challenges in digital transformation due to a scarcity of digital talents. Managers express concern that the shortage of qualified personnel significantly affects their operations.

Financial constraints hinder the digital transition for **39.4%** of studied banks, preventing necessary investments in updating materials, training staff, and acquiring new competencies. Complexity in the transformation process emerges as a key obstacle, with **34%** of interviewees citing it as a discouraging factor for digitalization. Moreover, **37.2%** of banks lack sufficient internal resources to facilitate the required changes, often stemming from a broader issue of inadequate training.

Managers also highlight the challenge of internal resistance to change, with **30.8%** identifying it as a significant obstacle in the digital transformation of banks. The absence of a well-defined digital strategy discourages **28%** of respondents, emphasizing the importance of a coherent strategy for overcoming resistance. Interestingly, only **19%** consider cybercriminality as a hindrance, suggesting a relatively lower concern in comparison to other identified obstacles.

4.4 Regulation and Oversight:

the banking sector is regulated and overseen by the Bank of Algeria, which is the central bank of the country. The Bank of Algeria is responsible for maintaining financial stability, setting monetary policy, and supervising the banking system. It ensures that banks comply with regulations and safeguards the interests of consumers. Additionally, the Banking Commission plays a role in supervising and regulating banks to ensure their soundness and protect consumers. These entities work together to maintain a stable and secure banking sector in Algeria¹.

¹ Roles and missions by the bank of Algeria
<https://www.bank-of-algeria.dz/role-et-missions/>

II.2.Recent Digitalization Initiatives:

1. Digitizing Algeria: A Comprehensive Overview of Electronic Banking Evolution and Initiatives:

After Algeria recently realized the necessity of employing modern technologies in its various economic activities and entering the world of the digital economy to advance the national economy, it has made and continues to make efforts to upgrade its economic activities and its banking system, as banks took the initiative of establishing a private company that works to install electronic payment devices for merchants for free in exchange for paying a monthly subscription of 500 DZD. This is in order to upgrade and develop its services and spread the culture of using payment cards¹.

A. Entities Engaged in Electronic Transactions

Electronic services in Algeria are primarily facilitated by three entities: AEBF, SATIM, and GIE monétique. This section will focus on SATIM and GIE, both of which are making significant strides in the facilitation and modernization of the electronic banking platform.

- **SATIM: Interbank Transaction Automation and Electronic Banking Company:**

Established in 1995 by the banking community, SATIM stands as the exclusive interbank electronic operator for domestic and international cards. It plays a crucial role in supporting the development and modernization programs of banks, particularly in promoting various means of payment, with a special emphasis on card payments. SATIM, with its 19 members, is dedicated to developing and promoting the use of electronic payment instruments. It achieves this by implementing and managing technical and organizational platforms to ensure interoperability within the electronic payment network in Algeria. SATIM is responsible for overseeing the functioning of the electronic banking system, including technology control, process automation, and transaction speed. The company ensures the connectivity and management of ATMs and personalization of interbank withdrawal cards for banks. In recent years, SATIM has experienced significant

¹ ANNANE Fatma Zohra, METARREF Aouatef, BOUMOUD Imene, July 30,2021, The presentation of Digital Systems Applications in the Algerian Banks as Part of their Efforts in the Digital Transformation, economic studies journal p (142).

growth in its services, connecting more Automated Teller Machines to its servers, and enabling over 180 web merchants on its platform¹.

- **GIE monétique: Economic Interest Grouping for Electronic Banking**

Established in June 2014, GIE monétique plays a pivotal role in regulating the interbank electronic payment system, ensuring interoperability with local and international electronic payment networks, and promoting financial inclusion. Comprising 19 members, including 18 banks and Algerie poste, GIE monétique collaborates with the Bank of Algeria as a non-adhering member to enhance system security and payment methods. GIE monétique has set developmental goals that include the widespread use of modern payment methods, the launch of mobile payment, establishing interoperability between Edahabia Card and CIB interbank card, replacing current CIB card specifications with white label specifications, upgrading adherents to international standards, and implementing security measures to secure transactions and protect relevant data. GIE monétique aims to encourage the adoption of electronic payments by developing and implementing technical standards and regulations, thereby standardizing electronic banking systems and products².

In Algeria, the interbank electronic network has evolved significantly over the years. It has witnessed transformative milestones, starting from the inception of the initial interbank withdrawal transactions via automatic teller machines (ATMs) in 1977. The progression continued, marking a noteworthy shift with the inaugural interbank payment operation on Point of Sale (TPE) terminals in 2005, as documented by SATIM³.

The culmination of this evolution occurred with the official introduction of online payment services in 2016⁴.

In October 2016, Algeria witnessed the initiation of its inaugural online payment service, a collaborative effort involving 11 banks and nine companies. Among the participants were six public banks—BADR, CPA, BDL, BNA, BEA, CNEP—and five private banks, including Trust

¹ Boukrouh Bahia, dec 31,2022, E-payment adoption in the era of digital transformation: the case of Algerian banking system, Journal of Contemporary Economic Studies, Volume: 07 / N°: 02 (2022), p (490).

² Idem.

³ Merbouhi, S., & Hadid, N. (2017). Le paiement électronique en Algérie, défis économiques et Financiers. Revue nouvelle économie, N16-vol 01, pp. 19-27.

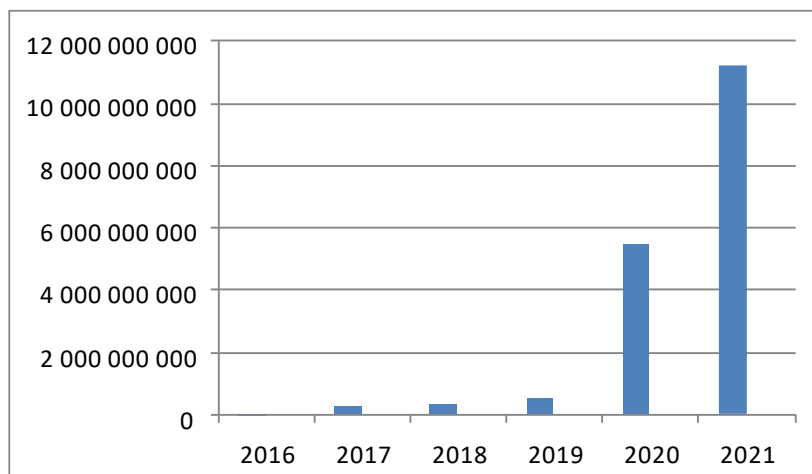
⁴ Boukrouh Bahia, dec 31,2022, E-payment adoption in the era of digital transformation: the case of Algerian banking system, Journal of Contemporary Economic Studies, Volume: 07 / N°: 02 (2022), pp (491).

Bank, Natixis, Société Générale, Gulf Bank, and Al Baraka. This endeavor also saw the involvement of various public and private entities such as Air Algérie, Algerie Telecom, Mobilis, Société des Eaux et de l'Assainissement d'Alger, Djezzy, Ooredoo, Amana Assurances, Tassili Airlines, and CNAS.

Since the introduction of online payment services, the participation of institutions has grown significantly, with numerous companies becoming part of the system. The count of web merchants subscribing to the internet payment system via interbank cards exceeded 180 by March 2022. Notably, the system processed more than 14 million transactions from the inception of online payment until March 2022, as reported by GIE monétique.

Furthermore, the agreement facilitating the launch of the electronic payment service through interoperability among Algerie Poste, GIE monétique, and SATIM, operational since January 5, 2020, has fortified the widespread adoption of electronic payment methods. This interoperability mechanism between postal and banking networks enables electronic payment activities for both Edahabia and interbank cardholders. The impact of this collaboration is evident in the overall amount of online payments, which experienced a substantial 106% increase in 2021, as depicted in the following figure¹.

Figure 4: *The evolution of online payment activities*



Source: Boukrouh Bahia ⁽²⁾

¹ibid, p (493).

² Ibid, p (494).

The provided graphic illustrates a subtle rise from 2016 to 2019, followed by a significant upsurge in the last two years. This increase can be attributed, alongside the previously mentioned factors, to the incorporation of commercial websites into the online payment platform. Notably, GIE monétique introduced the Cibweb electronic payment integration platform on April 4, 2021. This platform, designed for the inclusion of merchants in online payment and sales, has expedited the integration process. The newly launched e-service streamlines the registration, authentication, and technical and legal conformity processes for merchants, institutions, and even craftsmen venturing into e-commerce. This approach eliminates the challenges associated with manual file processing, previously identified as an impediment to service development.

It is worth noting that, despite considerable efforts to promote e-commerce and digital payment, 2019 statistics revealed that only 4.6% of the population engages in online purchases. Cash on delivery remains the preferred method for e-commerce transactions.

While financial technology has been introduced, Algerian banks still exhibit a relatively modest adoption of digital tools. This is particularly notable in an environment where cash culture prevails, despite shifts in consumer behavior towards contactless payments post-COVID-19. The innovation landscape in the banking sector is currently in its early stages, and there is a pressing need for substantial efforts to transition successfully to a new economic model grounded in technology¹.

2. The Algerian Digital Dinar Project: Potential Benefits and Implementation Scenarios:

The latest issue of the official gazette, N° 43, includes the issuance of the monetary and banking law. The new law takes into consideration recent developments in the world of currency and exchange, especially digital currencies.

According to Article N° 2 of the text of this law, the Algerian currency can take a digital form and be called the "Algerian Digital Dinar." Furthermore, the new law allows for the establishment of exchange offices and independent brokers to enter the exchange market².

¹ Idem.

² Law No. 09-23 dated 3 Dhul-Hijjah 1444 corresponding to June 21, 2023, includes the monetary and banking law, from MINISTRY OF FINANCE, <https://www.mf.gov.dz/index.php/ar/activites-ar/1228-loi-n-23-09> .

6.1 Potential Gains from Implementing the Central Digital Dinar Project:

The central bank's introduction of a digital currency based on blockchain technology can yield various benefits, some of which are conceptual, such as enhancing financial inclusion. Others are technological, including reducing the costs and fees associated with financial transactions, speeding up financial transfers, and mitigating the risks associated with the use of digital currencies, which are not subject to the scrutiny of central monetary authorities. These gains may include the following:

✓ **Cost Reduction in Transactions:**

Since CBDC transactions issued by central bank are designed to operate on a peer-to-peer basis without a trusted third-party intermediary, this makes them more competitive in terms of costs and fees compared to other payment methods, such as cards electronic payment and bank transfers. This represents a great incentive for both traders and financiers. Statistics show that transaction costs for private cryptocurrencies, like Bitcoin, are less than 2% of the transaction value, compared to 2-4% for traditional payment systems. This percentage can reach 21% or 22% taking into account the corresponding bank account fees. In addition, the digital dinar is expected to bring savings on the exchange costs of fiduciary currencies for cross-border transactions. Its high divisibility and limited costs make it more attractive for micropayments¹.

✓ **Transaction Processing Time:**

The digital dinar can achieve faster transaction settlement compared to traditional payments. For example, the processing time for a Bitcoin transfer transaction range between 22 and 02 minutes. A new block is added to the blockchain transaction ledger every 22 minutes, positively impacting transaction costs that continue around the clock and throughout the week (2/24). It appears that central digital dinar payments can be favorably compared to credit transfers or card payments. Table 02 below summarizes a comparison of some virtual currencies in terms of average transaction costs, processing time, and energy efficiency².

¹ lakhdar Zidan et ferdji Mohamed, jun 28,2021, Central bank digital Algerian dinar project, Moudaber journal, vol (8), num (1), p (231) <https://www.asjp.cerist.dz/en/article/161624>.

² Ibid, p (232).

Table 3: Comparison of some virtual currencies

Energy Efficiency	Transaction Processing Power per Second	Average Transaction Processing Time	Average Transaction Fees in U.S. Dollars	Virtual coin
LOW	7	9_10 MIN	7.32	Bitcoin
LOW	20	14 SEC	0.22	Ethereum
LOW	50	9_10 MIN	0.32	Bitcoin Cash
HIGH	1000	3,5 SEC	0.0000024	Ripple
LOW	56	2 MIN	0.15	Litecoin
LOW	4000	2_3 MIN	0.302.43	Dash
LOW	1700	2 MIN	0.21	Monero
HIGH	3000	30 SEC		Men

Source: Emmanuelle Ganne (2018)¹

¹ Ganne Emmanuelle, 2018, Can Blockchain revolutionize international trade?, world trade organization, chapter(4), p(93), https://www.wto.org/english/res_e/publications_e/blockchainrev18_e.htm, accessed (dec 3, 2023)

✓ **Certainty of payments received:**

Merchants can benefit from the central digital dinar in several ways. The process of creating a digital currency address differs significantly from establishing an account with credit card payment systems like Visa or Mastercard. To accept credit and debit card payments, merchants must first obtain a merchant account by entering into an agreement with a bank that has a processing relationship with Visa or Mastercard. This agreement binds the merchant to the operating regulations set by the credit card company. It subjects them to a comprehensive review of their business model and financial details. Small business owners must disclose their personal information and undergo a credit check. Typically, the merchant account provider imposes two types of fees: a fixed fee per transaction and a percentage fee based on the total transaction amount (usually 2% to 2.5%). Merchants who accept credit cards are also subject to chargebacks in cases where the cardholder disputes a transaction with the merchant, claiming issues such as card theft or receiving goods that do not meet required specifications. By relying on the digital dinar as a payment method, merchants can not only reduce transaction costs but also mitigate the risks of fraud ⁽¹⁾.

✓ **Expanding Coverage:**

Limited physical infrastructure stands as one of the most significant barriers preventing access to a wide range of financial products. Central digital currencies and associated financial services enable individuals with mobile phones to increasingly access digital financial services. By connecting them to services such as savings, insurance, investments, cross-border payments, and loans, digital currencies extend financial inclusion and convenience to a broader spectrum of the population².

6.2 Scenarios for Implementing Central Bank Digital Currency (CBDC) Projects:

The realization scenarios for the Central Digital Dinar project are determined based on the desired type of digital currency to be implemented and the type of blockchain technology adopted. In this regard, we can present four possible scenarios:

¹ lakhdar Zidan et ferdji Mohamed, jun 28,2021, Central bank digital Algerian dinar project, Moudaber journal, vol (8), num(1), p(233) , <https://www.asjp.cerist.dz/en/article/161624>.

² Ibid, p (236).

✓ **CBDC Retail Indirect:**

In this case, there is a direct relationship between individuals and merchants, but the central bank relies on intermediaries from commercial banks to verify and execute transactions. The central bank assumes responsibility for settling final accounts.¹

✓ **CBDC Retail Direct:**

In this scenario, transactions are conducted from the payer to the beneficiary using their private accounts with the central bank, without the involvement of commercial banks. The central bank bears the responsibility for verifying the safety of transactions and transfers, in addition to its role in settling accounts.²

✓ **Local CBDCs Wholesale:**

In this case, trading in central bank digital currency is allowed within the legal jurisdiction of the central bank but is not permitted for cross-border payments. This is achieved through a local digital platform that enables commercial banks and financial institutions to open digital accounts and use them for settling local payments and financial transactions.³

✓ **Wholesale CBDCs for Cross-Border Payments:**

While most current digital currency projects focus on local payments, there is competition among major countries such as China, the United States, the European Union, Japan, Canada, and Russia to introduce digital currencies for cross-border transactions. This aims to support and encourage international trade, reduce dependence on the dollar for settling international transactions, and overcome sanctions and trade and financial restrictions imposed by states⁽⁴⁾

¹ Ibid, p (238).

² Ibid, p (238).

³ Ibid, p (238).

⁴ Ibid, pp (238, 239).

III. Section 03: Understanding Data Privacy

III.1. Importance of Data Privacy

In today's world of unparalleled digital connectedness, protecting data privacy has become of utmost importance in shaping personal and organizational interactions. The safekeeping of sensitive information, whether it be personal details or confidential corporate data, lies at the heart of this significance. However, the consequences of neglecting data privacy extend far beyond legal consequences and encompass crucial factors such as trust, reputation, and ethical considerations. Therefore, it is not only a legal obligation but also a vital part of establishing and sustaining a secure, reliable, and ethical digital environment to understand and uphold principles of data privacy. This investigation delves into the complex factors that highlight the significance of data privacy, encompassing a wide range of considerations, from safeguarding individuals against identity theft to upholding the esteemed image of organizations in an ever-changing digital world.

In this section, we will discuss data privacy without forgetting to delve into a series of key points that highlight the critical importance of data privacy in today's digital world and the difference between data privacy and data security

Data privacy is founded on the principle that individuals retain authority over the collection, management, and sharing of their personal information by entities with access to it. In the era of digital advancements, the notion of data privacy predominantly concerns the responsible management of crucial personal details, commonly referred to as personally identifiable information (PII) and personal health information (PHI)¹.

Data privacy is important for several key reasons:

- **Safeguarding Personal Information:** Data privacy ensures the protection of individuals' personal information against unauthorized access, securing sensitive data like social security numbers, financial records, and health information. By retaining control over

¹ Stouffer Clare, What is data privacy and why is it important? from life lock Norton, <https://lifelock.norton.com/learn/identity-theft-resources/what-is-data-privacy-and-why-is-it-important> 19 May 2024.

their personal data, individuals can mitigate the risks associated with identity theft, fraud, and other malicious activities¹.

- **Building Trust and Confidence:** Establishing trust between individuals and organizations is paramount for data privacy. When companies prioritize and demonstrate their commitment to safeguarding personal information, they cultivate a reputation for reliability and integrity. This commitment fosters customer confidence, cultivating stronger relationships and long-term loyalty².
- **Compliance with Legal and Regulatory Standards:** Adherence to various data protection laws, such as the General Data Protection Regulation (GDPR) and the California Consumer Privacy Act (CCPA), is essential. These regulations mandate organizations to implement measures protecting individuals' data privacy rights, helping businesses avoid legal consequences, substantial fines, and reputational damage³.
- **Ethical Data Handling:** Respecting data privacy is not just a legal obligation but an ethical responsibility. Organizations must ensure proper consent for data collection, use, and sharing. Adhering to ethical data practices demonstrates a commitment to respecting individuals' rights and promoting transparency in business operations⁴.
- **Fostering Data-driven Innovation:** Data privacy is not solely about protection; it also fuels innovation. When individuals trust that their data will be handled responsibly, they are more inclined to share information willingly. This shared data can then be leveraged to derive valuable insights, facilitate personalized experiences, and advance research and development across various industries⁵.
- **Empowering Individual Autonomy:** Data privacy empowers individuals to retain control over their personal information. It allows them to determine how their data is collected, used, and shared. By respecting individual autonomy, data privacy ensures that personal information is not exploited or misused without consent⁶.

¹ Donal Tobin, Oct 09, 2023, what is Data Privacy—and Why Is It Important? From INTEGRATE.IO <https://www.integrate.io/blog/what-is-data-privacy-why-is-it-important/#importance> 19 May 2024.

² Idem.

³ Idem.

⁴ Idem.

⁵ Idem.

⁶ Idem.

III.2. Data privacy vs data security:

Data privacy revolves around the ethical and responsible handling of personal information, emphasizing individual's control over their data. On the other hand, data security is focused on safeguarding data from unauthorized access and malicious activities, ensuring the integrity and confidentiality of information. While data privacy is concerned with defining policies and practices for proper data use, data security involves the implementation of measures to prevent unauthorized access and protect against potential breaches. Both aspects are crucial for maintaining a secure and ethical approach to handling information in today's digital landscape ¹.

III.3. Legal and Regulatory Framework:

The legal and regulatory framework concerning customer data protection in digital banking transactions in Algeria will be explored in this section.

- Data protection and security in Europe is mainly overseen by the General Data Protection Regulation (GDPR). Managing collections, processing and safeguarding of personal information are examples of strict requirements under the GDPR policy. In specific, it entails that personal data should not be used unless clearly agreed upon by the owner strictly requires that personal data should not be used unless clear agreements are made with the owners; necessitates informing people when their information is stolen online; whilst legal sanctions should be applied against those who ignore the Laws².
- A mix of federal and state laws govern data privacy and security in digital banking in the US. A financial institution must protect its client's details in compliance with the Gramm-Leach-Bliley Act (GLBA)³. Also, the Health Insurance Portability and Accountability Act (HIPAA) covers health-related financial services ⁴while the Fair Credit Reporting Act (FCRA) controls credit information gathering and utilization⁵. Various state laws such as

¹ Stouffer Clare, , What is data privacy and why is it important?, <https://lifelock.norton.com/learn/identity-theft-resources/what-is-data-privacy-and-why-is-it-important> , 29 April 2024.

² Wolford Ben, what is GDPR, the EU's new data protection law? <https://gdpr.eu/what-is-gdpr/> , 29 April, 2024.

³ Kranz Garry, Gramm-Leach-Bliley Act (GLBA), <https://www.techtarget.com/searchcio/definition/Gramm-Leach-Bliley-Act> , 29 April 2024.

⁴ Lutkevich Ben, HIPAA (Health Insurance Portability and Accountability Act), <https://www.techtarget.com/searchhealthit/definition/HIPAA> , 29 April 2024.

⁵ Gillis Alexander, FACTA (Fair and Accurate Credit Transactions Act), <https://www.techtarget.com/whatis/definition/FACTA-Fair-and-Accurate-Credit-Transactions-Act> , 29 April 2024.

California's Consumer Privacy Act (CCPA)¹ and New York's Department of Financial Services (NYDFS)² regulations also effect Data privacy and security.

- In Algeria the National Authority for Personal Data Protection (ANPDP) is a regulatory body charged with protecting individual's personal data and ensuring compliance with data protection laws and legislation within the country³. Established to enforce the Personal Data Protection Law (Law No. 18-07)⁴, ANPDP plays a vital role in monitoring the collection, processing and storage of personal data by public and private entities. As an independent body, ANPDP is responsible for granting licenses to process sensitive data, investigating complaints of data breaches or violations of privacy rights, and imposing sanctions on entities found to be non-compliant with data protection legislation. In addition, ANPDP is involved in raising awareness about data privacy issues among companies, organizations and the general public, and promoting a culture of data protection and privacy. Through its regulatory functions and active initiatives, ANPDP seeks to ensure that individuals' rights to privacy and data protection are respected and safeguarded in Algeria's evolving digital landscape⁵.

¹ Wright Gavin, California Consumer Privacy Act (CCPA),

<https://www.techtarget.com/searchcio/definition/California-Consumer-Privacy-Act-CCPA>, 29 April 2024.

² Goldman Dov, 10 Facts You Should Know About NYDFS, <https://panorays.com/blog/nydfs-facts/>, 29 April 2024.

³ Presentation de l'ANPDP from AUTORITÉ NATIONALE DE PROTECTION DES DONNÉES À CARACTÈRE PERSONNEL: السلطة الوطنية لحماية المعطيات ذات الطابع الشخصي, <https://anpdp.dz/fr/missions-de-lanpdp/>, 12 May 2024.

⁴ Official Journal of Algeria, N° 34, page 10, Sunday, 25th of Ramadan, 1439 Corresponding to June 10, 2018.

⁵ Missions de l'ANPDP from AUTORITÉ NATIONALE DE PROTECTION DES DONNÉES À CARACTÈRE PERSONNEL: السلطة الوطنية لحماية المعطيات ذات الطابع الشخصي, <https://anpdp.dz/fr/missions-de-lanpdp/>, 12 May 2024.

III.4. The Effect of Digital Transformation on Data Privacy in the banking sector

1. Data Security in Digital Payment Systems:

1.1.Strategies for Data Protection in the digital Banking:

A. Authentication:

Authentication entails verifying the identity of individuals initiating transactions, whether they are accessing their accounts online, visiting bank branches, or using credit/debit cards. Previously, authentication relied solely on an ID and password/pin; however, modern authentication methods employ two-factor and multi-factor authentication to ensure the validity of the user's identity¹.

B. Audit Trails:

In addition to traditional banking statements or passbooks, banks maintain comprehensive audit trails documenting every interaction a customer has with their systems. These records, whether accessed through mobile or online banking, meticulously log the time and details of each interaction. Data from these trails is regularly backed up and archived, ensuring a complete historical record².

C. Secure Infrastructure:

Secure infrastructure encompasses the database systems and servers where data is stored, with strict boundaries in place to safeguard it. Core banking setups encrypt production data, and access to these systems is tightly controlled. Bank employees are equipped with specialized tools that restrict access to non-work-related websites and communication channels³.

D. Secure Processes:

Banks employ various processes to ensure robust security measures, including Know Your Customer (KYC) procedures, Non-Disclosure Agreements (NDAs) for employees, and the use of

¹ Ashish M Shaji, data protection in the banking industry, <https://enterslice.com/learning/data-protection-in-the-banking-industry/>, 2024.

² Idem.

³ Idem

remote data centers. Implementing Data Loss Prevention solutions helps mitigate insider threats and protects customer data from unauthorized access or disclosure¹.

E. Continuous Communication:

Banks maintain ongoing communication with customers, informing them of system upgrades, new authentication procedures, and enhanced security measures. In addition to regular account statements, customers can opt to receive alerts, ensuring they are promptly notified of any unusual account activity or security-related updates².

F. Tokenization:

Tokenization is a security measure used in digital banking to protect sensitive data during transactions. It involves replacing this data with unique identifiers called tokens. These tokens act as references to the original data without revealing sensitive information. The process starts by capturing and sending the sensitive data to a tokenization system, which generates a unique token for each data set. These tokens are then used in transactions, ensuring that the actual sensitive data is never exposed. Tokenization enhances security by reducing the risk of unauthorized access or interception³.

In digital banking, tokenization is commonly used in online transactions to safeguard customer data, such as credit card information. Once tokenized, the original data cannot be reversed or decrypted, adding an extra layer of security against potential breaches. Additionally, tokenization can extend beyond transactions to other areas like customer authentication, where tokens replace sensitive login credentials, further enhancing security and minimizing risks⁴.

1.2. (3D) Secure Implementing for Enhancing Data Security in Digital Banking:

a. Explaining 3D Secure:

3D Secure, commonly known as 3DS, is an additional security protocol used in online credit and debit card transactions. It adds an extra layer of authentication to verify the identity of the cardholder during online purchases. This authentication process

¹ Idem.

² Idem.

³ Arunkumar Krishnakumar, What is tokenization and how are banks tapping into its design principles?, <https://cointelegraph.com/news/what-is-tokenization-and-how-are-banks-tapping-into-its-design-principles> , Jan 20, 2024.

⁴ Idem.

involves a three-party interaction among the cardholder, the merchant, and the card issuer (usually a bank), helping to reduce the risk of fraudulent transactions over the internet¹.

b. Understanding 3D Secure Operation:

3D Secure operates through a three-domain model to bolster security during online transactions. These domains consist of the acquirer domain (the merchant's bank), issuer domain (the cardholder's bank), and interoperability domain (the infrastructure provided by the card company for 3D Secure support). When a buyer initiates a transaction, they enter their card details on the payment form. The system validates the card information and checks for active 3D Secure functionality. Subsequently, the cardholder is directed to a verification page where they authenticate their identity, often through a security question or two-factor authentication. Following this, the acquirer confirms the information, and if no errors are detected, the payment is approved. Finally, the cardholder is redirected to a confirmation page indicating the transaction's status as either approved or denied².

Algerian banks use 3D Secure technology to enhance the security of financial transactions over the Internet. By implementing 3D security, the major Algerian bank aims to raise the level of protection of its customers' payment cards and prevent unauthorized access during electronic transactions. These additional security measures contribute significantly to reducing the likelihood of fraud, providing enhanced security and peace of mind for cardholders and businesses involved in online transactions.

2. Impact of Digitalization on Data Privacy:

The effect of making banking more digital on protecting customer data is complex with both opportunities and challenges. As banks move services online and into apps, they must balance using data to improve customer's experiences while keeping data private and secure. Digital banking provides convenience but also risks if data is accessed improperly. Banks will need

¹ Tweddle Andy, what is 3D Secure and how does it work? <https://truelayer.com/blog/payments/what-is-3d-secure-and-how-does-it-work/>, 16 Mar 2024.

² Benko David, A useful insight into 3D secure authentication, <https://blankfactor.com/insights/blog/3d-secure-authentication/>, February 1, 2024.

policies to gain customer's trust that privacy and security are top priorities, as people share sensitive financial information expecting it remains private.

2.1.Opportunities:

- **Enhanced security measures:** in the realm of enhanced security measures, the advent of digitalization presents banks with the opportunity to deploy sophisticated technological solutions, including two-factor authentication, biometric identification, and encryption techniques. These advanced security protocols play a pivotal role in fortifying the safeguarding of customer data, effectively raising the barriers against unauthorized access to sensitive information¹.
- **Customized privacy controls:** The integration of customized privacy controls within digital banking platforms presents banks with the opportunity to empower customers by granting them greater autonomy over their privacy preferences. Through user-friendly interfaces and transparent settings, customers can exercise precise control over the sharing of their data, there by customizing their privacy parameters to align with their individual comfort levels².
- **Data analytics for fraud detection:** the utilization of data analytics in the domain of fraud detection within digital banking transactions offers banks a powerful tool for real-time detection and prevention. Leveraging the wealth of data generated, banks can employ sophisticated algorithms to scrutinize customer behavior, identifying irregularities and patterns indicative of potential fraudulent activities. Through proactive intervention, banks can effectively mitigate risks, safeguarding both customer data and financial assets³.

2.2.Challenges:

As digital banking services develop, the risk of data breaches and cyber-attacks increases. Hackers exploit vulnerabilities in digital systems to access sensitive customer information. This

¹ Meah Jhon, The Digital Revolution in Banking: Exploring the Future of Finance, <https://www.techopedia.com/the-digital-revolution-in-banking-exploring-the-future-of-finance> , 17 January 2024.

² Strohm Mitch, Horton Cassidy, 5 Benefits Of Digital Banking, <https://www.forbes.com/advisor/banking/benefits-of-digital-banking/> , Apr 27, 2024, 10:11am.

³ Mohamed Salim, Data Analytics for Fraud Detection and Prevention, <https://www.rsm.global/southafrica/insights/data-analytics-fraud-detection-and-prevention> , April 27, 2024.

poses major challenges to the banking industry in the area of data privacy. Now, let's explore these challenges and investigate their implications.

•**Data Breaches:** A data breach refers to any security breach where unauthorized entities obtain access to sensitive or confidential information, encompassing personal data like Social Security numbers, bank account details, and healthcare records, as well as corporate data such as customer records, intellectual property, and financial information¹.

•**Cyber-attack:** A cyber-attack refers to any unauthorized cyber activity aimed at breaching the security protocols of a cyber asset, resulting in damage, disruption, or interference with the services or access to information of said asset. This includes deliberate employment of cyber-weapons against information systems, causing cyber incidents².

•**Spoofing:** Spoofing is a deceitful tactic utilized by hackers to impersonate a genuine banking website's URL, producing a nearly identical copy that looks and acts the same. This clever ploy tricks unsuspecting users into entering their login information, which is then covertly collected by the hackers for potential misuse. What is truly concerning is the advancement of advanced spoofing techniques, rendering traditional methods like altering URLs obsolete. Now, even those who navigate to the correct website address can fall victim, magnifying the potential danger of unauthorized access to confidential data³.

•**Insider threat:** Insider threat is a critical security problem. The threat of insiders can be posed unintentionally or intentionally by malicious insiders. Malicious insider threat is defined as the threat that is caused by a person who has authorized access privileges and knowledge of the computer systems of an organization, and is inspired to antagonistically influence the organization. Insiders could be employees, contractors, or business partners. They have the capabilities, which outsiders do not have, that enable them to launch complicated attacks⁴.

¹ Danao Monique, Aditham Kiran, What Is A Data Breach? Definition, Examples & Prevention, <https://www.forbes.com/advisor/business/what-is-data-breach/>, April 20, 2024, 11:00am.

² Yuchong Li, Qinghui Liu, nov 2021, A comprehensive review study of cyber-attacks and cyber security; Emerging trends and recent developments, ELSEVIER, v 7, pp 8178, <https://www.sciencedirect.com/science/article/pii/S2352484721007289>

³ Folger Jean, What Is Spoofing? How Scam Works and How to Protect Yourself, <https://www.investopedia.com/terms/s/spoofing.asp>, Jan 30, 2024.

⁴ Qussai Yaseen, Insider Threat in Banking Systems,

•**DDOS attack:** A Distributed Denial of Service (DDoS) attack is a sneaky form of cyberattack where an overwhelming amount of traffic is sent to a specific system, like a website or online service, from numerous sources at the same time. The ultimate objective of a DDoS attack is to render the target's infrastructure powerless, making it exceedingly difficult for legitimate users to access it¹.

•**BANK DROPS:** Bank drops are a deceptive scheme that capitalizes on existing bank accounts, often obtained through unlawful methods such as identity theft. These accounts act as a conduit for illegal transactions, allowing criminals to deposit stolen money, carry out money laundering activities, or engage in other illicit financial activities. The term "bank drop" highlights the pivotal role of these accounts in receiving fraudulent funds, which can then be cunningly manipulated or transferred to evade detection and thwart law enforcement efforts².

III.5.Meeting Customer Expectations: Safeguarding Data Privacy in Banking:

In today's dynamic banking landscape, customer expectations about data privacy are shifting significantly. With increased awareness of privacy rights, concern about data breaches, and increasing regulatory oversight, customers are demanding greater transparency, accountability, and precautionary measures from their banks. This requires a deeper dive into various aspects of customer expectations regarding data privacy. From the critical aspects of security and trust to the pivotal role of digital channels and the urgency of building trust through transparency and control, this exploration details the evolving dynamics of customer expectations and their implications for banking organizations. By understanding and meeting these expectations, banks can foster trust, loyalty and resilience in an increasingly technology-centric world.

https://www.researchgate.net/publication/316665272_Insider_Threat_in_Banking_Systems , Jan 2024.

¹ McKeever Grainne, Why Banks Are Still a Top Target For DDoS Attacks, <https://www.imperva.com/blog/why-banks-are-still-a-top-target-for-ddos-attacks/> , mar 22, 2024.

² Harz Tyler Von, What is a bank drop? How they work and how banks can prevent bank drop fraud, <https://fingerprint.com/blog/bank-drop-scams/> , February 24, 2024.

1. Customer Expectations of Data Privacy:

Over the past few years, customer expectations about data privacy in banks have evolved significantly. This is due to increased awareness of privacy rights, concerns about data breaches and identity theft, and increased regulatory scrutiny. Nowadays, customers expect banks to prioritize protecting their personal and financial information. They also expect transparency, accountability, and proactive measures to protect their privacy. Let's dive into some of the key aspects of customer expectations regarding data privacy in banks.

- **Security and trust:**

In banking, data security is of utmost importance to customers. When individuals choose a bank to deposit their money, they are not only placing their trust in the institution's ability to protect their money, but also in protecting their personal information.

Customer loyalty is greatly influenced by the level of trust they have in their bank's commitment to protecting their data. Moreover, banks can enhance this trust by using customer data to provide personalized services and targeted advice. For example, if a customer expresses interest in purchasing a property, the bank can provide relevant home loan guidelines based on the customer's financial profile, including factors such as monthly income, expenses, and spending habits.

By prioritizing the protection of customer data and leveraging it to provide personalized services, banks foster a sense of trust and loyalty among their customers. This shows customers that their data is treated responsibly and that the bank is truly committed to meeting their individual needs¹.

- **Data Protection and Privacy:** Consumers expect their personal and financial data to be protected. They view data privacy as a basic human right, with 87% expressing this sentiment. Transparency about how their data is collected, used, and stored is crucial².

¹Nikhilesh Mahendran, Customer Expectations for Digital Banking Experience in 2021, <https://www.netizenexperience.com/blog/customer-expectation-digital-banking-experience> ,2024.

² Lake Rebecca, Foreman Daphne, Increase In Digital Banking Raises Consumer Data Privacy Concerns: How To Protect Yourself, <https://www.forbes.com/advisor/banking/digital-banking-consumer-data-privacy-concerns/> ,Apr 2024.

- **Preference for Digital Channels:** The pandemic has accelerated the shift toward digital banking 57% of consumers now prefer internet banking over traditional branches, and 55% favor mobile banking apps. Banks must ensure that their digital platforms prioritize privacy and security¹.

2. Building Trust in Data Privacy:

In today's world, banking is changing rapidly due to digital technology. Digital banking apps and websites allow people to easily access their accounts from anywhere. This is very convenient, but it also raises privacy concerns. As more people use digital banking, protecting their personal information becomes very important. For banks, ensuring data privacy isn't just a requirement by law. It's also crucial for keeping customers happy, reducing risks, and maintaining a good reputation. We will discuss various ways that digital banks can build trust in data privacy. This includes:

a) Transparency and Clear Communication:

Transparency in data practices is foundational to building trust between companies and consumers. By openly disclosing the methodologies behind data collection, processing, storage, and utilization, companies can foster a sense of transparency and accountability. Clear communication of data privacy policies, including the types of information gathered, the intended purposes, and the security protocols implemented for data protection, serves as a cornerstone for establishing trust with consumers. Furthermore, offering easily comprehensible privacy notices and terms of service empowers customers to make informed decisions regarding the sharing of their personal information. This transparency enables individuals to navigate the digital landscape confidently, knowing that their data is handled responsibly and in accordance with their preferences and expectations².

¹ ibid

² BORNER PETER, Trust and Confidence in Data Privacy, <https://thedataprivacygroup.com/us/blog/trust-and-confidence-in-data-privacy/#> , Apr 2024.

b) Empowering Customers with Data Control:

Enabling customers to exert control over their personal information is pivotal for fostering trust. By incorporating features that facilitate easy access, modification, or deletion of their data, businesses not only adhere to data protection regulations but also signify a dedication to honoring individuals' privacy preferences and nurturing digital trust. Providing robust account management tools and streamlining the process for customers to exercise their rights over their consumer data bolsters their perception of control and confidence in the organization¹.

c) Investing in Data Security Measures:

Elevating data security to a top priority is paramount for instilling confidence. Companies should allocate resources towards implementing cutting-edge cybersecurity measures to shield customer information from unauthorized access, breaches, and malicious activities. Regularly updating and patching systems, employing advanced encryption techniques, and conducting thorough and frequent security audits are essential practices. Communicating the outcomes of these audits to customers reinforces the assurance that their data is handled meticulously, fostering a strong sense of trust in the company's commitment to data protection².

d) Regular Security Awareness Training:

There are three key components to any security awareness training program: Training modules and educational content, Phishing simulations and testing, Reporting and analytics. These three keys are essential for educating employees on cybersecurity best practices. It helps reduce internal security risks and prevent insider threats and the Employees who are trained to identify and handle phishing attacks, social engineering tactics, and other cyber threats are crucial in protecting customer data³.

¹Idem.

²Idem.

³Rees Megan, What Is Security Awareness Training And Why Is It Important?, <https://expertinsights.com/insights/what-is-security-awareness-training-and-why-is-it-important/> , Feb 09, 2024.

Conclusion:

The first chapter provides a comprehensive exploration of the theoretical foundations of digital transformation in the banking sector, with a focus on data privacy considerations. Digital transformation is defined as the integration of digital technologies with the aim of enhancing operational efficiency and customer experience, as distinguished from simple digitalization by its broader scope that includes fundamental changes in operations, business models and customer acquisition strategies. The chapter highlights global trends that suggest banks are increasingly adopting technologies such as mobile banking, online banking and digital payment systems to meet evolving customer expectations and remain competitive. Digital transformation has led to innovative banking services, customer convenience and streamlined internal processes, while introducing challenges related to cybersecurity, regulatory compliance and the need for continuous technology upgrades. Specifically, recent initiatives and the pace of digital technology adoption in the Algerian banking sector are discussed, along with challenges such as infrastructure constraints and regulatory hurdles. The importance of data privacy is emphasized, noting the need for banks to protect customer information against breaches and misuse, explore legal and regulatory frameworks governing data protection, and address customer concerns about data privacy. Strong data privacy measures are critical for regulatory compliance and building customer trust and loyalty. Overall, the first chapter lays a strong theoretical foundation for understanding the dynamics of digital transformation in the banking industry, in particular with regard to data privacy, which serves as the first step for practical analysis and empirical study in subsequent chapter.

CHAPTER 02: Practical Implementation and Analysis

Introduction:

Building on the theoretical foundations established in the first chapter, the second chapter deals with the practical implementation and analysis of digital transformation in the banking sector. This chapter focuses on the Foreign Bank of Algeria (BEA), and provides a comprehensive overview of its history, organizational structure, and digital initiatives. By conducting an empirical study, we aim to verify the study hypotheses and address the research problem related to the impact of digital transformation on customer relationships and data privacy in Algerian banks. Through a combination of descriptive and quantitative analyses, this chapter presents key findings and recommendations for future work, emphasizing the practical implications of our theoretical ideas.

I. Section01: Presentation of the BEA ALGERIA.

In this initial section, we will introduce the hosting organization by discussing its creation, history and organizational structure.

I.1. Creation of BEA:

The Foreign Bank of Algeria (BEA) was established on October 1, 1967, by ordinance No. 67.204, as a national company with an initial capital of 24 million dinars, fully subscribed by the state in the takeover of activities from Lyonnais Credit. Its main purpose was to facilitate and develop economic and financial relations between Algeria and the rest of the world.

As part of the completion of the nationalization process of the Algerian banking system, BEA successively took over the activities of foreign banks operating in Algeria; those of General Society as of December 31, 1967, then Barclay Bank Limited as of April 30, 1968, then Credit North and Industrial Bank of Algeria and the Mediterranean (BIAM) as of May 31, 1968. However, our bank only acquired its definitive structure from June 1, 1968, with the capital being exclusively subscribed by the State.

Since 1970, Foreign Bank of Algeria has been entrusted with all banking operations of major national industrial companies. Its main objective was to facilitate and develop economic and financial relations between Algeria and the rest of the world.

In the wake of the restructuring of industrial enterprises and the profound changes initiated by the authorities in the 1980s, BEA changed its status and became a Joint Stock Company on February 5, 1989 (in accordance with the provisions of Law 88.01 of January 17, 1988 on the autonomy of enterprises), while largely retaining the same purpose as that set out in the October 1, 1967 ordinance. Its capital, which could be increased once or several times by the creation of new shares whose conditions are determined by the extraordinary general meeting of shareholders, was raised to 1 billion dinars. It was held by the former participation funds of the main sectors of BEA's commercial portfolio (in addition to hydrocarbons), namely:

- Construction Participation Fund
- Electronic, Telecommunication, and Information Technology Participation Fund

- Transportation and Services Participation Fund
- Chemistry, Petrochemistry, and Pharmacy Participation Fund

In 1991, the bank's capital was increased by 600 million dinars, thus increasing from 1.6 billion dinars to 5.6 billion dinars in March 1996. After the dissolution of the participation funds, the capital remained the property of the State. The capital of our bank has continued to grow since then, increasing from 12 billion dinars in 2000 to 24.5 billion dinars in September 2001, reaching 230 billion in 2019. It was only in 2002 that BEA was officially authorized to carry out various recognized banking operations, through Decision No. 02-04 of September 23, 2002¹.

I.3 History:

The Foreign Bank of Algeria was established on October 1, 1967 (by ordinance No. 67-204), as a national company.

- In 1970, all banking operations with foreign countries carried out by Algeria's largest national companies were entrusted to BEA.

- In 1989, the bank changed its status to become a joint-stock company while retaining its original purpose.

- In 2008, Foreign Bank of Algeria was ranked first among Maghreb banks and sixth among the top 200 African banks by the magazine.

- In 2011, BEA opened the first self-service agency in Algerian territory and announced a social capital of 7.6 billion dinars.

- Said Kessasra was appointed CEO of BEA in June 2016. He replaced Mohamed Loukal in this position.

- In January 2017, Said Kessasra was dismissed and replaced, on an interim basis, by B. Semid, general manager of credit within BEA.

- In February 2017, the management announced plans to open agencies in France by the end of the year.

- In 2019, BEA increased its social capital from 150 billion DA to 230 billion DA².

- In 2022, BEA has a network of 106 branches in Algerian territory (including two exchange offices), as well as 11 regional offices.

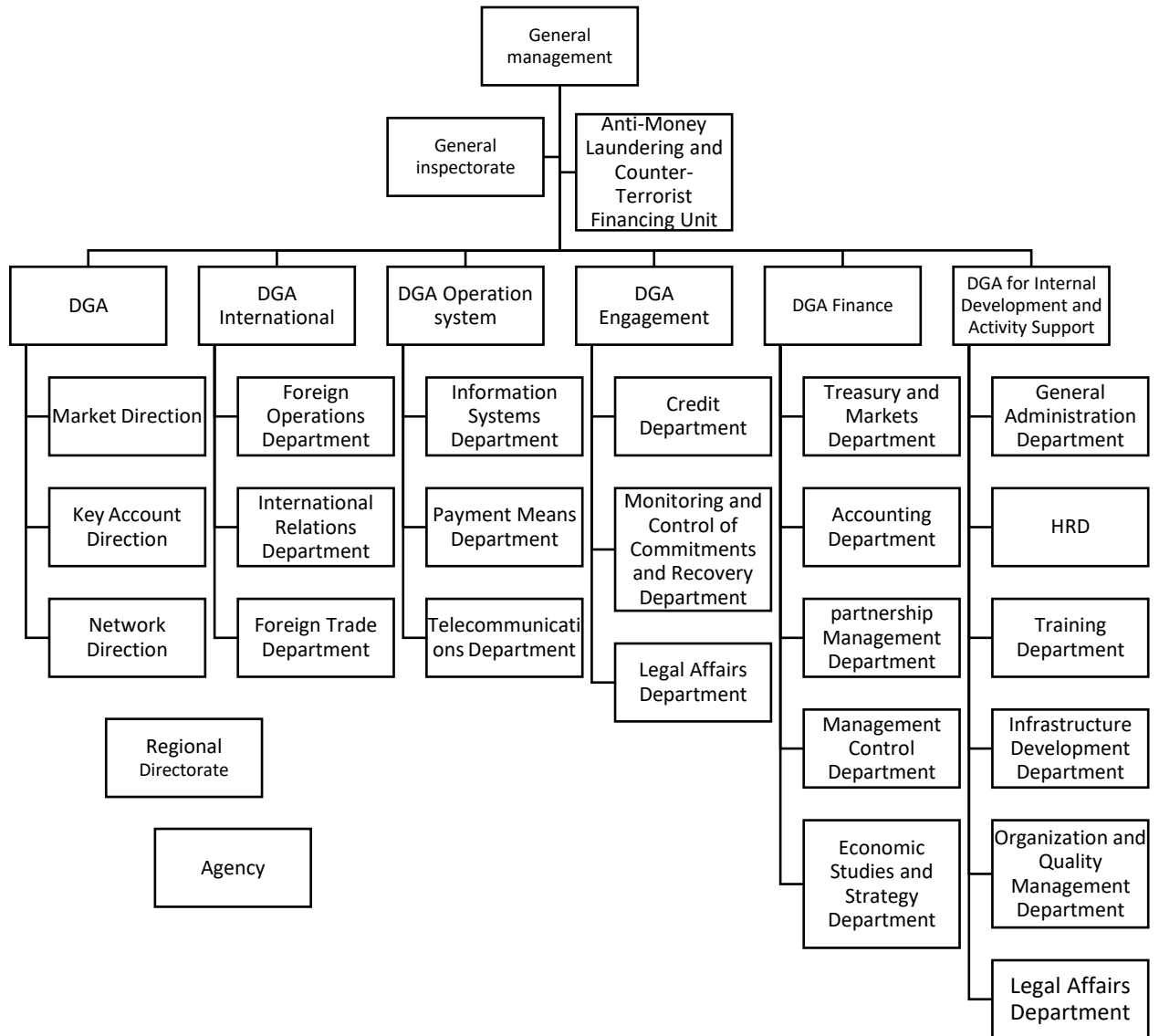
¹ Internal document of BEA Algeria.

² Ibid.

I.3. Structure and Organization of BEA:

I.3.1 Organizational chart of BEA

Figure 5: Organizational chart of BEA



Source: internal document of BEA

II. Section 02: Presentation of the agency 013

II.1 Presentation of the reception agency:

The BEA Khemis-Miliana 013 agency, opened in May 1981, is located at Rue DJITLI Mustapha Khemis Ain Defla, capable, subject to compliance with current banking regulations, of carrying out any banking operation, within the meaning of the Currency and Credit Law.

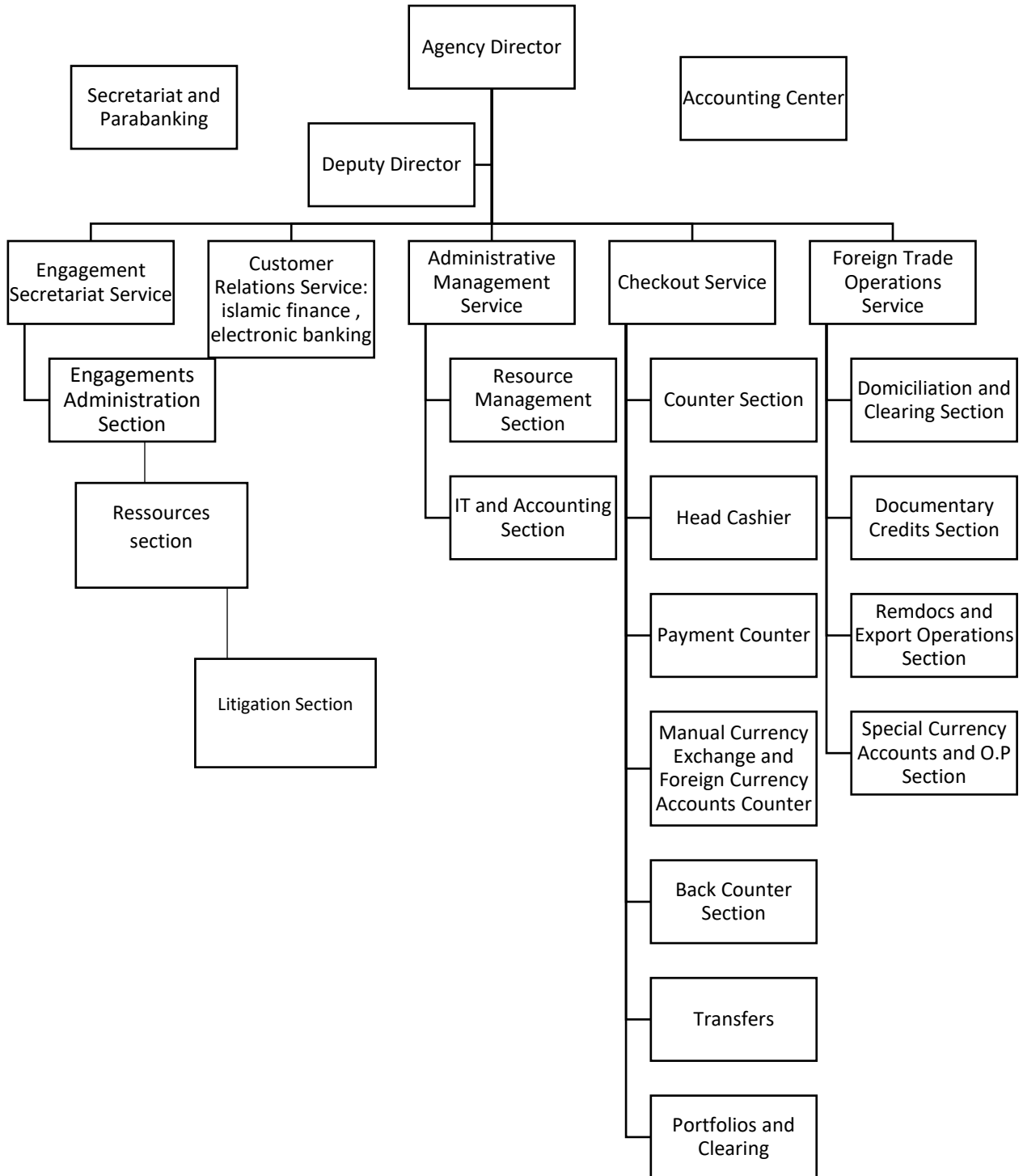
In this context, this agency, like any other agency, constitutes the versatile core unit of the bank's operations. It must be able, thanks to efficient reception and processing structures, to satisfy the clientele regardless of its nature and sector of activity. Additionally, it must fulfill a number of missions within its field of competence, namely:

- Processing banking operations entrusted by clients, maintaining and developing sustained commercial relationships with them.
- Implementing the commercial action plan.
- Receiving, studying, deciding, and implementing credits within the limits of the prerogatives conferred by regulatory means, in accordance with internal rules and procedures (meeting the required prerequisites and collecting guarantees...).
- Ensuring the management and monitoring of decided credits and required guarantee.
- Processing foreign trade operations within the limits of the conferred prerogatives¹.

¹ Internal document of 013 agency.

II.2 Organizational chart of the BEA 013 agency:

Figure 6: Organizational chart of 013 agency



Source: internal document of 013 agency.

II.3 General organization of the 013 agency:

The BEA 013 agency is organized into seven (07) main functions, which are:

1. Foreign Trade Department.
2. Accounting Department.
3. Cash and Portfolio Department.
4. Engagement Department.
5. Islamic Operations Department.
6. Administrative Department.
7. Customer Service Department.

1. Foreign Trade Department :

The role of the foreign trade department is to carry out all operations relating to foreigners in accordance with the exchange and foreign trade regulations in force.

Responsible in particular for carrying out the following missions:

- Domiciliation and clearance of import and export files.
- Management of contracts and granting of various guarantees (export, temporary admission.....etc).
- Execution of transfer orders corresponding to operations that exchange regulations permit.
- Opening of credits and documentary discounts.
- Control repatriation operations.
- Preparation of statistics intended for the hierarchy.

- 2. Accounting Department :** The mission of this service is to verify and consolidate all accounting operations carried out within the day.¹

¹ Internal document of 013 agency.

3. Cash and Portfolio Department :

- ✓ **Cash service:** executes transactions initiated by its own clients and those requested by other branches of the bank. Operations are distributed among different sections of the service depending on their nature and the number of transactions they process. The cash service is designed for making or receiving payments and deposits, as well as transferring funds from one account to another. It also deals with processing of income operations, preservation/storage of money, preparation of values for payment and handling of unpaid payments, maintenance of client account balances, carrying out of administrative work (issuance of cheque books, reconciliation of accounts), as well as management of the branch treasury.
- ✓ **portfolio service:** (Object and role)

The portfolio service has the following essential responsibilities:

- Cash and check collection.
- Discounting of checks and effects.
- Mobilization of credits, outstanding payments, risk files, commercial information, etc.

4. Engagement Department : (Missions)

- Studies credit files.
- Follows up on inheritance files.
- Manages disputes with clients.
- Manages ATD (Third Party Notice) files.

5. Islamic Operations Department: newly opened counter specializing in Islamic products it's missions:

- Offers Mourabaha credits.
- Offers Islamic consumer credits.
- Manages the opening of individual accounts.¹

¹ Internal document of 013 agency.

6. Administrative Department:

The Administration Department oversees all aspects related to employee needs, in addition to managing office equipment and supplies. It also takes care of paying bills such as electricity and gas bills.

7. Customer Service Department:

Main missions are:

- Opening accounts for clients (3940 Commercial accounts, 12468 Deposit accounts, 10496 Foreign currency accounts).
- Responsible for collecting and managing credit files.
- Manages the opening of electronic banking accounts for clients (126 e-banking clients).

III. Section 03: Empirical study

In this section, we reveal the results of a study that looked at the complex interactions between digital banking, data privacy, and customer relationships in Algerian Banks, focusing on the BEA bank. Using questionnaire responses as the main source of information, the study also utilized various research methods like observation, document analysis, and interviews to enhance the depth and reliability of the data collected.

I.1. Data collection and evaluation tool:

We carried out a thorough study with 226 customers to examine the link between digital banking and data privacy. Data was gathered carefully using a detailed questionnaire that was shared with the public through online platforms like Google Forms and through manual distribution methods to ensure broad coverage and effectiveness. Various tools were also used to collect and verify the data during the study. In addition We carefully studied a wide range of documents, such as online reports and internal bank documents, to ensure the information gathered was reliable and thorough.

I.2. The Questionnaire

- **Main axes of the questionnaire:**

(Questionnaire is in Appendix A)

The survey is divided into seven main parts designed to gather detailed information. It was distributed in English, French, and Arabic to make sure it is easy to understand and trustworthy. This approach of using multiple languages was intended to make it easier for people to respond and cater to different language and cultural differences, ultimately improving the inclusivity and efficiency of the research.



The screenshot shows a Google Forms interface with a light green background. At the top, it says "Bienvenus! مرحبا بكم! Welcome!". Below this, there is a heading in Arabic: "الرجاء اختيار لغتك المفضلة" followed by "Veillez choisir votre langue préférée" and "Please choose your preferred language". A red asterisk indicates a required question. Below the text, there are three radio button options: "العربية", "English", and "Français". At the bottom, there are "Next" and "Clear form" buttons. A small note at the very bottom says "Never submit passwords through Google Forms".

A. Section 01: Personal Data (07 Questions):

This section is designed to gather basic demographic information from the people being surveyed, such as age range, gender, education level, occupation, monthly earnings, bank account status, and bank name. This information is essential for further analysis, as it helps in identifying patterns such as the impact of age, gender, or average household income on various banking activities and choices.

There are two main questions at the end of this section. The first question asks about the status of your bank account, which helps us separate customers who have a bank account from those who don't. This helps us gather a sample of only customers with bank accounts. The second question asks for the name of your bank, which helps us understand how much digital banking is used in each bank. This helps us divide our sample into different groups. This division allows us to study how clients act and what they intend to do in different banks.

B. Section 02: Evaluation of the Level of Digitalization of the Banking Sector and Its Quality (14 questions)

In this part of the assessment, we will be looking into the quality and extent of digitalization in the banking sector of Algeria. Participants are encouraged to assess different digital banking services and share their overall satisfaction with the digital infrastructure offered by their bank. The questionnaire includes questions regarding Mobile Wallets Quality, Online Transfers Quality, Peer-to-Peer Payment Apps Quality, QR Code Payments Quality, Mobile Banking Application Quality, Digital Wallets Quality, Virtual Cards Quality, Cards (Debit/Credit)

Quality, Preference for Local Visa Cards, and Contactless Cards Quality. Furthermore, individuals will be inquired regarding their internet connection quality, skill level when using digital devices and services, perception of ATM accessibility in their area, as well as opinion on online banking payment and withdrawal options provided by their bank. These specific questions have been carefully chosen to measure the level of digital transformation within the Algerian banking industry, taking into account the global progress in digital tools and technologies.

C. Section 03 (02 questions) : perceptions of the security of digital banking applications and tools

In this part, we examine how users feel about the security of digital banking apps and tools. Questions like Q16 ask about their trust in the security of their online banking accounts, while Q17 looks at their faith in tools such as ATMs and QR codes. The goal of this section is to gauge users' confidence in the security measures set up by their banks in the digital banking world. We will also investigate if users' views on security in this section are related to their thoughts on privacy or their satisfaction overall.

D. Section 04 (03 questions): confidence in the security aspects of digital banking applications

In this part, we examine how customers feel about the security of their digital banking apps. We want to know their trust in encryption for mobile transactions (Q18), security measures like passwords and biometric authentication (Q19), and the protection of their personal and financial data from online threats (Q20). These questions help us understand how customers view the security of their digital banking apps, which is important for building trust and keeping sensitive information safe.

E. Section 05 (03 questions) : customers' perceptions regarding the privacy protection

In this part of the study, we focus on analyzing how customers feel about the privacy protection provided by their digital banking apps. We want to know their thoughts on how their personal information is kept safe while using the app (Q21), their trust in the app's ability to protect their privacy (Q22), and how secure they feel in terms of preventing data breaches or unauthorized access to their personal information stored in their accounts (Q23). By delving into these areas, we aim to gain a better understanding of customers' confidence and trust in the

privacy measures of their digital banking apps, which are essential for upholding user trust and ensuring data security.

Section 06 (02 questions): influence of social and individual factors

In this section, we will look at how social and personal factors affect the use of digital banking services, with a specific focus on security and privacy. We will examine the frequency of conversations about security and privacy in digital banking with friends and family (Q25) and how safe friends and family feel when using digital banking tools (Q26). These questions are important in understanding how social interactions and personal beliefs influence users' decision to keep using digital banking services. By analyzing these factors, the section seeks to understand users' intentions and perceptions better, which are crucial for improving the adoption of digital banking services.

Section 07 (3 questions + comments) : intentions and perceptions regarding digital banking applications and comments

In this part, we will be looking at how users feel about using digital banking apps. We want to know if they plan on using them in the future, how satisfied they are with the apps' performance and usability, and whether they find them convenient and helpful for managing their finances. Participants are welcomed to share their thoughts and suggestions on digital banking services, data privacy, and security for consumers and Algerian banks (Q30). These inquiries are designed to gather users' perspectives, feedback, and ideas for enhancing digital banking services and addressing user concerns effectively.

I.3. Evaluation process:

The way we evaluate things combines open-ended questions and scaled inquiries, using the well-known Likert scale. This scale, with five points, helps us understand individuals' behaviors, preferences, and reactions. Widely used in research, the Likert scale provides a structured way to measure qualitative data, giving us important insights into how respondents perceive and feel about different aspects.

I.4. Analysis of results:

In this part, we will explore the data we gathered from our survey using a combination of descriptive and inferential analysis methods.

A. Section 01: Personal Data (07 Questions):

1. Age :

Table 4: Age distribution of survey respondents

		Q1_Age		
		n	%	cum%
Valid	18-25 years	97	42.9	42.9
	26-35 years	68	30.1	73.0
	36-45 years	46	20.4	93.4
	46-55 years	9	4.0	97.3
	Over 55 years	6	2.7	100.0
Total		226	100.0	

Comments:

The data in the table demonstrates a wide range of participants spanning various age groups, with a noticeable majority of younger people included in the study. This breakdown of demographics offers valuable information on the age distribution of the participants, shedding light on how age can impact perceptions, behaviors, and attitudes towards digital banking and related issues.

2. Gender :

Table 5: Gender distribution of survey respondents

		Q2_Gender		
		n	%	Cum %
Valid	Male	138	61,1	61,1
	Female	88	38,9	100,0
	Total	226	100,0	

Comments:

The sample has more males than females, which could affect the study's results, particularly when looking at gender-specific trends, preferences, or attitudes towards digital banking. Knowing the gender distribution is important for making sure the findings can apply to various demographic groups.

3. Q3_Education_level :

Table 6: Education level distribution of survey respondents

	N	%
Valid Primary education	1	0,4
Secondary education	22	9,7
License	69	30,5
Master	114	50,4
Ph.D	20	8,8
Total	226	100,0

Comments:

Most respondents in the survey have at least a bachelor's or master's degree, showing they are knowledgeable about technology and proficient in digital skills. Although there are fewer respondents with secondary education, their presence adds diversity to the sample. A small number of respondents have only completed primary education, indicating a lack of representation for those with limited educational backgrounds. This variety in educational levels provides valuable understanding of how different factors impact views and actions regarding digital banking.

4. Q4_Job_position :

Table 7: Job position distribution of survey respondents

	N	%
Valid Full-time / Part-time employee	104	46,0
Independant Worker	24	10,6
Retired	5	2,2
Unemployed / Student	92	40,7
Total	226	100,0

Comments:

The table shows the different employment statuses of survey participants. Many are either full-time or part-time employees, showing engagement in the workforce. There is also a significant number of independent workers. Retirees make up a smaller group, while a large portion of respondents are unemployed or students, indicating a demographic with changing financial needs. This data underscores the significance of taking into account employment diversity when examining factors influencing perceptions and behaviors towards digital banking.

5. Q5_Monthly income :

Table 8: Income distribution of survey respondents

		N	%
Valid	Less than 20,000 DZD	56	24,8
	20,000-50,000 DZD	62	27,4
	50,000-100,000 DZD	45	19,9
	Above 100,000 DZD	12	5,3
	Total	226	100,0

Comments:

The table shows how different respondent’s monthly incomes are spread out, giving us important information about how people’s financial situations affect their views and actions when it comes to digital banking. It demonstrates a wide variety of income levels among the respondents, from lower to higher brackets. This variation is crucial for understanding how financial circumstances influence attitudes and behaviors towards digital banking services. In general, the table emphasizes the significance of taking income diversity into account when studying how financial factors impact perceptions and behaviors towards digital banking.

6. Q6_Do you currently have a bank account?

Table 9: Bank account ownership

		n	%
Valid	No	129	57,1
	Yes	92	40,7
	I have had an acc	5	2,2
	Total	226	100,0

Comments:

The table shows the current status of respondent’s bank account ownership. Most respondents do not have a bank account at the moment, showing that a considerable number of people lack access to regular banking services. On the other hand, a significant percentage of respondents say they do have a bank account, and a smaller group mention having had one in the past. This breakdown emphasizes the existence of a sizable portion of the population who may not be well-served by traditional banking, highlighting the need for inclusive financial solutions to meet their requirements.

7. Q7_What is the name of the bank you deal with?

Table 10: Distribution of respondents by bank affiliation

	N	%
No acc	129	57,1
AGB	6	2,7
Al Salam	2	0,9
BADR	2	0,9
Banque beni ouartilane	1	0,4
BDL	16	7,1
BEA	37	16,4
BNA	8	3,5
BNP	1	0,4
CNEP	5	2,2
CPA	7	3,1
Not Provided	6	2,7
SGA	4	1,8
TRUST	2	0,9
Total	226	100,0

Comments:

The table shows which banks respondents are affiliated with. BEA is the most popular bank among those with an account. BDL comes next, followed by BNA, CPA, and CNEP, which have smaller percentages of respondents. Some respondents did not disclose their bank.

This diversity in bank affiliations indicates different preferences and experiences with digital banking among the respondents.

B. Cross Tabs:

➤ **Q7_What is the name of the bank you deal with? * Q9_2_Online_Transfers_quality**

Crosstabulation:

Table 11: Bank affiliation vs perceived quality of online transfers

		Q9_2_Online_Transfers_quality				Tal
		Low quality	Average quality	Good quality	Very good quality	
Q7_What is the name of the bank you deal with?	AGB	0	2	3	1	6
	Al Salam	0	1	1	0	2
	BADR	0	0	1	0	2
	Banque beni quartilane	0	1	0	0	1
	BDL	4	0	9	0	16
	BEA	3	11	22	1	37
	BNA	3	1	3	0	8
	BNP	0	0	1	0	1
	CNEP	2	1	1	0	5
	CPA	2	0	3	0	7
	Not Provided	0	0	5	0	6
	SGA	0	1	3	0	4
	TRUST	0	0	1	1	2
	Total	14	18	53	3	97

Comments:

BEA was rated highly in both "Good quality" and "Very good quality" categories, with a total of 22 respondents. BDL, while receiving more ratings in the "Low quality" category, still received solid ratings in the "Good quality" category, with 9 respondents. This suggests that both BEA and BDL have focused on offering satisfactory online transfer services to their customers, with BEA generally receiving higher overall ratings.

➤ **Q7_What is the name of the bank you deal with? *****Q9_5_Mobile_Banking_Application_quality Crosstabulation:***Table 12: Bank affiliation vs perceived quality of mobile banking app*

		Q9_5_Mobile_Banking_Application_quality Crosstabulation			Total
		Average quality	Good quality	Very good quality	
Q7_What is the name of the bank you deal with?	AGB	2	2	2	6
	Al Salam	0	1	1	2
	BADR	0	0	1	2
	Banque beni ouartilane	1	0	0	1
	BDL	1	9	2	16
	BEA	12	13	9	37
	BNA	2	2	2	8
	BNP	1	0	0	1
	CNEP	1	3	0	5
	CPA	1	2	0	7
	Not Provided	0	4	1	6
	SGA	1	2	0	4
	TRUST	0	1	1	2
Total	22	39	19	97	

Comments:

BEA and BDL are leading the pack in terms of positive ratings for their mobile banking apps. BEA received significant ratings in the "Good quality" and "Very good quality" categories, showing that many users are pleased with their app. BDL, while not as high as BEA, still received notable ratings in these categories, indicating a positive perception of their app as well. On the other hand, other banks have mixed ratings, with some having more lower-quality ratings and others with higher-quality ratings.

It seems that BEA and BDL have put effort into providing high-quality mobile banking apps, as reflected in the positive feedback from users.

➤ **Q7_What is the name of the bank you deal with? * Q9_8_Virtual Cards (Debit/Credit)_quality Crosstabulation :**

Table 13: Bank affiliation vs perceived quality of virtual cards

		Q9_8_Virtual Cards (Debit/Credit)_quality					Tot
		Not available	low Q	Average Q	Good Q	Very good Q	
Q7_What is the name of the bank you deal with?	AGB	0	1	1	4	0	6
	Al Salam	1	0	0	1	0	2
	BADR	1	0	0	1	0	2
	Banque beni ouartilane	0	0	1	0	0	1
	BDL	6	7	0	3	0	16
	BEA	11	12	10	3	1	37
	BNA	2	2	1	3	0	8
	BNP	0	0	0	0	1	1
	CNEP	3	0	1	1	0	5
	CPA	2	2	1	2	0	7
	Not Provided	0	6	0	0	0	6
	SGA	0	0	0	3	1	4
	TRUST	0	0	0	2	0	2
Total	26	30	15	23	3	97	

Comments:

Despite the fact that there is a very low number of respondents who provided feedback, Trust and SGA banks top when it comes to positive ratings for its virtual card quality. However, BEA and BDL received 37 and 16 responses respectively. Nonetheless, most responses have rated virtual card quality 'not available' or 'low quality'.

This represents a major drawback in the quality of virtual cards provided by BEA because virtual cards are not issued by the bank. This deficiency may affect the loyalty and satisfaction of clients.

C. Analysis of Section 02 to 07 :

1.1. Consistency of the questionnaire:

The Cronbach's alpha coefficient evaluates the consistency of questionnaire items. It indicates how well items in the questionnaire represent the same thing. When the Cronbach's alpha is greater than or equal to 0.70, it means that there is a good reliability because there exist great relationships between variables.

Table: III - 11: Reliability Statistics Cronbach's alpha coefficients

Table 14: Reliability analysis of questionnaire sections

	Cronbach's Alpha	N of Items
Section02 (level)	0.899	31
Section 03 (security)	0.921	2
Section 04 (Trust)	0.929	3
Section 05 (Privacy)	0.961	3
Section 06 (social)	0.543	2
Section 07(overall)	0.861	3
Reliability of the questionnaire	0.899	45

Comments:

The questionnaire has an alpha value of 0.899 which shows that it is internally consistent and therefore stable. This provides more credence to information obtained from the questionnaire, thus proving that it can always measure same true value without deviation.

1.2. Variable Importance:

Various suitable statistical methods were employed in achieving the study's aims and analyzing the data collected using the Statistical Package for the Social Sciences (SPSS) version 27. The range was calculated as $5 - 1 = 4$ after codifying the data to determine the sizes of five points scale cells. The range divided by the number of scale cells thus gives us an accurate cell length- $4/5=0.80$ (which is then added on the lowest value in the scale, which is 1).

Table: III - 12: The verification level of the variable in light of the relative weight*Table 15: verification level of variable based on relative weight.*

Verification Level:	Very weak	Weak	Moderate	Strong	Very strong
Relative Weight:	1 - 1.8	1.81 - 2.6	2.61 - 3.4	3.41 - 4.2	4.21 – 5

Source: Created by the student using MS Excel.

Descriptive Analysis:

The examination was restricted to digital banking customers actively responding in this special analysis. The objective was to provide a more profound insight into what they think about such services, why they use them, what are their attitudes towards them, and what motivates them. This made it the focus group in order to have an in-depth understanding of how they perceive these services while noting their attitudes and drives towards digital money transactions. Every part of our writing was thoroughly looked at so as to draw out the implications of the message when it comes to finding out what makes them buy as well as how satisfied they feel during any transaction on their mobile phone's financial platforms.

A. Section 02: Evaluation of the Level of Digitalization of the Banking Sector and Its Quality (14 questions)

Table 16: descriptive statistics of digital banking service usage and quality perceptions

Descriptive Statistics							
	N	Min	Max	Mean	Std	Var	Level
Q8_Do you regularly use digital banking services (via the bank's app, online portal, ATM, etc.)?	97	1	5	3.72	1.281	1.640	Strong
Q9_1_Mobile_Wallets_quality	97	1	5	1.90	1.159	1.343	Week
Q9_2_Online_Transfers_quality	97	1	5	3.28	1.058	1.120	Moderate
Q9_3_Peer_to_Peer_Payment_Apps_quality	97	1	5	3.19	1.228	1.507	Moderate
Q9_4_QR_Code_Payments_quality	97	1	5	2.47	1.200	1.439	Week
Q9_5_Mobile_Banking_Application_quality	97	1	5	3.55	1.137	1.292	Strong
Q9_6_Digital_Wallets_quality	97	1	5	1.66	1.108	1.227	Very week
Q9_7_Virtual_Cards_quality	97	1	5	1.07	.505	.255	Very week
Q9_8_Virtual_Cards (Debit/Credit) _quality	97	1	5	2.45	1.208	1.459	Week
Q9_9_I believe that using local Visa cards is better than using international Visa cards.	97	0	5	1.93	1.139	1.297	Week
Q9_10_Contactless_Cards_quality	97	1	5	1.27	.860	.740	Very week
Q10_Rate the quality of your internet connection.	97	2	5	3.19	.928	.861	Moderate
Q11_Choose your level of proficiency in using digital devices and services (such as smartphones, mobile apps, online payment, etc.).	97	1	5	3.88	1.063	1.130	Strong
Q12_How do you assess the availability of ATMs in your city?	97	1	5	2.52	1.091	1.190	Week
Q13_Evaluate the flexibility of online payment and fund withdrawal options within your bank (such as purchasing from popular online platforms or international transfers).	97	1	5	2.65	1.283	1.647	Moderate
Q14_level_of_confidence_in the security measures used during mobile transactions.	97	1	5	3.32	1.036	1.074	Moderate
Q15_I believe my financial information is protected during mobile transactions	97	1	5	3.33	1.097	1.203	Moderate
Valid N (listwise)	97						

Source: created by student based on the company data by using SPSS.

Comments:

Respondents have varied opinions on digital banking services, internet connectivity, digital proficiency, and security measures during mobile transactions. Even though the overall perception of mobile banking applications and online transfers is positive, there are those who rate digital wallets, virtual cards, and contactless cards lower. Despite this, the respondents have high levels of internet connectivity and digital proficiency. In addition, there is moderate confidence about the security measures when using mobile phones; this suggests they generally believe their financial information is safe.

B. Section 03 (02 questions): perceptions of the security of digital banking applications and tools

Table 17: Descriptives statistics on perceptions of digital banking security.

Descriptive Statistics						
	N	Min	Max	Mean	Std	Level
Q16_I believe that my digital banking application/account is secure from unauthorized access.	97	1	5	3.36	1.033	Moderate
Q17_I believe that digital banking tools such as ATMs are secure.	97	1	5	3.49	1.072	Strong
Valid N (listwise)	97					

Source: created by student based on the company date by using SPSS.

Comments:

This table presents summary statistics on perceptions of security in digital banking tools and applications in relation to two specific questions. While survey participants show only little trust in their digital banking applications/profiles, the study shows that there is some level of anxiety about unapproved entry to these areas. On the other hand, they have greater hope when it comes to ATM security in electronic cash transfers.

Both applications and tools are moderately to strongly secure, calling for perpetual security protocols upgrading and monitoring to avoid the possible vulnerabilities.

C. Section 04 (03 questions): confidence in the security aspects of digital banking application

Table 18: Descriptive statistics on trust in digital banking app security

Descriptive Statistics						
	N	Min	Max	Mean	Std	Level
Q18_I trust the encryption methods used in my digital banking application for mobile transactions.	97	1	5	3.32	1.095	Moderate
Q19_I trust the security features provided by my digital banking application (such as password protection, biometric authentication).	97	1	5	3.41	1.068	Strong
Q20_I trust that my personal and financial information stored in the application is safe from electronic threats.	97	1	5	3.24	1.078	Moderate
Valid N (listwise)	97					

Source: created by student based on the company date by using SPSS

Comments:

Respondents depict different degrees of confidence across various dimensions of security with respect to digital banking applications. The trust level concerning the security attributes provided by the application is strong, beside that, for encryption methods and defense against electronic threats, it is moderate. This signifies why it is important for banks and other financial facilities to always try upgrading their digital banking systems by putting out information about how secure they are developed along dealing with all the perceptive weaknesses to keep protecting client’s belief and certainty.

D. Section 05 (03 questions): customer’s perceptions regarding the privacy protection

Table 19: statistics on perceptions of privacy protection in digital banking app

Descriptive Statistics						
	N	Min	Max	Mean	Std	Level
Q21_I believe that the privacy of my personal information are protected when using the digital banking application.	97	1	5	3.22	1.148	Moderate
Q22_I believe that the digital banking application adequately protects my privacy.	97	1	5	3.20	1.178	Moderate
Q23_I feel that my account is safe from data breaches or unauthorized access to my personal information through the digital banking application.	97	1	5	3.31	1.149	Moderate
Valid N (listwise)	97					

Source: created by student based on the questionnaire results using SPSS.

Comments:

A moderate level of confidence in privacy protection provided by digital banking applications is shown by the respondents. Even though there are people who consider privacy protection as effective, there are still some areas that can be improved or in which one can be concerned. This stresses why there is need for consistent efforts in order to improve privacy protection mechanisms as well as addressing possible loopholes.

E. Section 06 (02 questions): influence of social and individual factors

Table 20: Influence of social and individual factors on perceptions of Security in digital Banking Tools

Descriptive Statistics						
	N	Min	Max	Mean	Std	Level
Q25_How often do you discuss security and privacy issues related to digital banking services with friends or family?	97	1	5	2.42	1.345	Week
Q26_Friends and family feel safe when using digital banking tools.	97	1	5	3.36	1.218	Moderate
Valid N (listwise)	97					

Source: created by student based on the questionnaire results using SPSS

Comments:

According to the findings, there is little discussion around security or privacy topics concerning digital banking services within family and friend’s circles, however some extent of security is perceived by the respondents in their social circles while using digital banking tools. This demonstrates how individual’s perspective of digital banking security may be shaped by social factors and shows the need for increased understanding on security and privacy issues among close friends to improve awareness concerning these in general when banking is done online.

F. Section 07 (03 questions): intentions and perceptions regarding digital banking applications and comments

Table 21: Descriptive statistics on intentions and perceptions regarding digital banking app

Descriptive Statistics						
	N	Min	Max	Mean	Std	Level
Q27_I will continue to use the digital banking application in the future.	97	1	5	3.71	1.354	Strong
Q28_I am satisfied with the overall performance and ease of use of my digital banking application and/or digital tools.	97	1	5	3.41	1.161	Strong
Q29_I believe that using digital banking applications is convenient and helpful for managing my financial affairs.	97	1	5	3.47	1.119	Strong
Valid N (listwise)	97					

Source: created by student based on the questionnaire results using SPSS

Comments:

The findings show that the participants in the study are determined to keep using digital banking apps because they are happy with how they operate and find them easy to use while at the same time seeing them as handy aids in their pursuit of financial management. In essence, there is an element of satisfaction that the participants hold towards the idea of digital banking services and hence they are likely to keep using them in the future.

Axis analysis:

In order to analyse the level of each axis we calculated the mean of questions contained in each axis using spss, results are as follow:

Table 22: Descriptive statistics on security, trust, privacy and overall satisfaction in digital banking apps

Descriptive Statistics						
	N	Min	Max	Mean	Std	Level
Axis_Security	97	1.50	5.00	3.4278	1.01291	Strong
Axis_Trust	97	1.67	5.00	3.3230	1.00859	Moderate
Axis_Privacy	97	1.00	5.00	3.2405	1.11569	Moderate
Axis_overall_Satisfaction	97	1.00	5.00	3.4433	1.04302	Strong
Valid N (listwise)	97					

Source: created by the student based on the questionnaire data, using SPSS v27

Comments:

According to the findings, digital banking services are perceived positively by customers with high confidence in security and general satisfaction, and a moderate level of trust and privacy. That there is some room for improvement in trust aspect and privacy is seen from this suggestion: customers generally view digital banking services favorably.

Correlation analysis:

To deeply analyze user perceptions within digital banking applications, we implemented a comprehensive correlational analysis. Using SPSS, we calculated Spearman's rho coefficients to measure the interaction between the basic axes - security, trust, privacy, and overall satisfaction.

Table 23: correlational analysis in digital banking apps: sec, trust, privacy and overall satisfaction

		Correlations					
		Q27_I will continue to use the digital banking applications in the future.	Axis Security	Axis Trust	Axis Privacy	Axis_overall_Satisfaction	
Spearman's rho	Q27_I will continue to use the digital banking application in the future.	Correlation Coefficient	1.000	.621**	.652**	.585**	.709**
		Sig. (2-tailed)	.	.000	.000	.000	.000
		N	97	97	97	97	97
	Axis Security	Correlation Coefficient	.621**	1.000	.905**	.700**	.629**
		Sig. (2-tailed)	.000	.	.000	.000	.000
		N	97	97	97	97	97
	Axis Trust	Correlation Coefficient	.652**	.905**	1.000	.842**	.663**
		Sig. (2-tailed)	.000	.000	.	.000	.000
		N	97	97	97	97	97
	Axis Privacy	Correlation Coefficient	.585**	.700**	.842**	1.000	.605**
	Sig. (2-tailed)	.000	.000	.000	.	.000	
	N	97	97	97	97	97	
Axis_overall_Satisfaction	Correlation Coefficient	.709**	.629**	.663**	.605**	1.000	
	Sig. (2-tailed)	.000	.000	.000	.000	.	
	N	97	97	97	97	97	

** . Correlation is significant at the 0.01 level (2-tailed).

Source: created by the student based on the questionnaire data, using SPSS v27

Comments: The correlational analysis highlights the important relationships between different themes – security, trust, privacy, and overall satisfaction – in digital banking applications. Users willing to continue using these apps demonstrate stronger perceptions of security, trust, and privacy. The interconnections between these themes confirm their mutual interconnectedness, indicating their common influence on users' experiences. Enhancing security, trust, and privacy can increase overall satisfaction and improve user retention in digital banks.

1.1. Multiple Linear regression

The dependent variable was customer relations (overall satisfaction) while security, trust, and privacy were independent variables and this enabled us to establish a linear relationship among these 4 axes following our analysis through linear regression analysis in SPSS to precisely determine what exactly the impact of digital banking data privacy was on customer relations.

Table: III - 19: Linear regression results (all variables)

Table 24: Summary of Regression Model: Overall Satisfaction Prediction

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.651 ^a	.424	.405	.80452

a. Predictors: (Constant), Axis Trust, Axis Privacy, Axis Security

Source: created by the student based on the questionnaire data, using SPSS v27

Table 25: ANOVA Results for Regression Model of Overall Satisfaction Prediction

ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	44.243	3	14.748	22.785	.000 ^b
	Residual	60.195	93	.647		
	Total	104.438	96			

a. Dependent Variable: Axis_overall_Satisfaction

b. Predictors: (Constant), Axis Trust, Axis Privacy, Axis Security

Source: created by the student based on the questionnaire data, using SPSS v27

Table 26: Coefficients of Regression Model for Overall Satisfaction Prediction

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.119	.295		3.789	.000
	Axis Privacy	.177	.147	.189	1.200	.233
	Axis Security	.304	.214	.295	1.422	.158
	Axis Trust	.213	.286	.206	.746	.457

a. Dependent Variable: Axis_overall_Satisfaction

Source: created by the student based on the questionnaire data, using SPSS v27

Comments:

Since the variables were found to be non-significant, this could be attributed to multicollinearity between the variables. We then re-estimated the model without the trust variable, as trust is a direct result of privacy and security. The updated model is as follows:

Table: III - 19: Linear regression results (Axis_overall_Satisfaction, Axis Privacy, Axis Security)

Table 27: Summary of Regression Model: Overall Satisfaction Prediction

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.648 ^a	.420	.408	.80263

a. Predictors: (Constant), Axis Security, Axis Privacy

Source: created by the student based on the questionnaire data, using SPSS v27

Table 28: ANOVA Results for Linear Regression Model: Overall Satisfaction Prediction

ANOVA ^a						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	43.882	2	21.941	34.059	.000 ^b
	Residual	60.556	94	.644		
	Total	104.438	96			

a. Dependent Variable: Axis_overall_Satisfaction

b. Predictors: (Constant), Axis Security, Axis Privacy

Source: created by the student based on the questionnaire data, using SPSS v27

Table 29: Coefficients of Regression Model for Overall Satisfaction Prediction

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.118	.295		3.796	.000
	Axis Privacy	.254	.105	.272	2.420	.017
	Axis Security	.438	.116	.426	3.791	.000

a. Dependent Variable: Axis_overall_Satisfaction

Source: created by the student based on the questionnaire data, using SPSS v27

In this model, all variables are significant, indicating that overall satisfaction is influenced by perceptions of privacy and security. Next, we estimated the effect of these variables on the intent of customers to continue using digital services based on security and privacy. The results are as follows: Variables Entered/Removed in Regression Analysis

Table 30: Variables Entered/Removed in regression analysis

Variables Entered/Removed ^a			
Model	Variables Entered	Variables Removed	Method
1	Axis Security Axis Privacy		Enter

a. Dependent Variable: Q27_I will continue to use the digital banking application in the future.

b. All requested variables entered.

Source: created by the student based on the questionnaire data, using SPSS v27

Table 31: Model summary

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.631 ^a	.398	.385	1.062

a. Predictors: (Constant), Axis Security, Axis Privacy

Source: created by the student based on the questionnaire data, using SPSS v27

Table 32: Regression Coefficients Analysis

		Coefficients ^a				
		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	T	Sig.
1	(Constant)	.769	.390		1.974	.051
	Axis Privacy	.293	.139	.241	2.109	.038
	Axis Security	.582	.153	.435	3.804	.000

a. Dependent Variable: Q27_I will continue to use the digital banking application in the future.

Source: created by the student based on the questionnaire data, using SPSS v27

The findings reveal that customer’s decision to continue using digital services is influenced by their perceptions of security and privacy, with security playing a more significant role than privacy among Algerian customers.

These results highlight the impact of different variables on client decisions and can assist Algerian banks in developing new strategies to enhance customer trust and satisfaction. This can be achieved through various approaches such as improving security measures, enhancing privacy protections, and implementing transparent communication about data practices.

Conclusion:

The pilot study shows the impact of digital transformation on the Algerian banking sector by analyzing customer's perceptions of security and privacy using data from 226 participants and analyzed by SPSS v27. The results showed a significant positive relationship between perceived security and continued use of digital banking services, with security confirmed as a more important factor than privacy. The study also found that there is a close connection between perceptions of security and privacy and overall customer satisfaction. It pointed to moderate progress in digital transformation in Algerian banks, although some challenges persist. The study recommends that Algerian banks improve security and privacy protection measures to enhance customer confidence and satisfaction, with an emphasis on transparent communication about data practices. It recommends for further research using advanced statistical methods and comparative studies with developed countries for a deeper understanding of the factors influencing the adoption of digital banking services in Algeria, which helps in policy making and strategic decision-making.

General conclusion:

This aim of this thesis is to explore how technological, social, and individual factors influence Algerian user's perceptions of security and privacy in digital banking, impacting their intention to continue using digital banking applications. In the theoretical part of the thesis, we examined the basic concepts of digital transformation in banks, highlighting its role in enhancing operational efficiency and customer experience by integrating digital technologies. These discussions were complemented by an analysis of global trends, emphasizing the increasing adoption of digital banking solutions to meet evolving customer expectations. Furthermore, we explored the transformative impact of digitization on the banking sector, identifying the benefits from innovative services and the challenges of cybersecurity threats and regulatory compliance. We then moved to focus on the Algerian banking sector, where we emphasized the importance of data privacy amid recent initiatives in adopting digital technology, recognizing that it is essential for regulatory compliance and enhancing customer confidence and loyalty.

The practical part builds on these theoretical foundations, turning to a practical exploration of digital transformation within the Foreign Bank of Algeria (BEA). Through an empirical study, we aimed to investigate hypotheses related to the impact of digitalization on customer relationships and data privacy in Algerian banks, with a particular focus on BEA. This pilot study included a comprehensive questionnaire distributed to 226 participants, covering aspects such as use of digital banks, perceptions of data privacy, and customer satisfaction. Our analysis revealed that Trust and SGA banks received the highest positive ratings for the quality of virtual cards, despite a limited number of respondents. Conversely, BEA received mixed reviews, indicating a significant drawback as it does not issue virtual cards, which could impact customer loyalty.

Despite the presence of mobile banking services at Algerian Foreign Bank, it lacks many modern technologies such as contactless cards and digital wallets. Even if available, there are generally restrictions that limit their usage due to Algerian banking policies, necessitating the adoption of modern technologies to ensure customer satisfaction and keep pace with current advancements.

While respondents hold positive perceptions of mobile banking applications and online transfers, there are lower ratings for digital wallets, virtual cards, and contactless cards. This

indicates a clear deficiency in the adoption of modern technologies in Algerian banks, with Trust Bank being the only exception in embracing contactless cards.

Analysis shows moderate perception of security in digital banking tools by users, highlighting the need for continuous upgrades to ensure customer data privacy and protection, as well as enhancing trust to build lasting customer relationships.

Through limited discussion on security within social circles, there's a clear need to increase awareness of the importance of safeguarding personal financial data. Despite the ease of use and financial management benefits of digital banking apps, security and privacy remain significant barriers to the adoption of these modern technologies.

The correlational analysis confirms the crucial relationships between security, trust, privacy, and overall satisfaction, making it necessary to enhance these factors to strengthen loyalty to digital banking services.

Hypothesis verifications

At the beginning of our thesis we suggest 03 hypothesis, here verification of hypothesis one by one: At the outset of our thesis, we proposed several hypotheses, and through our analysis, we have sought to verify their validity:

1.Moderate Development in Digitization: Our findings support the hypothesis that there is moderate development in the field of digitization in Algeria, particularly concerning the adoption of the latest digital technologies and improvements in online services. However, we also observed challenges, especially in providing advanced services on a wide scale. Additionally, we noted that digital banking in Algeria tends to exhibit less openness, particularly regarding international transfers, likely due to economic decisions aimed at preserving currency reserves.

2.Digital Transformation and Enhanced Security Measures: Our analysis confirms a significant positive relationship between data privacy and security measures. This aligns with our hypothesis that digital transformation, coupled with enhanced security measures and data protection, ensures the confidentiality of information and safeguards it from potential threats. As security measures are bolstered, customer confidence in the confidentiality of their information increases.

3.Link Between Privacy, Security Perceptions, and Customer Satisfaction: Our findings also support the hypothesis that there is a link between privacy and security perceptions and overall customer satisfaction, as well as the intention to continue using digital banking services. We observed a significant positive relationship between privacy, security, and the intention of users to continue using digital banking. Moreover, we found that privacy and security perceptions positively influence overall customer satisfaction. This underscores the importance of ensuring robust privacy and security measures to enhance customer satisfaction and retention in the digital banking sector.

Based on the findings from our questionnaire analysis and the insights gained during my internship at the Foreign Bank of Algeria, Branch 013, we present the following recommendations specifically for BEA and generally for other Algerian banks:

Recommendations and future work

1. Recommendations:

We recommend the following strategic actions for BEA and other Algerian banks to successfully navigate the digital transformation landscape. Implementing these recommendations will enhance customer satisfaction, improve operating efficiency, and drive sustainable growth:

1.1.Enhancing security measures: Since perceived security greatly influences customer's willingness to continue using digital banking services, Algerian banks must invest in advanced cybersecurity technologies. This includes multi-factor verification, encryption, and regular security audits to protect customer data and build trust.

1.2.Improving data privacy: Enhancing data privacy practices is critical. Banks must ensure compliance with international data protection standards and be transparent about how they collect, use and store customer data. Regular updates to privacy policies and clear communication with customers about their rights can foster trust.

1.3.Enhancing digital culture: To encourage wider adoption of digital banking, banks should provide educational programs to help customers understand and use digital services with confidence. This includes tutorials, workshops and online resources that explain the benefits and security features of digital banking.

1.4.Enhancing Customer Experience: Focus on improving the user interface and overall customer experience of digital banking platforms. This includes making the platforms

more user-friendly, responsive, and accessible across various devices. Personalization and effective communication can also play a vital role in customer retention.

1.5.Expansion of digital services: Continuous innovation and expansion of the scope of digital services provided. This can include mobile payments, online loan applications, and advanced financial management tools. Ensuring these services integrate seamlessly can provide a competitive advantage.

1.6.Enhance Regulatory Compliance: Stay abreast of local and international regulatory changes and ensure that all digital transformation efforts comply with these regulations. This requires continuous cooperation with regulatory bodies to align banking practices with legal requirements.

1.7.Enhancing a culture of innovation: Encouraging a culture of innovation within the organization. This can be achieved by investing in R&D, collaborating with fintech startups, and fostering an internal environment that supports creative problem solving and agile working methodologies.

For BEA specifically:

1.1.Introduction of Virtual Cards: To address customer dissatisfaction and keep pace with global trends in the banking sector, BEA should introduce virtual card services. This will contribute to enhancing customer comfort and loyalty.

1.2. Adoption of Modern Banking Technologies: BEA should integrate advanced technologies such as contactless cards and digital wallets. This merger will contribute to improving operational efficiency and enhancing customer experience.

1.3.Enhancement of Security Measures: To address the moderate security levels identified, BEA should continually update their cybersecurity procedures. Ensuring data privacy and strong protection is critical to building customer trust

1.4.Customer Awareness Initiatives: BEA should implement programs to raise awareness of the importance of protecting personal financial data. Educating customers on cybersecurity best practices will help them make informed decisions and adopt safe banking habits.

1.5.Focus on Customer Trust and Satisfaction: Enhancing customer trust and satisfaction should be a priority. This can be achieved through improved

communication, prompt response to customer concerns, and ensuring transparency in banking operations.

By implementing these recommendations, BEA and other Algerian banks can effectively navigate the digital transformation landscape, ensuring enhanced customer satisfaction, operational efficiency, and sustainable growth.

2. Future work

In the future work of my thesis, I propose several avenues for further research:

2.1. Structural Equation Modeling (SEM): Implementing SEM can provide a more detailed understanding of how variables interrelate and affect overall performance and user intention to continue using digital banking. SEM allows for the examination of complex relationships among multiple variables simultaneously, offering insights into causal pathways and direct and indirect effects.

2.2. Comparative Analysis with Developed Countries: Conducting a comprehensive comparison between digital banking in Algeria and other developed countries can offer valuable insights into areas of strength and areas needing improvement. By benchmarking against global standards, we can identify best practices and potential strategies for enhancing digital banking services in Algeria.

2.3. Econometric Models and Economic Data Analysis: Exploring econometric models such as Vector Autoregressive (VAR) models or panel methods alongside economic data can provide deeper insights into the economic factors influencing digital banking adoption and performance. However, this approach requires reliable and comprehensive economic data, which may pose challenges in Algeria. Nonetheless, integrating econometric methods can enrich our understanding of the economic dynamics impacting digital banking.

These suggestions aim to expand upon the current research findings and provide a more comprehensive understanding of the factors shaping digital banking in Algeria. By employing advanced statistical techniques and comparative analyses, we can uncover valuable insights to inform policy-making, business strategies, and future research directions in the field of digital banking.

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Appendix A:

- **The Questionnaire**

Digital transformation--data privacy-- customer relationship in Algerian banks: A Comprehensive Survey

In our study we aim to understand how people see data privacy, use digital banking, and connect with banks in Algeria. Your thoughts will help banks improve digital services while making sure customers feel safe and their information stays private.

[Connectez-vous à Google](#) pour enregistrer votre progression. [En savoir plus](#)

1. Participant Information

Participant information collected in this survey is strictly for study purposes and will be kept confidential and secure.

1: Your age .

- 18-25 years
 - 26-35 years
 - 36-45 years
 - 46-55 years
 - Above 55 years
-

2. Your Gender:

- Male
- Female

3. Your educational Level

- Primary education or below
- Secondary education
- Licence's degree
- Master's degree
- Doctorate or above

4. Your employment Status

- Employed full-time /part-time
 - Self-employed
 - Unemployed /Student
 - Retired
-

5. Monthly Income

- Less than 20,000 DZD
- 20,000-50,000 DZD
- 50,000-100,000 DZD
- Above 100,000 DZD
- Prefer not to say

6. Do you currently have a bank account?

- Yes
- No

Suivant

Effacer le formulaire

Information about the bank

What is the name of your bank?

Votre réponse _____

3. Digital Banking quality

7. I consistently utilize digital banking services (via app or online portal, ATM ..etc)

	1	2	3	4	5	
Strongly disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly agree

8. Rate the quality of digital payment options within your bank

	1 [doesn't exist]	2 [low quality]	3 [medium quality]	4 [good]	5 [very good]
Mobile Wallets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Online Transfers	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Peer-to-Peer Payment Apps	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
QR Code Payments	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Mobile Banking App	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Digital Wallets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
virtual Card (debit -Credit)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Contactless cards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. Rate your internet quality

	1	2	3	4	5	
very bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	very good

10. Select your level in using digital devices and services (e.g., smartphones, mobile apps, online payment etc..)

Digital Literacy Level

	1	2	3	4	5	
very bad	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	very good

11. How would you rate the availability of ATM machines in your city

Infrastructure Development

	1	2	3	4	5	
Very few ATMs available	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	So many ATMs in my city

12. Rate the flexibility of online payment and fund withdrawal options within your bank (like buying from famous online platform or internaional transfert)

	1	2	3	4	5	
Very restrictive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Very flexible

Retour

Suivant

Effacer le formulaire

4. Perceived Mobile Transaction Security

13. I feel confident in the security measures employed during mobile transactions.

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

14. I believe that my financial information is protected during mobile transactions.

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

15. I trust the encryption methods used in my digital banking app for mobile transactions.

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

Retour

Suivant

Effacer le formulaire

5. Perceived digital Mobile App and tools Security

16. I believe that my digital banking app /account is secure from unauthorized access.

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

17. I believe that my digital banking tools like ATMs/RQare secure

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

18. I feel confident in the security features provided by my digital banking app (e.g., password protection, biometric authentication).

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

19. I trust that my personal and financial information stored in the app is safe from cyber threats.

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

Retour

Suivant

Effacer le formulaire

6. Perceived Privacy Risk

20. I am concerned about the privacy of my personal information when using the digital banking app.

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

21. I believe that my digital banking app adequately protects my privacy.

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

22. I am worried about potential data breaches or unauthorized access to my personal information through the digital banking app.

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

7. personal / social / environmental Factors

23. How often do you update your digital banking app to the latest version?

	1	2	3	4	5	
Never	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Always

28. I believe that using digital banking apps is convenient and beneficial for managing my finances.

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

29. i think using local visa cards is better than using international visa cards

	1	2	3	4	5	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

what's your recommendation or remarks about digital banking and data privacy and security ?

Votre réponse

Thanks

Thank you for your participation! Your responses will contribute to our understanding of digital banking security and privacy perceptions.

[Retour](#)

[Envoyer](#)

[Effacer le formulaire](#)