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## GRADUATION DISSERTATION

To obtain an Academic Master degree in Management Marketing

The impact of digitalization on customer satisfaction

Case: NAFTAL KHADAMAT mobile application

Elaborated by:

Feriel Raouane *HAMIDA*

Supervised by:

*Dr. Ilhem BOUZEROUATA*

Co-supervised by:

*Dr. Hachemi MAHMOUDI*

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## ABSTRACT

This study explores the influence of digitalization, particularly through "NAFTAL KHADAMAT" mobile application, its free nature, and quality, on customer satisfaction. Using a quantitative research approach and an online survey with 150 respondents, multiple linear regression analysis was employed to examine the relationship between digitalization, "NAFTAL KHADAMAT" mobile application, its free nature, quality, and customer satisfaction. The findings reveal a positive correlation between these variables and customer satisfaction, highlighting the importance of embracing digital services and prioritizing quality and affordability in digital offerings to enhance overall customer satisfaction.

**Keywords:** Digitalization, customer satisfaction, NAFTAL KHADAMAT mobile application, quality, free nature.

## RÉSUMÉ

Cette étude explore l'influence de la digitalisation, en particulier à travers l'application mobile "NAFTAL KHADAMAT", sa gratuité et sa qualité, sur la satisfaction du client. En utilisant une approche de recherche quantitative et une enquête en ligne avec 150 répondants. Une analyse de régression linéaire multiple a été utilisée pour examiner la relation entre la digitalisation, l'application mobile "NAFTAL KHADAMAT", sa gratuité, sa qualité et la satisfaction du client. Les résultats révèlent une corrélation positive entre ces variables et la satisfaction du client, soulignant l'importance d'adopter des services digitaux et de prioriser la qualité et l'accessibilité dans les offres digitaux pour améliorer la satisfaction globale du client.

**Mots-clés:** Digitalisation, satisfaction du client, NAFTAL KHADAMAT application mobile, qualité, gratuité.

## المخلص

تستكشف هذه الدراسة تأثير الترقية الرقمية، خاصة من خلال تطبيق "نفتال خدمات"، وطبيعته المجانية، وجودته، على رضا العملاء. باستخدام نهج البحث الكمي واستطلاع عبر الإنترنت مع 150 مجيب، تم استخدام تحليل الانحدار الخطي المتعدد لاستكشاف العلاقة بين الترقية الرقمية، وتطبيق "نفتال خدمات"، وطبيعته المجانية، وجودته، مع رضا العملاء. تكشف النتائج عن وجود علاقة إيجابية بين هذه المتغيرات ورضا العملاء، مما يؤكد على أهمية اعتماد الخدمات الرقمية وإعطاء الأولوية للجودة والتوفر في العروض الرقمية لتعزيز رضا العميل العامة.

**الكلمات الرئيسية:** الترقية الرقمية، رضا العملاء، تطبيق نفتال خدمات، الجودة، المجانية.

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## LIST OF ABBREVIATIONS AND ACRONYMS

**AI:** Artificial Intelligence

**BEA:** The External Bank of Algeria

**CRM:** Customer Relationship Management

**DAI:** Digital Agility Index

**DT:** Digital Transformation

**E-Algeria:** Electronic Algeria

**E-Commerce:** Electronic Commerce

**E-Government:** Electronic Government

**ERP:** Enterprise Resource Planning

**E-Satisfaction:** Electronic Satisfaction

**E-Service:** Electronic Service

**HR:** Human Ressources

**ICT:** Information and Communication Technology

**IoT:** Internet of Things

**LPG:** Liquefied Propane Gas

**SDT:** Self-Determination Theory

**SHV:** SONATRACH Hydrocarbon Valorization

# ***INTRODUCTION***

## 1. Context & theme interest

In today's era, the integration of digital technology has emerged as indispensable for shaping the modern customer experience. By harnessing digital tools, businesses can enhance their customer service, personalize interactions based on individual preferences, and gain profound insights into customer needs. This paradigm shift towards digitalization offers businesses with unparalleled opportunities to elevate customer experience and satisfaction, promising substantial benefits for those who fully embrace it. As time progresses, catalyzed by the digital revolution, society undergoes an unprecedented transition from an industrial-centric to a digital-centric focus. A fresh wave of customers, raised amidst the democratization of the internet, exhibits a heightened affinity towards technological advancements. For contemporary organizations, the adoption of digital transformation is not just optional, it's an imperative necessity.

The Algerian enterprise NAFTAL has developed a mobile application with the objective of aiding its clientele, streamlining communication channels, and providing digital services aimed at augmenting their satisfaction. Our study seeks to:

- *Investigate the impact of digitalization, particularly through "NAFTAL KHADAMAT" mobile application developed by NAFTAL, on its users satisfaction.*

## 2. Research question

To effectively tackle our objective within the presented context, we have crafted the ensuing research question:

- *What is the impact of "NAFTAL KHADAMAT" mobile application on users' satisfaction?*

From this problem statement, we have formulated the following research questions:

- *Does the fact that "NAFTAL KHADAMAT" mobile application is free have a positive effect on users' satisfaction?*
- *Does the quality of "NAFTAL KHADAMAT" mobile application have a positive influence on users' satisfaction?*

➤ *Does the digitalization have a positive impact on users' satisfaction?*

### 3. Hypotheses

The studies by (CONILH, 2020), (Boustani mallah & Ibrahim , 2021), (Yasfi & Pardede, 2023), (Hasman, Ginting, & Rini, 2019), (Sudjatmoko, Caesar, Gumuljo, & Jeremy, 2022) and (Rania AZEROUAL, QMICHCHOU, & SALEK, 2023), collectively emphasize the positive impact of digital tools and technologies, particularly E-service quality, on customer satisfaction within various contexts such as banking, E-commerce, and website usage.

(CONILH, 2020) & (Boustani mallah & Ibrahim , 2021) indicated that the implementation of digital tools and technologies in banking positively contributes to customer satisfaction.

Furthermore, (Yasfi & Pardede, 2023) affirmed that E-service quality has a positive and significant influence on customer satisfaction.

A study conducted by (Boustani mallah & Ibrahim , 2021) indicated that customers are ready to use digitalization.

The results of (Hasman, Ginting, & Rini, 2019) show that the quality of E-services has a positive and significant impact on customer satisfaction.

E-Service quality and price have a positive significant effect on customer satisfaction (Sudjatmoko, Caesar, Gumuljo, & Jeremy, 2022).

Meanwhile, (Rania AZEROUAL, QMICHCHOU, & SALEK, 2023) in their study found that the quality of E-service regarding a website positively impacts customer satisfaction.

Higher customer satisfaction is directly and positively associated with the design and reliability of the technological tool (Kane, 2019).

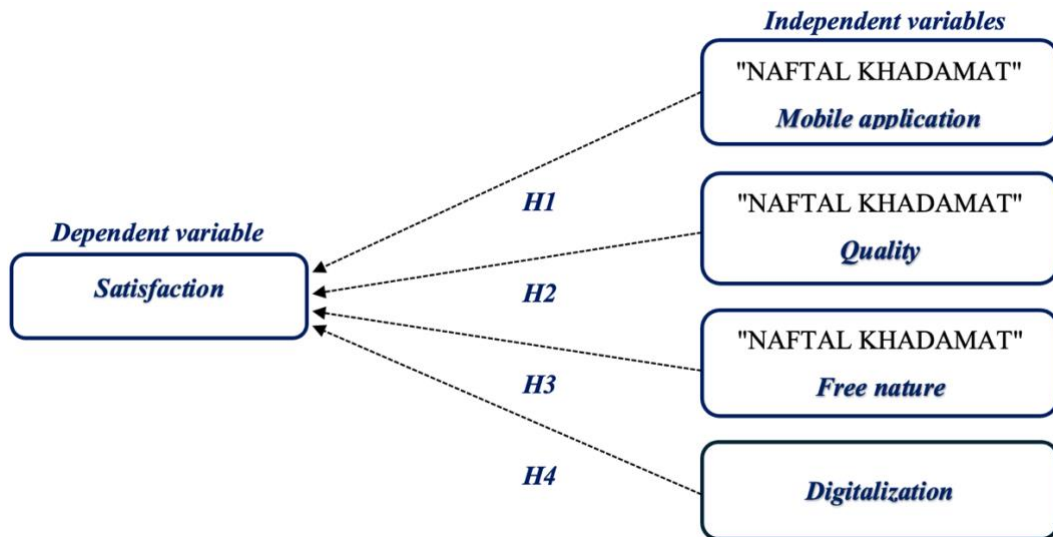
The results demonstrated that there is a significant impact of E-service quality on customers' satisfaction, and digitalization on customers' satisfaction (Saad, Hammad, & Barakat., 2021).

Based on the literature review, the following hypotheses have been formulated to examine the impact of "NAFTAL KHADAMAT" mobile application on user satisfaction:

- **H1: "NAFTAL KHADAMAT" mobile application has a significant positive impact**
- **H2: "NAFTAL KHADAMAT" mobile application's quality has a positive impact on users' satisfaction.**
- **H3: The free nature of "NAFTAL KHADAMAT" mobile application has a positive impact on users' satisfaction.**
- **H4: The digitalization has a positive impact on users' satisfaction**

The research model is summarized in *Figure N°1*.

*Figure N°1: research model.*



**Source:** self-developed based on (CONILH, 2020), (Boustani mallah & Ibrahim , 2021), (Kane, 2019), (Saad, Hammad, & Barakat., 2021), (Yasfi & Pardede, 2023), (Hasman, Ginting, & Rini, 2019), (Sudjatmoko, Caesar, Gumuljo, & Jeremy, 2022), (Rania AZEROUAL, QMICHCHOU, & SALEK, 2023).

**Table N°1 : summary table of hypotheses.**

Variables				
Independent	Dependent		Hypotheses	References
"NAFTAL KHADAMAT" mobile application	Satisfaction.	<b>H1</b>	<b><i>"NAFTAL KHADAMAT" mobile application has a significant positive impact on users' satisfaction.</i></b>	(CONILH, 2020), (Boustani mallah & Ibrahim , 2021), (Kane, 2019), (Saad, Hammad, & Barakat., 2021).
The quality of "NAFTAL KHADAMAT" mobile application.	Satisfaction.	<b>H2</b>	<b><i>"NAFTAL KHADAMAT" mobile application's quality has a positive impact on users' satisfaction.</i></b>	(Sudjatmoko, Caesar, Gumuljo, & Jeremy, 2022).
The free nature of "NAFTAL KHADAMAT" mobile application.	Satisfaction.	<b>H3</b>	<b><i>The free nature of "NAFTAL KHADAMAT" mobile application has a positive impact on users' satisfaction.</i></b>	(Yasfi & Pardede, 2023), (Hasman, Ginting, & Rini, 2019), (Sudjatmoko, Caesar, Gumuljo, & Jeremy, 2022), (Rania AZEROUAL, QMICHCHOU, & SALEK, 2023), (Saad, Hammad, & Barakat., 2021).
Digitalization.	Satisfaction.	<b>H4</b>	<b><i>The digitalization has a positive impact on users' satisfaction</i></b>	(CONILH, 2020), (Boustani mallah & Ibrahim , 2021), (Kane, 2019), (Saad, Hammad, & Barakat., 2021).

**Source:** self-developed.

#### **4. Method**

This dissertation adopts a post-positivist epistemological stance and utilizes a hypothetico-deductive reasoning approach. To investigate the research question and test the hypotheses, the study employs a quantitative methodology.

- The tools that can be used in order to investigate the research question are:

Utilizing both documentary research and a survey.

#### **5. Relevance of the research**

##### **5.1. Theoretical relevance:**

Digitalization is a relatively recent area of study that has gained significance with the rapid evolution of technology and customer satisfaction. Upon exploring the existing literature, it has become increasingly evident that digitalization plays a crucial role in customer satisfaction. The advantages of this marketing strategy are manifold. , digitalization has become an indispensable tool for companies aiming to enhance customer satisfaction and remain competitive in an ever-changing environment.

##### **5.2. Managerial relevance:**

In a highly competitive environment, companies are continually seeking ways to enhance customer satisfaction. They often utilize various means, among which is the digitalization of services, contributing to the achievement of their strategic objectives with a focus on marketing efforts. Our study aims to investigate the digitalization strategy implemented by NAFTAL, particularly through its mobile application "NAFTAL KHADAMAT", and its impact on customers satisfaction. By identifying the factors that influence it, such as pricing strategy and overall quality.

#### **6. Plan announcement**

The structure of this paper is organized as follows:

The Introduction section furnished an overview of the research topic, emphasizing its significance, while also spotlighting the research problem and objectives. Furthermore, it introduced a research model developed from an examination of pertinent literature, elucidating its key concepts and components. Additionally, hypotheses were formulated based on this research model, which were then tested through a suitable research methodology.

Subsequently, the paper includes three chapters:

**Chapter I** consisted of two integral sections:

*First section:* literature Review, delving into previous research, studies, and documentation.

*Second section:* conceptual Framework, elucidating the fundamental components of each concept under scrutiny, such as "Digitalization" and "Satisfaction".

**Chapter II** comprised two vital sections:

*First section:* focused on the organizational context. It provides a comprehensive overview of the studied entity, covering its essential aspects such as company description, industry sector, and organizational structure, etc.

*Second section:* provided a comprehensive insight into the methodological framework utilized in this study, offering a meticulous elucidation of the chosen research methodology. This included a delineation of the selected methodological approach and an exposition on the tools employed for data collection.

**Chapter III** presents the empirical findings, which are then analyzed in conjunction with the insights gleaned from the literature review. The conclusion succinctly summarizes the dissertation's contents, encompassing the main results and both theoretical and managerial contributions. Additionally, it acknowledges the study's limitations and delineates potential avenues for future research.

***CHAPTER I: THEORETICAL  
FRAMEWORK***

The first chapter of this paper is divided into two sections. The first section focuses on the literature review, while the second section aims to identify and define all the concepts used in this research.

## **Section 1: literature review**

The digital is widely recognized as the fourth industrial revolution, a transformative era characterized by the pervasive integration of digital technologies across all aspects of society and industry. This revolution heralds not only significant economic growth but also profound social transformation. It presents unprecedented opportunities for innovation, efficiency, and connectivity, fundamentally reshaping how businesses operate and how individuals interact.

### **1. Digitalization**

According to a study conducted by (CONILH, 2020), the research emphasized the impact of digitalization in French retail banks on customer satisfaction. The objective was to comprehend how the introduction of digital technology in retail banking has influenced customer experience, satisfaction, and changed their behaviors. This investigation employed a quantitative approach, gathering data through an online questionnaire distributed to a sample of 125 clients selected from an adult population ranging from 18 to 99 years old. The questionnaire was designed to assess the quality of the relationship with the bank, particularly focusing on the advisor, and aimed to collect a wide range of client information. Moreover, The study emphasized the relationship within the banking ecosystem following the implementation of new digital tools. The study's results indicated that the digitalization of retail banks in France impacts the relationship between advisors and clients regarding their satisfaction.

“In recent years, digitalization has transitioned from an emerging technology to a widespread tool for enhancing business efficiency. It will improve the perception of change among customers” (Boustani mallah & Ibrahim , 2021). Another study carried out by these researchers focused on the effects of technology and digitalization on customer satisfaction in financial institutions. Through a quantitative methodology, the authors used a questionnaire addressed to clients of several commercial banks, obtaining responses from 263 individuals of various age groups, with 250 responses being usable. Based on the results obtained, the researchers

concluded that although clients are encouraged to adopt the use of technology and digitalization, they still prefer human contact in ordinary moments for a more meaningful interaction with customer advisors.

(BOUMEDIENE & Bardida, 2021) conducted a study focusing on the effects of digitizing banking services on customer behavior. Employing a quantitative methodology, they administered a questionnaire distributed to clients of BEA Bank. The sample comprised 102 clients from BEA branch 060 Emir in Oran province, representing the parent population targeted by the survey. The study's findings indicate that investments made by banks in digitizing their services positively affect both their clientele and the overall digitization process, leading to significant changes in customer behavior.

“Digitization is regarded as an additional benefit offered to customers, serving as an supplementary avenue to augment customer relations” (Kane, 2019). Investigating the impact of digitalization on the banking sector, a study delved into customer satisfaction and loyalty in light of the growing adoption of digital services. Furthermore, it examined how such digitalization initiatives contribute to overall customer retention. Employing a quantitative methodology, the author administered a survey with 116 participants. The findings of the survey indicated a positive perception among customers regarding the digitization of banking services. They viewed it as an added value proposition that enhanced service quality and heightened satisfaction levels.

Moreover, the scholarly article referenced as (Saad, Hammad, & Barakat., 2021) seeks to explore the influence of digitalization on customer satisfaction within the educational sector, particularly focusing on higher education. Employing a quantitative research methodology, the study utilized a questionnaire to investigate the impact of digitalization on customer satisfaction within the College of International Transport and Logistics in Alexandria, Egypt. The survey sample encompassed respondents from various educational levels. The findings of the study revealed significant correlations between ICT, E-service quality, and digitalization, and their collective impact on customer satisfaction. Specifically, the research highlighted the substantial role played by ICT and E-service quality in shaping customer satisfaction levels within the

educational context. Furthermore, the study underscored the broader implications of digitalization on enhancing overall customer satisfaction in higher education settings.

## **2. Customer satisfaction**

A recent study conducted by (Yasfi & Pardede, 2023) aims to explore significant relationships within the online retail industry, specifically focusing on the influence of E-service quality on customer retention, customer satisfaction, and WOF. The study employed quantitative methods with survey techniques via questionnaires, collecting data from 190 respondents residing in the Jabodetabek area. To ensure the validity, reliability, and quality of their research instruments, the researchers utilized statistical tests such as the Outer Model and the Inner Model. Data analysis was conducted using the Partial Least Square Structural Equation Modeling (PLS-SEM) method. The results showed that customer satisfaction plays a central role in linking the quality of electronic services with customer retention and WOM. Overall, these results provided valuable insights into the dynamics of the online retail industry, emphasizing the importance of E-service quality in fostering customer satisfaction, retention, and positive Word of Mouth, thereby contributing to the success of online retail businesses.

Meanwhile, a research led by the author (Hasman, Ginting, & Rini, 2019), the focus was on examining the influence of E-Service Quality on E-Satisfaction and its subsequent impact on repurchase intention among students using e-commerce applications at Universitas Sumatera Utara. This research utilized a quantitative methodology with a causality research design. Data collection involved primary and secondary data obtained through questionnaires. The study population comprised regular undergraduate students from 2014 to 2018 who were actively studying at Universitas Sumatera Utara and had made purchases using e-commerce applications at least twice. The sample size for the study was 96 individuals. The sampling method used is nonprobability sampling method employing an incidental sampling technique. Data analysis was conducted using descriptive analysis and inferential statistical analysis, particularly employing path analysis. The results of the study indicated several significant findings. Firstly, E-Service Quality was found to have a positive and significant effect on both E-Satisfaction and repurchase intention. Additionally, E-satisfaction was observed to have a positive and significant effect on repurchase intention. Finally, the study revealed that E-

service quality positively and significantly influenced repurchase intention through its impact on E-satisfaction. In summary, these findings underscored the critical role of E-service quality in fostering E-satisfaction and subsequently influencing repurchase intention among students using e-commerce applications, providing valuable insights for businesses aiming to enhance customer loyalty and retention in the digital marketplace.

Additionally, the article by (Sudjatmoko, Caesar, Gumuljo, & Jeremy, 2022) aims to examine the relationship between E-service quality, Customer Perceived Value, Price, and Customer Satisfaction for healthcare application users in Indonesia. This research utilized a quantitative method, collecting 154 samples from customers of healthcare applications. The results indicate that both E-service quality and price have a positive impact on customer satisfaction, whereas customer perceived value does not show a significant effect. These findings offer valuable insights for healthcare applications to maintain or enhance their customer satisfaction levels.

“The quality of online customer service indeed has a significant impact on a company's image. This impact extends to customer satisfaction as well”. (Rania AZEROUAL, QMICHCHOU, & SALEK, 2023) In their article, the authors aimed to examine the influence of E-service quality on purchase intention through the mediating effect of customer satisfaction. This article employed a quantitative methodology. The authors collected data through a survey of 154 Moroccan consumers who had made at least one online purchase. The results suggest that dimensions of E-service quality (responsiveness, trust, personalization) positively impact purchase intention, while website design and reliability do not affect purchase intention. The results also indicate that customer satisfaction mediates the impact of E-service quality on purchase intention.

## Section 2: conceptual Framework

In this section, the pivotal concepts employed in this research will be introduced.

### 1. Digitalization

#### 1.1. Digital transformation:

At present, there exists no universally recognized definition for the term DT. Furthermore, the terms digitalization and digitization are often used interchangeably (BDI & Berger, 2015). The term “digital transformation” actually encompasses a broader scope than just those terms. It involves intensive use of digital technologies such as social networks, the Internet of Things, artificial intelligence, Big Data and cloud computing. Selected definitions in the context of DT are shown in the following table N°2.

*Table N°2: current definitions.*

<i>Sources</i>	<i>Definition</i>
(Bowersox, Closs, & Drayer, 2005)	Digital Business Transformation is a “process of reinventing a business to digitise operations and formulate extended supply chain relationships. The DBT leadership challenge is about reenergizing businesses that may already be successful to capture the full potential of information technology across the total supply chain”
(PwC, 2013)	DT describes the fundamental transformation of the entire business world through the establishment of new technologies based on the internet with a fundamental impact on society as a whole.
(Mazzone D. M., 2014)	“DT is the deliberate and ongoing digital evolution of a company, business model, idea process, or methodology, both strategically and tactically.”
(Reis, Amorim, Melão, & Matos, 2018)	“Proposed three distinct categories of definitions for digital transformation: a technological definition, organizational definition, and social definition.”
(Fitzgerald, Kruschwitz, Bonnet, & Welch, 2013)	“A technological definition, in which digital transformation is grounded in the adoption of new digital technologies such as social media, mobile technology, analytics tools, or integrated systems.”
(Ross, et al., 2016)	An organizational definition, where digital transformation entails changes in operational principles or the creation of new business models.
(MATT, HESS, & BENLIAN, 2015)	DT also known as social transformation, affects all aspects of human life.

**Source:** (Bowersox, Closs, & Drayer, 2005), (PwC, 2013), (Mazzone D. M., 2014), (Reis, Amorim, Melão, & Matos, 2018), (Fitzgerald, Kruschwitz, Bonnet, & Welch, 2013), (Ross, et al., 2016), (MATT, HESS, & BENLIAN, 2015)

### **1.2. Definition of digitalization:**

Digitalization, characterized by the use of digital technologies in various aspects of daily life, has greatly influenced customer experiences and satisfaction (Kannan & Li, 2017). This encapsulates the social transformation triggered by the mass adoption of digital technologies that generate, process, and transfer information (Katz & Technovation, 2013). It involves not just the digitization of information but also the strategic and operational changes in a business that leverage this digital information to improve or innovate processes, products, and business models (Oesterreich, Teuteberg, Bensberg, & Buscher., 2019).

It is also termed as " a process of integrating digital technologies into a company's commercial operations and business processes, enabling improvements in productivity, efficiency, and customer experience. It also allows the company to differentiate itself from competitors by creating new products, services, and business models " (Westerman, Bonnet, & McAfee, Oct 14, 2014 ).

Furthermore, digitalization refers to the strategic adoption and integration of digital technologies to transform business models, operations, and customer experiences. (Chaffey & Ellis-Chadwick., 2019). It also known as the "ability to turn existing products or services into digital variants, and thus offer advantages over tangible product" (Gassmann, Frankenberger, & Csik, 2013).

(T.Eymann, et al., 2017) Delineate three successive waves of digitalization. The first wave involves the substitution of paper with computers as a primary medium for storing and processing information. The second wave describes the emergence of a globally interconnected environment characterized by pervasive communication, which fundamentally alters how businesses create value and opens up novel avenues for business endeavors. Lastly, the third wave envisions the pervasive integration of computing technology, representing a visionary concept that is progressively becoming more tangible with each passing day.

### 1.3. Digitization vs digitalization:

The definitions of these two important concepts are often implicit, and in practice, there isn't a clear agreement on how to define either of them. Consequently, within innovation management research, a single construct has been employed to denote to different phenomena.

The table N°3 displays chosen definitions regarding the distinction between Digitization and digitalization.

*Table N°3: exemplary concepts for digitization and digitalization.*

(Tilson, Lyytinen, & Sørensen, 2010)	<p><b>Digitization:</b> “[technical] process of converting analog signals into a digital form, and ultimately into binary digits (bits)” (p. 749)</p> <p><b>Digitalization:</b> “[...] socio-technical process of applying digitizing techniques to broader [...] contexts” (p. 749)</p>
(Clarke, 2019)	<p><b>Digitization:</b> “[...] a large proportion of data is now ‘born digital’, and analogue data can be inexpensively converted into digital form” (p. 59)</p> <p><b>Digitalization:</b> “interpretation and management of the world [...] [through] processes, that are almost entirely dependent on digital data” (p. 59)</p>
(T.Eymann, et al., 2017)	<p><b>Digitization:</b> “[...] the technical process of converting analog signals into a digital form, ultimately into binary digits. “ (p. 301)</p> <p><b>Digitalization:</b> “[...] manifold sociotechnical phenomena and processes of adopting and using these technologies in broader contexts.” (p. 301)</p>

**Source:** (T.Eymann, et al., 2017), (Clarke, 2019), (Tilson, Lyytinen, & Sørensen, 2010)

### 1.4. Historical overview of digitalization:

Digitalization, refers to the process through which businesses and societies integrate digital technologies to enhance their operations, products, and services. Here's a summary of the historical overview of digitalization in general, followed by that of business digitalization and digital services:

#### 1.4.1. General digitalization timeline:

➤ *1940s-1960s:* early Computers.

- **1969-1980s:** emergence of the Internet.
- **1990s:** commercialization of the Internet.
- **2000s:** cloud Computing.
- **2010s:** IoT and AI.
- **2020s:** COVID-19 Acceleration.

#### **1.4.2. Business digitalization timeline:**

(Agrawal & Khan, 2018)

- **1960s:** introduction of computers into businesses initiates digitalization.
- **1990s:** digitalization accelerates with the rise of the Internet and ICT.
- **First stage:** automation of production and administrative tasks with ERP and CRM systems, leading to cost reduction and process optimization.
- **Second stage:** adoption of e-commerce platforms for online sales, expanding market reach globally.
- **Third stage:** digital transformation integrates technology across all business aspects, fostering new business models and product/service innovation.
- **Today:** continual digitalization driven by IoT, AI, and blockchain technologies, offering new avenues for process enhancement and customer value creation.

#### **1.4.3. Digital services timeline:**

- **1990s-2000s:** online Services and E-commerce.
- **2000s:** rise of Social Media and Streaming.
- **2020s:** online Healthcare and Virtual Learning.

### 1.5.Digitalization in Algeria:

- **1960s:** Algeria begins prioritizing investment in information technology, establishing specialized institutions like the Center for Study and Research in Computing and the National Information Processing Center. Computerization projects are initiated in major state-owned enterprises such as Sonatrach and Air Algérie (Kahlane A. , 2013).
- **Early 2000s:** foundations of a digital economy are laid with the creation of entities like Algeria Telecom and Algeria Post. The market is opened to foreign mobile operators to enhance communication services.
- **2008:** the E-Algeria 2013 strategy is formulated with 13 major objectives, including accelerating ICT usage in public administrations and strengthening telecommunications infrastructure.
- **2010:** additional progress is made with the introduction of biometric identity, emergence of E-commerce, and development of E-government services. About 15% of Algerian businesses embark on digital transformation, particularly those facing foreign competition (Kahlane A. , 2018).

Another research by (Nabila, 2022), indicated that despite efforts under the E-Algeria 2013 strategy, Algeria lags behind globally and regionally in digital transformation.

- **End of 2019:** the COVID-19 pandemic emerges, serving as a catalyst for the adoption of technology and the development of the digitization sector in Algeria (khalfallah & bendjelloul, 2023).
- **2022:** the Algerian government works to digitalize all sectors, particularly focusing on areas related to tax interests and individual property, to ensure complete digitization by 2023 (khalfallah & bendjelloul, 2023).

“However, the innovation ecosystem for Algeria’s green and digital economic development is not sufficiently developed” (Niehues-Jeuffroy, 2023). Key indicators show significant delays compared to other countries worldwide (Nabila, 2022).

**Table N°4: Algeria's positioning in relation to the rest of the world in digital technologies.**

<b>Index</b>	<b>Ranking*</b>
ICT Development Index	102/176
E-Government Development Index	130/193
Digital Agility Index (DAI)	93/176
Digital Maturity Index	117/139
Cybersecurity Indicator	114/139

\*Ranking of the latest available reports.

**Source:** (Nabila, 2022).

## **2. Customer satisfaction**

### **2.1. Definition of customer:**

A customer is an individual or entity that purchases goods or services from a company either for personal use or for resale to another party (Kotler & Keller, Marketing Management, 2016)

On the other hand, (Kotler & Armstrong, Principles of Marketing, 17th Global Edition., 2017) described a customer as someone who utilizes products or services acquired from a company, irrespective of whether they are an ultimate customer or a business purchaser. They are the end-users of products or services and play a vital role in the success of businesses by providing revenue and feedback. They can vary in their needs, preferences, and purchasing behaviors, making it essential for businesses to understand and cater to their diverse requirements.

#### **2.1.1. Customers vs. consumers:**

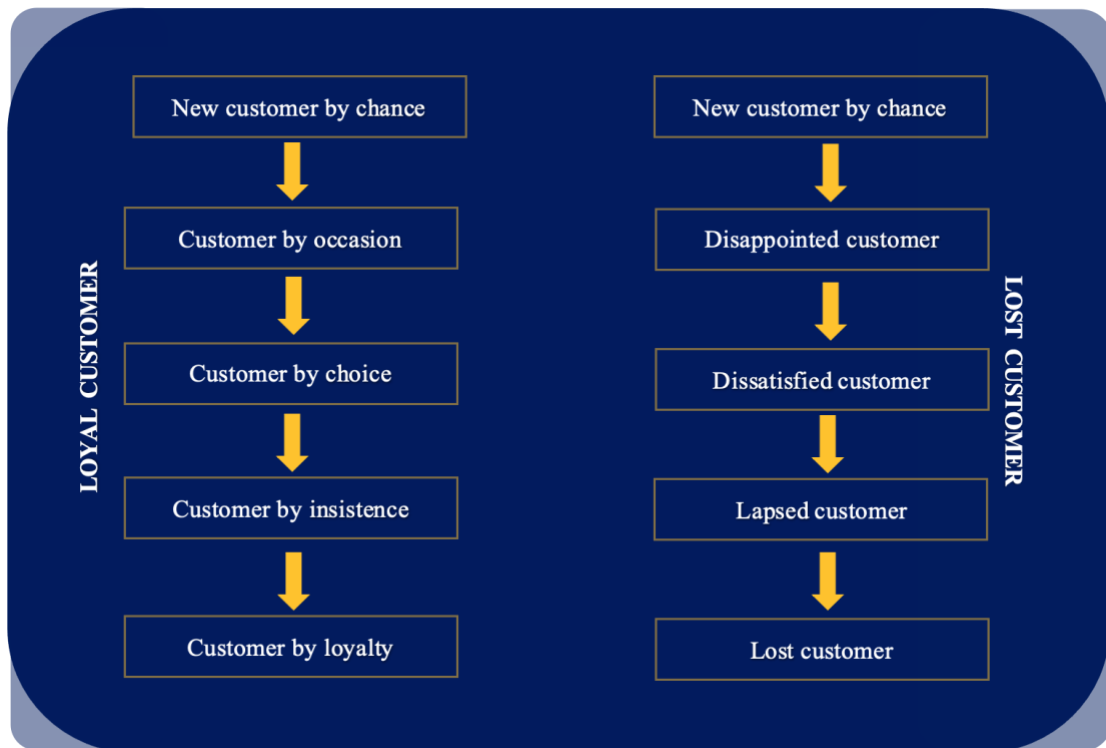
Customers are individuals who make purchases of a product or service, whereas consumers are those who actually utilize the product or service

#### **2.1.2. Types of customers:**

In the realm of marketing, authors have categorized customers into various types according to different criteria. (Mohamad & Sagadevan, 2003) customers come within a fold of an organisation in the following way:

- Customer by chance;
- Customer by occasion;
- Customer by choice;
- Customer by repetition;
- Customer by insistence;
- Customer by loyalty.

*Figure N°2: customer chain.*



**Source:** (Mohamad & Sagadevan, 2003).

## **2.2. Definition of satisfaction:**

Satisfaction was defined by (Oliver, Whence Consumer Loyalty?, 1999), (Shankar, Smith, & Rangaswamy, 2003) as "the perception of pleasurable fulfilment of a service" It may be delineated as an emotional state experienced by a customer, stemming from a holistic assessment encompassing all facets of the customer-provider relationship (Severt, 2002). According to (Bressolles & Durrieu, 2011) "satisfaction is a pleasant, transitory cognitive and emotional state that can result from a service experience, consumption, or use of a good."

Satisfaction can be defined by (Kotler & Keller, Marketing Management, 2016) as the positive or negative impression felt by a customer regarding a purchasing and/or consumption experience. It results from a comparison between their expectations of the product and its perceived performance. It is sometimes regarded as an emotion, sometimes as a cognitive appraisal, often as a blend of both.

### 2.3.Type of motivation:

SDT, a framework in psychology that focuses on human motivation and personality development. It posits that humans have three basic psychological needs: autonomy, competence, and relatedness. When these needs are satisfied, individuals tend to experience greater well-being and intrinsic motivation (Deci & Ryan, 2000) & (Ryan & Deci, 2002).

SDT distinguishes between different types of motivation, as illustrated in *Figure N°3* below (Deci & Ryan, 2000):

- **Intrinsic Motivation:** Engaging in an activity for the inherent satisfaction or pleasure derived from the activity itself. Intrinsic motivation arises from within the individual, driven by a sense of enjoyment, curiosity, or personal interest. Activities pursued intrinsically are those that individuals find inherently satisfying or enjoyable, without the need for external rewards or pressures.
- **Extrinsic Motivation:** Involves engaging in an activity for instrumental reasons. It is driven by external factors rather than internal desires. This type of motivation can be categorized into various categories based on the extent of control or self-regulation exercised over one's behavior. These categories range from external regulation to integrated regulation:
  - **External Regulation:** motivation driven by external rewards or punishments.
  - **Introjected Regulation:** motivation fueled by internal pressures.
  - **Identified Regulation:** motivation guided by personal goals and values.
  - **Integrated Regulation:** the highest level of extrinsic motivation, where externally driven behaviors align with an individual's sense of self and identity.



balanced approach that acknowledges and cultivates both motivations is crucial for fostering sustained satisfaction among customers.

#### **2.4. Customer satisfaction:**

Customer satisfaction is one of the most important concepts in economic. A recent perspectives in consumer studies portray satisfaction as a response to fulfillment. However, experts in human behavior recognize its malleability, often subject to adjustment and evolution. Consequently, consumer researchers have departed from a literal meaning of satisfaction, now pursue this concept as consumer experiences.

Satisfaction is the consumer's fulfillment response. It is a judgment that a product or service feature, or the product or service itself, provided (or is providing) a pleasurable level of consumption-related fulfillment, including levels of under or over-fulfillment (Oliver, *Satisfaction: A Behavioral Perspective on the Consumer*, 1997).

In the realm of the management literature, the concept of "customer satisfaction" is elucidated as the outcome of the perceived added value received by the customer following a transaction or relationship in comparison to the expected value (customer's expectations) of transactions or relationships with rival suppliers (Yi, 1990).

Some authors tend to define the concept from an emotional perspective, while others approach it from a cognitive perspective (Goudey, 2013).

According to (Dhingra, Gupta, & Bhatt, 2020), customer satisfaction is determined by the customer experience throughout the consumption process, which plays a crucial role in future customer behaviors such as repurchase and recommendation (Pereira, de Fátima Salgueiro, & Rita, 2016).

### **3. Role of digitalization in customer satisfaction**

The DT of businesses offers new opportunities to enhance the customer experience, which can lead to increased satisfaction and loyalty. Among its numerous advantages, it allows the company to (Baabdullah, Ainin, & Suurna, 2021):

- Facilitate faster and personalized communication with customers, thereby enriching their experience and satisfaction;
- Utilize tools for tracking and analyzing digital data to gain deeper insights into customer preferences and needs, facilitating the delivery of more tailored offers and services;
- Ensure availability of online services for streamlined access;
- Digitize after-sales and support services, enabling swift and efficient issue resolution, thus contributing to increased customer satisfaction etc.

Digitalizing an activity or a business demands an effective digital strategy to reap its undeniable benefits. However, these benefits may vary depending on different perspectives (Lejealle & Delecolle, 2017). Various perspectives on the subject have been chosen and are outlined in the table N°5 below.

***Table N°5: perspectives on digitalizing business: Company vs Customer viewpoints.***

Company perspective	<ul style="list-style-type: none"> <li>▪ Save time in procedures;</li> <li>▪ Achieve more accurate expense optimization, consequently boosting profitability;</li> <li>▪ Utilize collective intelligence to accelerate and simplify communication between different departments within the same company;</li> <li>▪ Enable the collection of substantial customer data to refine the company's target audience (Lejealle &amp; Delecolle, 2017).</li> </ul>
Customer perspective	<ul style="list-style-type: none"> <li>▪ Provide a more personalized and relevant offering tailored to individual needs;</li> <li>▪ Increase customer satisfaction;</li> <li>▪ Improve communication channels with the company;</li> <li>▪ Enhance the company's image in customers' minds by presenting a more modern image (Lejealle &amp; Delecolle, 2017).</li> </ul>

**Source:** (Lejealle & Delecolle, 2017).

*Chapter I* provided a comprehensive overview of digitalization and customer satisfaction, highlighting their definitions, theoretical frameworks, and empirical findings across various sectors. The next chapters will delve deeper into specific case studies and analyses to explore these concepts further in the context of the research objectives.

***CHAPTER II:***  
***ORGANIZATIONAL FRAMEWORK***  
***METHOD & DATA***

In this chapter, we present the organizational framework the first section, followed by the methodology employed in this study and a comprehensive explanation of the data and tools utilized for conducting the research in the second half.

## **Section 01: organizational framework**

### **1. Presentation of NAFTAL**

#### **1.1.Presentation of SONATRACH group:**

SONATRACH is the Algerian Company for Research, Exploration, Pipeline Transportation, Processing, and Marketing of Hydrocarbons and their derivatives. It also operates in other sectors such as electricity generation, new and renewable energies, and seawater desalination. SONATRACH is the largest oil and gas company in Algeria and in Africa.

#### **1.2.Presentation of the host organization**

##### **1.2.1. Historical background:**

The distribution of petroleum products was initially carried out by SONATRACH until Decree No. 80-101 of April 6, 1980, which established the National Refining and Distribution Company of Petroleum Products (ERDP). This was later modified by Decree No. 87-189 of August 25, 1987, which separated the refining and distribution activities of petroleum products by creating the National Company for Marketing and Distribution of Petroleum Products, NAFTAL.

NAFTAL, an entity under the Ministry of Energy, derives its name from two symbols:

- "AFT" Oil
- "L" Algeria

##### **1.2.2. Organizational evolution:**

- **1983:** integration of the LPG/fuel project from SONATRACH into NAFTAL.
- **1984:** establishment of forty-eight multi-product distribution units (UND) under NAFTAL.
- **1987:** separation of refining and distribution activities of petroleum products into two units: NAFTAL and NAFTEC.

- **NAFTAL:** responsible for the marketing and distribution of petroleum products.
- **NAFTEC:** responsible for petroleum refining.
- **1989:** decentralization of social and cultural activities of the company.
- **1990:** decentralization and information of activities regarding "“tock/sales/clients”"
- **1992:** consolidation of certain distribution units based on product flow studies. Currently, there are 39 NAFTAL distribution units and 09 attached units.
- **1995:** emergence of new operators in the lubricants and specialty products activity.
- **1997:** establishment of the "“sset Protection Directorate”"
- **1998:** transformation of NAFTAL into a joint-stock company with share capital of 6,650,000,000 DA. Establishment of NAFTAL/Spa, a wholly-owned by the holding company SVH.

NAFTAL is the national company responsible for the marketing and distribution of petroleum products. Its core mission involves distributing and marketing petroleum products within the national market. Distribution encompasses sourcing, storing, selling, and transporting the products to customers for their intended use. NAFTAL acts as an intermediary between domestic and foreign suppliers, such as refiners, manufacturers, and other producers.

### **1.3.Mission of NAFTAL:**

NAFTAL is tasked with the distribution and marketing of petroleum products within the national market. Its operations span various areas, including:

- LPG filling;
- Organization and management of distribution networks;
- Formulation of bitumen;
- Distribution of LPG products;
- Storage and marketing of special fuels;

- Transportation of petroleum products.

NAFTAL is reorganized into 04 branches:

- LPG Branch;
- Fuel Branch;
- Marketing Branch;
- International Activity Branch.

These branches are tasked with defining, together with the general management, the distribution and marketing strategy for the products, ensuring all conditions are met for its implementation in the company's operational center.

#### **1.4.The resources of NAFTAL company**

##### **1.4.1. Human Resources:**

The company's workforce consists of approximately 29,000 employees, including executives.

The monetary mass increased from 4,667 million dinars in 1993 to 5,080 million dinars in 1994 and represents 10% of the turnover for these two years.

##### **1.4.2. Financial Resources:**

NAFTAL contributes to the equivalent of 51% of final energy by producing 10 million tons of petroleum products, which correspond to:

- 8 million tons for fuels.
- Over 1.6 million tons for liquefied petroleum gas.
- Over 0.5 million tons for bitumen.
- Over 70,000 tons for lubricants.

##### **1.4.2. Material Resources:**

NAFTAL's mission is to deliver its offer composed of diverse products and services as defined above, from refining locations (Arzew, Skikda, etc.) or ports for certain products from Algerian refineries, using cabotage, or from refining and manufacturing facilities (tires) foreign to the numerous users scattered throughout the national territory.

To carry out its activities, NAFTAL has the following infrastructure and resources:

- 67 storage and distribution centers for fuels, lubricants, tires, CNG, and special products.
- 17 bitumen training units.
- 2,837 service stations mainly located across the territory, of which 702 belong to NAFTAL.
- 44 stacking centers for butane, propane, and camping.
- 59 relay depots for LPG storage.
- 134 LPG storage areas.
- 17,877 LPG sales points.
- 27 aircraft refueling depots.
- 6 marine centers.
- 17 sea sales points.
- A fleet of 5,232 vehicles and machinery.
- 14,550 LPG sales points for private individuals.
- 380 kilometers of multi-product pipelines and LPG pipelines.

The Organizational chart of the company NAFTAL SPA in *Appendix II*

## 2. Overview of LPG branch

The LPG division was established, like other divisions, to undertake some of the missions entrusted to NAFTAL, with its main mission being the supply and marketing of LPG products. This division was created in July 1998 and plays a significant role in the political, economic, and social aspects of the country, as it is responsible for supplying the Algerian market with gas and its derivatives. It operates with a two-tier structure:

- **Functional part:** Ensures technical and administrative organization of operational structures and provides necessary logistics for functioning.
- **Operational part:** Organized into maintenance & implementation directorate and 19 LPG districts, employing a decentralized approach to promote empowerment and responsibility.

### 2.1. Main missions of LPG branch:

The LPG branch consists of fourteen (14) functional directorates located at the headquarters and 19 operational district directorates, distributed nationwide. The main missions of the functional Directorates at the Headquarters of the LPG division include:

- Planning, managing, organizing, promoting, and developing the filling and distribution activities of LPG (bulk LPG transport by cabotage, pipelines, and trucks, primary and secondary storage, road transport of packaged LPG).
- Modernizing infrastructure to enhance productivity, safety, and management.
- Listening to the customer and identifying current and future requirements etc.

## **2.2.Human resources of LPG branch:**

The lpg division has a workforce of 7180 employees engaged in the activities outlined in its organization, across all categories, distributed as follows:

*Table n°6: distribution of HR by professional category.*

Hr Number	Senior management	Middle management	Supervisory	Execution	Total
	110	1470	3700	1900	7180

**Source :** NAFTAL LPG branch

The organizational chart of the company NAFTAL branch L.P.G in *Appendix II*.

NAFTAL continues its commitment to the continuous improvement of its services. In this regard, the company has effectively shifted towards digitalization, and recently introduced "NAFTAL KHADAMAT" mobile application, an initiative aimed at enhancing customer satisfaction.

## **3. NAFTAL KHDAMAT**

"NAFTAL KHADAMAT" is an innovative free application, was officially launched on Thursday, February 24, 2022 by Mr. Mourad MENOVAR, the Chief Executive Officer on PlayStore with over 50,000 downloads, and has updated on September 10, 2023. On March 13, 2024 NAFTAL has launched the application on the App Store.

This initiative is part of the company's service modernization efforts, in line with the national plan for digitizing services.

over 50,000 downloads.

### **3.1.NAFTAL KHADAMAT's services:**

In addition, "NAFTAL KHADAMAT" provides a variety of services, including:

- Geolocation and routes to the nearest gas station and SIRGHAZ conversion centers;
- Discovering the latest promotions offered by NAFTAL, such as maintenance packages and tire changes;
- Accessing information on the different fuels available, including their specifications and daily updated prices;
- Exploring details about products and equipment for sale at NAFTAL;
- Utilizing a precise inventory of the company's various stations nationwide, covering regular, Sirghaz, green fuel, and retail points;
- Accessing information about each gas station, including opening hours, email addresses, phone numbers.

Furthermore, the platform facilitates communication between the company and the customer, allowing for the submission of complaints, feedback, and grievances.

## **Section 02: method and data**

The purpose of this section is to present a thorough elucidation of the research methodology employed to fulfill the objectives of the study.

### **1. Epistemological posture**

Epistemology, a philosophical discipline, centers on the critical analysis of knowledge, belief, and justification. It delves into questions surrounding the nature of knowledge, its acquisition, and the human capacity to comprehend the world. Additionally, Epistemology explores themes concerning skepticism, truth, validation, and the boundaries of knowledge. Its primary aim is to underpin the foundations of scientific inquiry and evaluate the attributes, scope, and reliability of assertions concerning knowledge.

However, another way to conceive of epistemology is a branch of philosophy that seeks to establish the fundamental principles of scientific inquiry (Thiétart, 2014)

According (Gavard-Perret, Gotteland, Haon, & Jolibert, 2008), an epistemological paradigm refers to a collection of beliefs and assumptions about the nature of knowledge itself, including what qualifies as knowledge, its essence, and the processes by which it is acquired and developed. They identified two types of epistemological paradigms: positivist/post-positivist and constructivist. In this particular study, the researcher has adopted a post-positivist epistemological paradigm due to their stance towards the research object.

#### **1.1. Research reasoning:**

The hypothetico-deductive approach in research entails validating established theories or knowledge by formulating hypotheses and subjecting them to specific scenarios. As described by (Gavard-Perret, Gotteland, Haon, & Jolibert, 2008), this method emphasizes hypothesis validation and the evaluation of current knowledge. Researchers initiate the process by posing a question and forming a hypothesis, which they then test through empirical or experimental studies. They analyze the results and draw conclusions. If the hypothesis is confirmed, the research is concluded, and the results can be disseminated.

## **1.2.Methodological approach :**

To fulfill our research aims and ensure robust reliability, the quantitative approach stands out as the most suitable and fitting for hypothesis testing. This approach reflects a positivist epistemological standpoint characterized by a hypothetico-deductive framework.

In their work, (Burns & Susan, *he Practice of Nursing Research: Conduct, Critique and Utilization, 2005*) characterize quantitative research as a formal, rigorous, and objective method employing systematic strategies to generate and refine knowledge for problem-solving purposes.

According to (Mehrad, MohammadHossein, & Zangeneh, 2019), the quantitative research design, the principal purpose is situated to regulate the connotation between an independent variable and a dependent or consequence variable in a population. This research design is either descriptive or experimental.

The decision to employ quantitative research methodology in this study is justified by its alignment with the research question, which focuses on investigating the impact of digitalization on customer satisfaction. As per (Creswell & Creswell, 2018) perspective, post-positivist assumptions, typically associated with quantitative research, have long served as the conventional basis for research. This suggests that the foundational assumptions of quantitative research are well-suited to the aims of this study. Therefore, the adoption of quantitative research methodology is deemed essential for conducting a thorough investigation into the research question.

## **2. Data collection instruments**

Accurate data collection stands as a pivotal element of successful research, guaranteeing the reliability and validity of the study findings (N'Da, 2015).

### **2.1.Documentary and study:**

Documentary research enables the gathering of a vast array of documents related to the studied problem, acquiring maximum useful information within the subject area. It proves beneficial in

formulating questions and theoretical frameworks, conceptualizing, drafting literature reviews, and discussing research results. Additionally, it equips researchers with the necessary resources to explain or comprehend a phenomenon, offering general information on the subject and the field of study (N'Da, 2015).

For our documentary research, we initially consulted numerous scientific articles through online libraries such as SNDL, Cairn, Google Scholar, and ResearchGate for composing the literature review. To enrich our research endeavors, particularly in developing the conceptual framework, we utilized several books available on various digital platforms such as Z Library, Google books, PDF Drive, Scholarvox, in addition to books accessible in our school library.

## **2.2.Survey:**

Surveys represent a frequently employed tool in research for collecting data from a targeted population. They offer a structured format comprising predetermined questions and corresponding answer options, which respondents complete to furnish pertinent information for the study.

Additionally, (Thiétart, 2014) emphasizes that surveys represent the most appropriate primary data collection method for conducting research and acquiring both qualitative and quantitative information. This methodology enables researchers to gather a substantial volume of data from a broad sample of respondents while capturing responses predetermined in advance.

Data for this research study were obtained through an electronic survey distributed from ***April 29, 2024, to May 15, 2024.***

The survey employed a simple random sampling method, facilitated by a Google Forms document, and distributed online.

The survey, detailed in ***Appendix I***, comprises seven distinct sections: User profile, eligibility, satisfaction and user experience, quality assessment, reasons for non-use, the impact of digitalization on customer interaction, and finally demographic profile of the respondent. Each section is thoroughly elucidated in the following segments.

**Demographic profile of the respondent:** The first part of the questionnaire [Q01-Q05] incorporates descriptive questions regarding respondents' demographic details, encompassing gender, age, family status, educational attainment, and more. Its objective is to gather fundamental data about the participants.

**User profile:** The second part of the questionnaire [Q06-Q08], consists of three multiple-choice descriptive inquiries concerning the user's profile, such as smartphone access. Aiming to collect fundamental data about the application's usage. If the user's response is negative, the questionnaire automatically directs them to subsequent section to complete other questions related to digitalization. Conversely, If their response is affirmative, they will be directed to the fourth section to answers other questions related to quality assessment etc.

**Digitalization :** The third part of the questionnaire [Q09], intended for the entire sample regardless of whether the respondent is a user or not, comprises one question employs a grid multiple-choice format with 4 items rated on a 5-point Likert scale related to digitalization.

**Quality assessment:** The fourth part of the questionnaire [Q10], comprises a grid multiple-choice format with 4 items rated on a 5-point Likert scale. Designed respondents' agreement levels with statements regarding to the quality assessment of the mobile application.

**The free nature:** The fifth part of the questionnaire [Q11], consists of a grid multiple-choice format where respondents rate 4 items using a 5-point Likert scale. Structured to assess respondents' agreement levels with statements concerning the free nature of the mobile application.

**Satisfaction:** The seventh part of the questionnaire [Q12], Crafted to measure respondents' agreement levels with statements pertaining to the satisfaction of the mobile application.

### **3. Population and Sample**

The population refers to a collective of individuals (human or non-human), encompassing a set of basic units (a person, a group, a city, a country) sharing specific common characteristics based on a set of criteria. It is not always feasible or necessary to study the entire population to gain a

thorough understanding of them. Useful information can be gathered from a portion (sample) of the whole (population) to make generalizations (N'Da, 2015).

In order to increase the sample size, a probabilistic method known as simple random sampling was utilized, ensuring that each member of the population had an equal chance of being selected for the sample. In total, 150 responses were received.

#### **4. Data treatment and analysis**

**Software programs:** The survey data underwent analysis using two software programs: SPSS version 28.0 and Excel 2016, renowned for their proficiency in statistical processing.

**Data conversion:** Before analysis, the data underwent conversion using Excel to ensure compatibility before being imported into SPSS.

**Reliability Study:** Cronbach's Alpha Coefficient measuring the cohesion of the relationship between items

**Descriptive and frequency Analysis:** The initial analysis included performing descriptive and frequency analyses to offer an overview and summary of the data.

**Multiple linear regression analysis:** A multiple regression analysis was conducted to examine the formulated hypotheses and evaluate the relationships among variables. This analysis explored linear associations and the predictive capabilities of the independent variables on the dependent variable.

Chapter II provides a structured overview of NAFTAL's organizational framework, including its history, mission, resources, and the establishment of the LPG branch. The methodological approach outlines the epistemological stance, research reasoning, data collection instruments, and detailed procedures for data analysis. This chapter sets the stage for Chapter III, which will delve into the empirical findings and interpretation of results obtained from the study.

## ***CHAPTER III: RESULTS & DISCUSSION***

This chapter presents the results of the data collection in the first section, followed by a discussion of the findings of this research in the second section.

### ***Section 01: results***

#### **1. statistical reliability**

Prior to analyzing the respondents' data, the reliability statistics table is presented, showing the results of the reliability coefficient (Alpha Cronbach). Cronbach's Alpha coefficient is a statistical tool in the social sciences that gauges the internal consistency or reliability of a test or questionnaire. It evaluates how well various items in a measure align with the same underlying concept, with values ranging from 0 to 1. A coefficient of 0.60 or higher is typically deemed acceptable, indicating a satisfactory level of consistency among the measured items in capturing the intended concept. Detailed in *Appendix III*

***Table N°7: statistical reliability***

<i>Section</i>	<i>Expressions</i>	<i>Cronbach's alpha coefficient</i>
<i>Digitalization</i>	04	0.801
<i>Quality assessment</i>	04	0.788
<i>The free nature</i>	04	0.804
<i>Satisfaction</i>	04	0.715

**Source:** Source: self-developed based on SPSS results

The text discusses the reliability analysis of a questionnaire, using Cronbach's Alpha coefficient as a statistical measure. This coefficient evaluates the internal consistency or reliability of a test or questionnaire, gauging how well various items align with the same underlying concept. It ranges from 0 to 1, with higher values indicating stronger reliability. In this case, the Cronbach's Alpha values suggest that the questionnaire items are relatively consistent in measuring the same concept. Moreover, all coefficients exceeded 0.70, indicating good reliability.

## 2. Univariate descriptive analysis

In this stage, a univariate descriptive analysis of the survey questions is conducted. This involves using descriptive statistics like frequency tables and percentage distributions to summarize the responses for each question.

### 2.1. Demographic profile of the respondent:

The analysis encompassed 150 responses, with over 33 respondents being female, constituting 22% of the total sample, while males accounted for 78%. The majority of respondents fell within the 18-25 age bracket, comprising 51% of the sample, while the lowest percentage was in the 56-65 age group, at 3.30%. Regarding marital status, singles comprised the largest group at 60.70%, whereas widows represented the smallest group at 0.70%. In terms of education, university-educated individuals constituted 83.30%, whereas secondary school attendees made up the smallest percentage at 2.70%. Geographically, the majority resided in the west region (40.70%), followed by the central region (27.20%), with the south region having the lowest representation at 14.70%.

These findings are summarized in *Table N°8*, providing descriptive and frequency statistics on the respondents' characteristics.

*Table N°8: socio-demographic characteristics of respondents*

Variable	Specification	Frequency	Percentage%
<i>Q1: what is your gender?</i>	Female	33	22%
	Male	177	78%
<i>Q2: How old are you ?</i>	18-25	77	51%
	26- 35	32	21.30%
	36-45	23	15.30%
	46-55	13	8.70%
	56-65	05	3.30%
	66 and more	00	0.00%
<i>Q3: What is your current family situation?</i>	Single	91	60.70%
	Married	52	34.70%
	Widow	01	0.70%

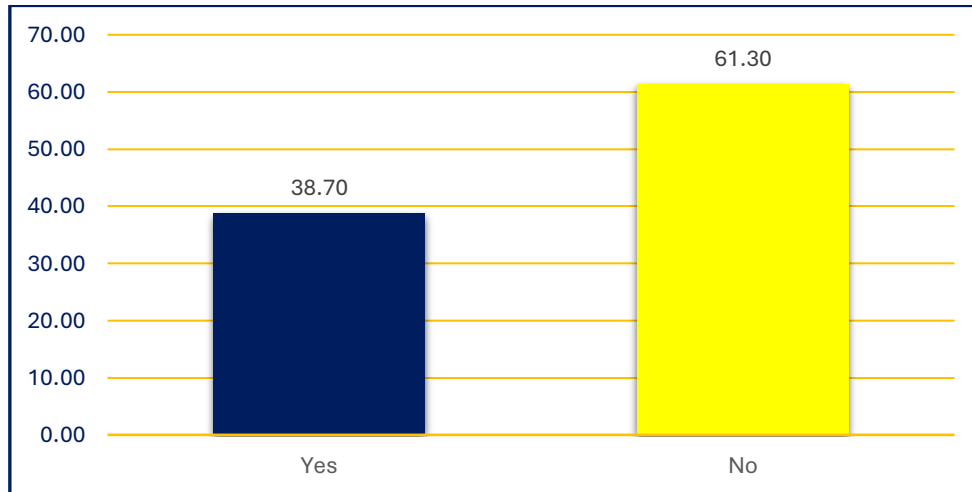
	Divorced	06	4.00%
<i>Q4: What is your level of education?</i>	Middle school	04	2.70%
	Secondary school	13	8.70%
	University	125	83.30%
	Professional training	08	5.30%
	Other	00	0.00%
<i>Q5: Which region do you currently reside in?</i>	North	24	16.00%
	South	07	4.70%
	East	19	12.70%
	West	61	40.70%
	Center	39	26.00%

Source: Self-developed based on SPSS results.

## 2.2. User profile:

*Q6: Do you own a vehicle?*

*Figure N°4: the frequencies of respondents according to Q6*

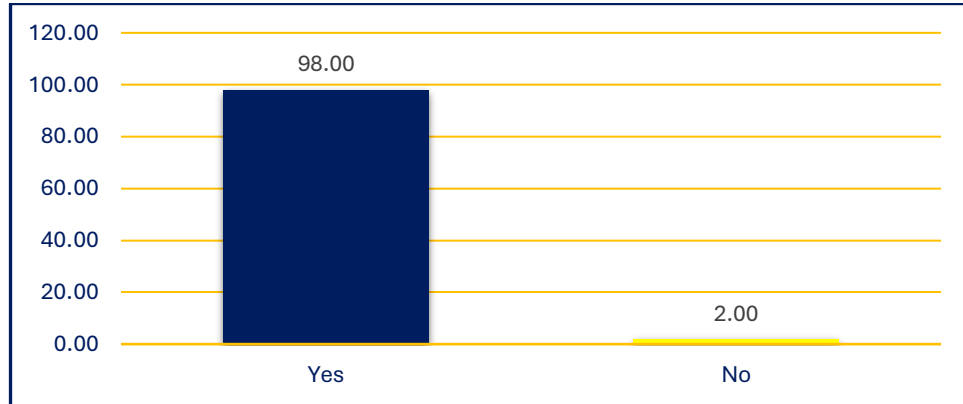


Source: Self-developed based on SPSS results.

According to *Figure N°5*, it's evident that over 92 respondents **do not own a vehicle**, constituting precisely 61.30% of the total study sample. Conversely, **vehicle owners** represent only 38.70% of the sample.

**Q7: Do you have access to a smartphone or mobile device capable of running mobile application?**

**Figure N°5: the frequencies of respondents according to Q7**

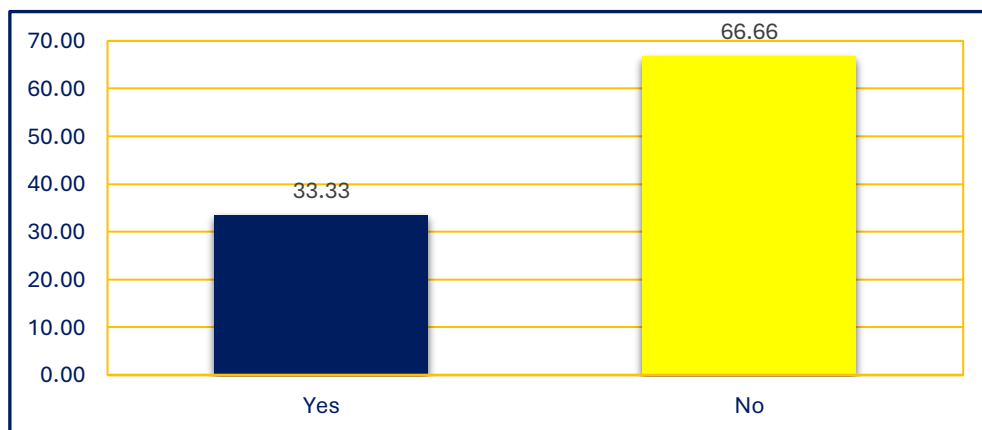


**Source:** Self-developed based on SPSS results.

As depicted in **Figure N°6**, it's apparent that over 147 respondents possess a smartphone or mobile device capable of running mobile applications, constituting precisely 98.00% of the total study sample. Alternatively, those without access to such devices represent only 2% of the sample.

**Q8: Are you currently a user of "NAFTAL KHADAMAT" mobile application?"**

**Figure N°6: the frequencies of respondents according to Q8**



**Source:** Self-developed based on SPSS results.

We observe from *Figure N°7* that 100 of the respondents currently not a user of "NAFTAL KHADAMAT" mobile application, where their exact percentage reached 66.66% of the total sample of the study, while the percentage of currently a user of "NAFTAL KHADAMAT" mobile application in the sample was only 33.33%.

### 2.3.Digitalization:

*Q9: Please rate your level of agreement with the following statements regarding the digitalization.*

*Table N°9: Likert Scale 5 Points*

Degré	1	2	3	4	5
Category	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Moyenne	1-1.79	1.8--2.59	2.6-3.39	3.4-4.19	5-4.2

Source: Self-developed based on SPSS results.

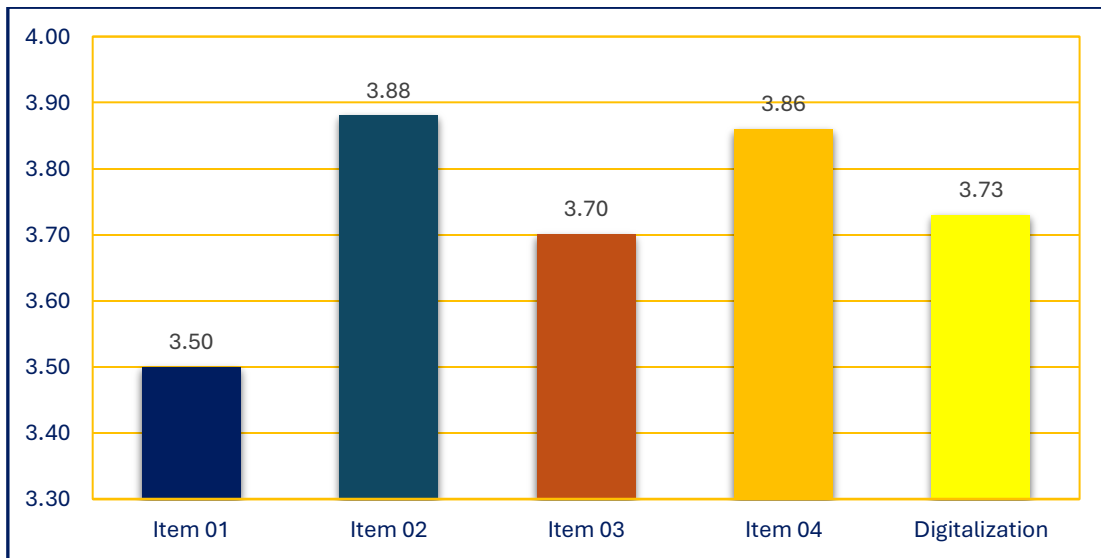
*Table N°10: frequencies and Descriptive statistics according to Q9*

N°	Items	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	standard deviation	overall tendency	Order
01	Digitalization has made it easier to interact with [Company/Organization] as a customer	01	09	09	26	05	3.50	0.974	Agree	4
02	Digitalization increases convenience, raising satisfaction levels.	01	03	02	39	05	3.88	0.746	Agree	1
03		02	03	08	32	05	3.70	0.886	A	3

	Personalization through digitalization enhances overall customer experience, leading to greater satisfaction.	4.00	6.00	16.00	64.00	10.00			
04	Digital tools provide customers with more control over interactions, contributing to increased satisfaction.	01	03	03	38	05	3.86	0.756	2
	<b>Digitalization</b>						3.73	0.672	Agree

Source: Self-developed based on SPSS results.

Figure N°7: the frequencies of respondents according to Q9



Source: Self-developed based on SPSS results.

According to *Figure N°8*, "**digitalization increases convenience, raising satisfaction levels**" is ranked first with an arithmetic mean of 3.88 and a standard deviation of 0.746, falling within the "Agree" range on the Likert scale. This suggests that respondents perceive digitalization positively. Following closely is "**digital tools provide customers with more control over interactions, contributing to increased satisfaction,**" also with a mean of 3.86 and a standard deviation of 0.756, indicating an overall "Agree" response tendency among respondents. Ranked third is "**personalization through digitalization enhances overall customer experience, leading to greater satisfaction,**" with a mean of 3.70 and a standard deviation of

0.886, signifying another "Agree" response tendency. Ranked last is "**digitalization has made it easier to interact with [Company/Organization] as a customer,**" with a mean of 3.50 and a standard deviation of 0.974, suggesting an "Agree" overall response tendency among respondents. Overall, the subsection on digitalization demonstrates a "Rather Agree" tendency, with an arithmetic mean of 3.73 and a standard deviation of 0.672, highlighting respondents' agreement with digitalization.

#### 2.4. Quality assessment:

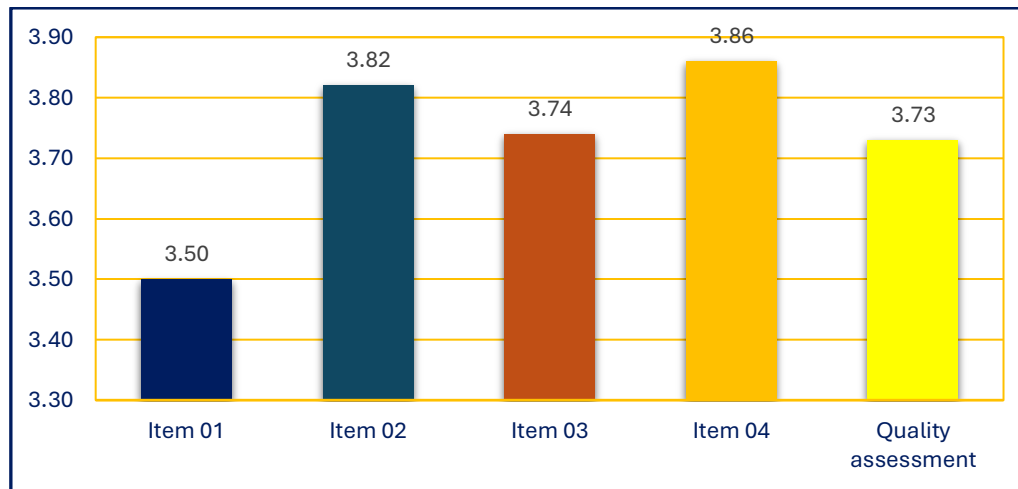
*Q10: Please rate your level of agreement with the following statements regarding the quality of "NAFTAL KHADAMAT" mobile application.*

**Table N°11: frequencies and Descriptive statistics according to Q10**

N°	Items	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	standard deviation	overall tendency	Order
		N								
		%								
01	The navigation is fast and easy.	01	09	09	26	05	3.50	0.974	Agree	4
02	The information provided is clear, and relevant.	01	04	03	37	05	3.82	0.800	Agree	2
03	The features and functionalities offered meet the expectations and requirements.	02	03	07	32	06	3.74	0.899	Agree	3
04	The overall design and visual appeal are modern and aesthetically pleasing.	01	03	03	38	05	3.86	0.756	Agree	1
<b>Quality assessment</b>							<b>3.73</b>	<b>0.671</b>	<b>Agree</b>	

Source: Self-developed based on SPSS results.

*Figure N°8: the frequencies of respondents according to Q10*



Source: Self-developed based on SPSS results.

Based on *Figure N°9*, "**the overall design and visual appeal are modern and aesthetically pleasing**" ranks first with an arithmetic mean of 3.86 and a standard deviation of 0.756. This falls within the "Agree" range on the Likert scale, indicating that respondents perceive the quality of "NAFTAL KHADAMAT" mobile application positively. Following closely is "**the information provided is clear and relevant**," also with a mean of 3.82 and a standard deviation of 0.800, suggesting an "Agree" overall response tendency among respondents. Ranked third is "**the features and functionalities offered meet the expectations and requirements**," with a mean of 3.74 and a standard deviation of 0.899, indicating another "Agree" overall response tendency. Ranked last is "**the navigation is fast and easy**," with a mean of 3.50 and a standard deviation of 0.974, suggesting an "Agree" overall response tendency among respondents. Overall, the subsection assessing the quality of "NAFTAL KHADAMAT" mobile application demonstrates a "Rather Agree" tendency, with an arithmetic mean of 3.73 and a standard deviation of 0.671, highlighting respondents' agreement with the application's quality.

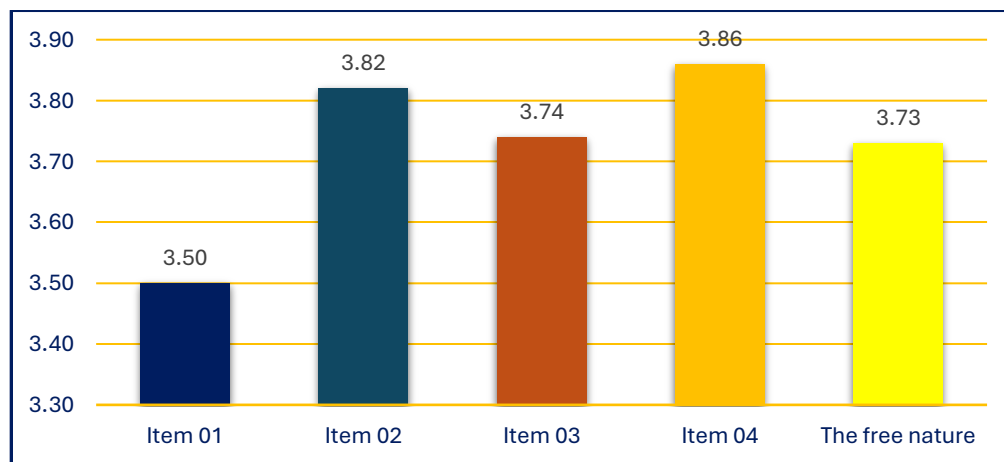
### 2.5.The free nature:

*Q11: Please rate your level of agreement with the following statements regarding the free nature of "NAFTAL KHADAMAT" mobile application.*

**Table N°12: frequencies and Descriptive statistics according to Q11**

N°	Items	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Ecart type	overall tendency	Order
		N								
		%								
01	The free nature enhances users' satisfaction with the service.	01	05	13	26	05	3.58	0.883	Agree	3
		2.00	10.00	26.00	52.00	10.00				
02	The free nature influences users' decisions to continue using it	01	05	02	37	05	3.80	0.883	Agree	2
		2.00	10.00	4.00	74.00	10.00				
03	The free nature contributes positively to users' overall experience.	04	07	08	26	05	3.42	1.108	Agree	4
		8.00	14.00	16.00	52.00	10.00				
04	The free nature motivates users to engage more frequently with the application's features.	01	05	03	34	07	3.82	0.873	Agree	1
		2.00	10.00	6.00	68.00	14.00				
<b>The free nature</b>							3.65	0.738	Agree	

Source: Self-developed based on SPSS results.

**Figure N°9: the frequencies of respondents according to Q11**

Source: Self-developed based on SPSS results.

Based on *Figure N°10*, "**the free nature motivates users to engage more frequently with the application's features**" ranks first with an arithmetic mean of 3.82 and a standard deviation of 0.873. This falls within the "Agree" range on the Likert scale, indicating that respondents perceive the free nature of "NAFTAL KHADAMAT" mobile application positively. Following closely is "**the free nature influences users' decisions to continue using it,**" also with a mean of 3.80 and a standard deviation of 0.883, suggesting an overall "Agree" response tendency among respondents. Ranked third is "**the free nature enhances users' satisfaction with the service,**" with a mean of 3.58 and a standard deviation of 0.883, indicating another "Agree" overall response tendency. Ranked last is "**the free nature contributes positively to users' overall experience,**" with a mean of 3.42 and a standard deviation of 1.108, suggesting an overall "Agree" response tendency among respondents. Overall, the subsection assessing the free nature of "NAFTAL KHADAMAT" mobile application demonstrates a "Rather Agree" tendency, with an arithmetic mean of 3.73 and a standard deviation of 0.671, highlighting respondents' agreement with the application's free nature.

**2.6.Satisfaction:**

*Q12: Please rate your level of agreement with the following statements regarding your satisfaction with "NAFTAL KHADAMAT" mobile application.*

*Table N°13: frequencies and Descriptive statistics according to Q12*

N°	Items	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Ecart type	overall tendency	Order
		N								
		%								
01	Users' satisfaction is high.	01	07	09	26	07	3.62	0.967	Agree	2
		2.00	14.00	18.00	52.00	14.00				
02	Overall performance enhances user satisfaction.	03	07	02	33	05	3.60	1.050	Agri	3

		6.0	14.	4.00	66.00	10.0			
		0	00			0			
03	users are satisfied with the range of services available.	02	05	08	26	09	3.70	1.015	1
		4.0	10.	16.0	52.0	18.00			Agree
		0	00	0	0				
04	Users are satisfied with the level of support and assistance provided by NAFTA L employees through the mobile application	01	09	09	25	06	3.52	0.995	4
		2.0	18.	18.0	50.0	12.00			Agree
		0	00	0	0				
	<b>Satisfaction</b>						3.61	0.739	<b>Agree</b>

Source: Self-developed based on SPSS results.

According to *Table N°13*, "users are satisfied with the range of services available" ranks first with an arithmetic mean of 3.70 and a standard deviation of 1.015, falling within the "Agree" range on the Likert scale. This indicates that respondents perceive the digitalization of "NAFTAL KHADAMAT" mobile application positively. Following closely is "users' satisfaction is high," with a mean of 3.62 and a standard deviation of 1.050, suggesting an overall "Agree" response tendency among respondents. Ranked third is "overall performance enhances user satisfaction," with a mean of 3.60 and a standard deviation of 1.050, indicating another "Agree" overall response tendency. Ranked last is "users are satisfied with the level of support and assistance provided by NAFTA L employees through the mobile application," with a mean of 3.52 and a standard deviation of 0.995, suggesting an overall "Agree" response tendency among respondents. Overall, the subsection assessing the digitalization of "NAFTAL KHADAMAT" mobile application demonstrates a "Rather Agree" tendency, with an arithmetic mean of 3.61 and a standard deviation of 0.739, highlighting respondents' agreement with the satisfaction levels related to "NAFTAL KHADAMAT" mobile application.

### 3. Hypotheses testing

- *H0: There is no impact of digitalization, quality assessment and the free nature on the dependent variable Satisfaction.*
- *H1: There is impact of digitalization, quality assessment and the free nature on the dependent variable Satisfaction.*

*Table N°14: multiple linear regression*

Model	The sum of squares	DF	Mean square	F	Sig
<b>Regression</b>	24.480	03	8.160	163.905	0.000
<b>Residuals</b>	2.290	46	0.050		
<b>Total</b>	26.77	49			

Variables	Coefficient	Std Error	T	Sig
<b>Digitalization</b>	1.036	1.042	1.705	0.011
<b>Quality assessment</b>	1.828	1.086	2.005	0.014
<b>The free nature</b>	0.265	0.090	2.95	0.005

Dependante Variable :	Correlation Coefficient :	Coefficient of determination :
<b>Satisfaction</b>	<b>R = 0.956</b>	<b>R<sup>2</sup> = 0.914</b>

**Source:** self-developed based on SPSS results

The results from the presented table indicate that the calculated f-value was 163.90, accompanied by a significance probability value of 0.000, which is less than the significance level ( $\alpha = 0.05$ ). This underscores the validity of the model in testing the hypotheses. Subsequently, the hypotheses were further examined using the multiple linear regression method to assess the impact of the independent variables (**digitalization, quality assessment, and the free nature**) on the dependent variable (**satisfaction**). Moreover, the table reveals a

correlation coefficient of 0.956 between the independent variables, signifying a strong positive correlation among them. It is also noted that the coefficient of determination is equal to 0.915. This means that 91.5% of the variation in satisfaction can be explained by the variation in digitalization, quality assessment and the free nature. The remaining percentage is due to other factors.

➤ ***The impact of quality assessment of "NAFTAL KHADAMAT" mobile application on users' satisfaction:***

From the same table, a statistically significant relationship is evident at the significance level ( $\alpha = 0.05$ ) between the independent variable quality assessment and the dependent variable satisfaction. The calculated t-value is 2.95, with a probability value (sig) of 0.005, which is below the significance threshold of 0.05.

Hence, we **reject** the null hypothesis, suggesting no positive impact on the dependent variable satisfaction.

Consequently, we **accept** the alternative hypothesis, indicating a positive impact of quality assessment on the dependent variable satisfaction, significant at the 0.05 significance level.

➤ ***The impact of the free nature of "NAFTAL KHADAMAT" mobile application on users' satisfaction:***

From the same table, a statistically significant relationship is observed at the significance level ( $\alpha = 0.05$ ) between the independent variable the free nature and the dependent variable satisfaction. The calculated t-value is 2.005, with a probability value (sig) of 0.005, which is below the significance threshold of 0.05.

Thus, we **reject** the null hypothesis, indicating no positive impact on the dependent variable satisfaction.

Consequently, we **accept** the alternative hypothesis, suggesting a positive impact of the free nature on the dependent variable satisfaction, significant at the 0.05 significance level.

➤ *The impact of digitalization on customer satisfaction:*

From the same table, a statistically significant relationship is evident at the significance level ( $\alpha = 0.05$ ) between the independent variable digitalization and the dependent variable satisfaction. The calculated t-value is 1.705, with a probability value (sig) of 0.001, which is below the significance threshold of 0.05.

Therefore, we **reject** the null hypothesis, indicating no positive impact on the dependent variable satisfaction.

Consequently, we **accept** the alternative hypothesis, affirming a positive impact of digitalization on the dependent variable satisfaction, significant at the 0.05 significance level.

➤ *Summary of hypotheses testing:*

*Table N°14: summary of hypotheses testing.*

Confirmation		Hypothesis
Accepted	Yes	<i>H1: "NAFTAL KHADAMAT" mobile application has a significant positive impact on users' satisfaction.</i>
Accepted	Yes	<i>H2: "NAFTAL KHADAMAT" mobile application's quality has a positive impact on users' satisfaction.</i>
Accepted	Yes	<i>H3: The free nature of "NAFTAL KHADAMAT" mobile application has a positive impact on users' satisfaction.</i>
Accepted	Yes	<i>H4: The digitalization has a positive impact on users' satisfaction.</i>

**Source:** self-developed based on multiple linear regression results.

## **Section 02: discussion**

The study's primary objective was to investigate the impact of digitalization on customer satisfaction. Employing hypothesis testing, it scrutinized the impact of various variables on the satisfaction process. The study's findings yielded significant insights, enriching our comprehension of the interplay between independent variables such as "NAFTAL KHADAMAT" mobile application, its free nature, its quality and the digitalization and the dependent variable satisfaction.

The analysis based on hypothesis testing reveals that "NAFTAL KHADAMAT" mobile application has a statistically significant positive impact on users' satisfaction, as indicated by the acceptance of hypothesis **H1**. This finding aligns with earlier research, reinforcing the understanding that digital services, such as mobile applications, play a crucial role in influencing customer satisfaction (CONILH, 2020), (Boustani mallah & Ibrahim , 2021), (Kane, 2019), (Saad, Hammad, & Barakat., 2021).

Moreover, the study's findings not only validate but further elaborate on the positive relationship observed between "NAFTAL KHADAMAT" mobile application's quality and users' satisfaction. This correlation underscores the pivotal role that quality plays in shaping user experiences and perceptions supporting hypothesis **H2**. By prioritizing aspects such as performance, reliability, usability, and responsiveness, developers can effectively cater to user needs and preferences, thereby fostering a more satisfying user experience. Furthermore, these conclusions are consistent with prior research conducted by (Yasfi & Pardede, 2023), (Hasman, Ginting, & Rini, 2019), (Sudjatmoko, Caesar, Gumuljo, & Jeremy, 2022), (Rania AZEROUAL, QMICHCHOU, & SALEK, 2023), (Saad, Hammad, & Barakat., 2021), which also highlighted the significance of quality improvements in driving user satisfaction within digital environments.

Based on the framework of hypotheses testing and the subsequent analysis, the rejection of the null hypothesis indicates that there is indeed a statistically significant relationship between the free nature of "NAFTAL KHADAMAT" mobile application and users' satisfaction as hypothesized **H3**. This suggests that users derive satisfaction from the fact that the application is provided to them at no cost. This finding aligns with prior research, reinforcing the notion

that the price influence customers' satisfaction. Whether the price is low or services/products are offered free of charge, it can positively impact user satisfaction (Sudjatmoko, Caesar, Gumuljo, & Jeremy, 2022).

Additionally, our study's results reveal a positive connection between digitalization and customers' satisfaction, indicating a widespread acceptance of digital adoption among customers. This supports hypothesis **H4**, suggesting that digitalization can positively influence customer satisfaction, a conclusion consistent with the previous studies by (CONILH, 2020), (Boustani mallah & Ibrahim , 2021), (Kane, 2019), (Saad, Hammad, & Barakat., 2021). By embracing digitalization, customers signal their recognition of the convenience and value offered by digital services. This acceptance represents a shift towards smoother and more efficient interactions with brands and services in the digital sphere.

In conclusion, the study's findings contribute to our understanding of the impact of digitalization on customer satisfaction, emphasizing the importance of factors such as mobile application quality, pricing strategies, and overall digital adoption in shaping positive customer satisfaction.

## ***CONSLUSION***

## 1. Main obtained results

This study highlights the significant impact of digitalization, particularly through "NAFTAL KHADAMAT" mobile application, its free nature, and quality, on customer satisfaction. Through a quantitative research approach involving 150 participants, the study confirms that embracing digital services positively enhances overall customer experiences. Specifically, "NAFTAL KHADAMAT" mobile application was found to significantly influence user satisfaction, along with the free nature of the application, which underscores the importance of pricing strategies in shaping customer perceptions. Moreover, quality emerged as a crucial determinant of satisfaction, with factors such as performance, reliability, usability, and responsiveness playing pivotal roles.

## 2. Recommendations

- Enhance their marketing strategy to attract more consumers and increase awareness of the application.
- Create appealing television advertisements to promote their application "NAFTAL KHADAMAT", highlighting its key features and user benefits.
- Utilize a multi-platform approach, guiding viewers to websites, social media, and other digital channels.

## 3. Limits

While this study has provided valuable insights, it is imperative to acknowledge its inherent limitations, which include:

- **Small Sample Size:** The study was limited by the small number of participants, which may have affected the reliability and generalizability of the results.
- **Time Restrictions:** The study was time-limited, preventing in-depth data collection and analysis. Prolonging the study duration could afford the opportunity for a more thorough investigation into the research queries.
- **Response bias:** The study may have been influenced by participants providing socially desirable responses or being untruthful in their answers, affecting the accuracy of the findings.

#### **4. Possible extensions of the research**

- Undertaking a similar study with an expanded sample size to augment the robustness of the outcomes and improve the generalizability of the findings to broader populations.
- Conducting an investigation to ascertain the factors contributing to the non-adoption of "NAFTAL KHADAMAT" mobile application among naftal customers.
- Employing diverse research methodologies or data collection techniques, such as qualitative or mixed-methods approaches, to acquire a more intricate comprehension of the subject matter and to triangulate the results.

## ***BIBLIOGRAPHY***

## I. Journals :

- Agrawal, S., & Khan, M. (2018). Digitalization of businesses: An overview. *Journal of Entrepreneurship, Management and Innovation*, 14(4), 67-84.
- Baabdullah, A. M., Ainin, S., & Suurna, M. (2021). Understanding customer satisfaction with online shopping: The role of website design, perceived ease of use, perceived usefulness and trust. *ournal of Retailing and Consumer Services*, 59, 102-358.
- Boustani mallah, N., & Ibrahim , P. M. (2021). les effets de la technologie et de la digitalisation sur la satisfaction des clients des institusions financière. *journal of contemporary research in business administration and economic sciences*.
- Bowersox, D. J., Closs, D. J., & Drayer, R. W. (2005). The digital transformation: Technology and beyond. *Supply Chain Management Review*, 9.
- Clarke, R. (2019). Risks inherent in the digital surveillance economy: A research agenda. *Journal of Information Technology* , 34(1), 59–80.
- Deci, E. L., & Ryan, R. M. (2000). The "What" and "Why" of Goal Pursuits: Human Needs and the Self-Determination of Behavior. *An International Journal for the Advancement of Psychological Theory* , 11(4), 227-268.
- Dhingra, S., Gupta, S., & Bhatt, R. (2020). A study of relationship among service quality of E-commerce websites, customer satisfaction, and purchase intention. *International Journal of E-Business Research (IJEER)*, 16(3), 42-59.
- Hasman, H. C., Ginting, P., & Rini, E. S. (2019). The influence of E-Service Quality on E-Satisfaction and its subsequent impact on repurchase intention among students using e-commerce applications at Universitas Sumatera Utara. *International Journal of Research & Review (www.ijrrjournal.com) Vol.6; Issue: 10; October 2019 , Vol.6(10)*.
- Kahlane, A. (2018). La transformation digitale des entreprises en Algérie. . *Revue Algérienne des Sciences de Gestion*, 7, 45-58.

- Kahlane, A. (2013). L'investissement dans les technologies de l'information en Algérie depuis l'indépendance. . *Revue Economique et Politique*, 4, 25-37.
- Kannan, P. K., & Li, H. (2017). Digital marketing: A framework, review and research agenda. *International Journal of Research in Marketing.*, 34(01), 22-45.
- Katz, R. L., & Technovation, P. K. (2013). Measuring digitization: A growth and welfare multiplier. *The Journal of Technological Innovation, Entrepreneurship and Technology Management*, 33(10-11), 311-386.
- khalfallah, H., & bendjelloul, k. (2023). The reality of digital transformation in Algeria: an analysis of international indicators. *Journal of Economic & Financial Research*, 10(01), 776-802.
- MATT, C., HESS, T., & BENLIAN, A. (2015). Digital Transformation Strategies. *Business & Information Systems Engineering*, 57(5), 339-343.
- Mehrad, A., MohammadHosseini, & Zangeneh, T. (2019). Comparison between Qualitative and Quantitative Research Approaches: Social Sciences. 5(7).
- Nabila, A. (2022). La transformation digitale et performance des entreprises. *Revue organisation et travail*, 10(4), 212-228.
- Oesterreich, T. D., Teuteberg, F., Bensberg, F., & Buscher., G. (2019). The controlling profession in the digital age: Understanding the impact of digitisation on the controller's job roles, skills and competences. *International journal of accounting information systems*, 35.
- Oliver, R. L. (1999). Whence Consumer Loyalty? *Journal of Marketing*, Vol. 63, *Fundamental Issues and Directions for Marketing*, 63, 33-44.
- Pereira, H. G., de Fátima Salgueiro, M., & Rita, P. (2016). Online purchase determinants of loyalty: The mediating effect of satisfaction in tourism. *Journal of Retailing and consumer Services*, 30, 279-291.
- Rania AZEROUAL, I. E., QMICHCHOU, M., & SALEK, H. (2023). The impact of e-service quality on customers' purchase intention : the mediating role of satisfaction.

*International journal of financial studies, economics and management, No 1, 1-17, 10.2022, 2.*

Saad, N. A., Hammad, D. A., & Barakat., A. (2021, 04 20). The Impact of Digitalization on Customers' Satisfaction in Educational Sector: An Empirical Study. *The Journal Psychology and Education, 58*(4).

Shankar, V., Smith, A. K., & Rangaswamy, A. (2003). Customer Satisfaction and Loyalty in Online and Offine Environments. *International Journal of Research in Marketing., 20*, 153-175.

T.Eymann, C.Legner, T.Hess, C.Matt, Böhmman, T., Drews, P., . . . F.Ahlemann. (2017). Digitalization: Opportunity and Challenge for the Business and Information Systems Engineering Community. *Business & Information Systems Engineering, 59*(4), 301–308.

Tilson, a., Lyytinen, K., & Sørensen, C. (2010). Research Commentary—Digital Infrastructures: The Missing IS Research Agenda. *Information Systems Research, 21*(4), 748-759.

Yasfi, S. M., & Pardede, R. (2023). influence E-service quality towards customer retention and word of mouth (MOW) mediated by customer satisfaction. *journal indonesia sosial sains Vol 4 No 11 november 2023.*

## **II. Books:**

Burns, N., & Susan, G. (2005). *The Practice of Nursing Research: Conduct, Critique and Utilization.* Saunders.

Chaffey, D., & Ellis-Chadwick., F. (2019). *Digital Marketing: Strategy, Implementation and Practice.* Pearson.

Creswell, J. W., & Creswell, J. D. (2018). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches .*

Edward, L., & Ryan, R. M. (1985). *Intrinsic Motivation and Self-Determination in Human Behavior (Perspectives in Social Psychology).* Plenum Press.

- Gassmann, O., Frankenberger, K., & Csik, M. (2013). *The St. Gallen Business Model Navigator*. ITEM-HSG.
- Gavard-Perret, M.-L., Gotteland, D., Haon, C., & Jolibert, A. (2008). *Méthodologie de la recherche : Réussir son mémoire ou sa thèse en sciences de gestion*. France: PEARSON.
- Kotler, P. T., & Armstrong, G. (2017). *Principles of Marketing, 17th Global Edition*. pearson.
- Kotler, P., & Keller, K. L. (2016). *Marketing Management*. Pearson.
- Lejealle, C., & Delecolle, T. (2017). *Aide-mémoire marketing digital* . France: Dunod.
- Mazzone, D. M. (2014). *Digital or Death: Digital Transformation — The Only Choice for Business to Survive Smash and Conquer. (1st ed.)*. Mississauga, Ontario: Smashbox Consulting Inc. Smashbox Consulting Inc.
- Mohamad, H., & Sagadevan, A. (2003). *Customers Relationship Management: A Step-by-step Approach*. VIKAS PUBLISHERS.
- N'Da, P. (2015). *Recherche et méthodologie en sciences sociales et humaines: Réussir sa thèse, son mémoire de master ou professionnel, et son article*. L'Harmattan.
- Oliver, R. L. (1997). *Satisfaction: A Behavioral Perspective on the Consumer* . New York: McGraw-Hill Inc.,US.
- Peppers, D., & Rogers, M. (2004). *Managing Customer Relationships: A Strategic Framework 3rd Edition*. John Wiley & Sons Inc.
- Phillips, D. C., & Burbules, N. C. (2000). *Postpositivism and Educational Research*. Rowman & Littlefield Publishers.
- Reichheld, F. F., & Teal, T. (1996). *The Loyalty Effect The Hidden Force Behind Growth, Profits, and Lasting Value*. Harvard Business School Press.
- Reis, J., Amorim, M., Melão, N., & Matos, P. (2018). *Digital Transformation: A Literature Review and Guidelines for Future Research*. Springer.
- Small, J. S. (2001). *The Analogue Alternative The Electronic Analogue Computer in Britain and the USA, 1930-1975*. Routledge.

Thiéart, R.-A. (2014). *Méthodes de recherche en management*. Dunod.

Westerman, G., Bonnet, D., & McAfee, A. (Oct 14, 2014 ). *Leading Digital: Turning Technology into Business Transformation*.

### **III. Book sections :**

BDI, & Berger, R. (2015). Analyses zur Studie — Die Digitale Transformation der Industrie. In *Die Digitale Transformation der Industrie*. Wiesbaden: Springer Fachmedien Wiesbaden.

Bressolles, G., & Durrieu, F. (2011). Impact des dimensions de la qualité de service électronique sur la satisfaction et les intentions de fidélité : différences entre acheteurs et visiteurs. In *La Revue des Sciences de Gestion* (pp. 37-45).

Fitzgerald, M., Kruschwitz, N., Bonnet, D., & Welch, M. (2013). Embracing Digital Technology. In *MIT Sloan Management Review* (pp. 1-12.).

Goudey, A. (2013). Exploration des effets du degré de technologie perçu du magasin sur le comportement de magasinage. In *Management & Avenir* (pp. 15-32).

Ryan, R. M., & Deci, E. L. (2002). Overview of Self-Determination theory: An organismic dialectical perspective. In *Handbook of self-determination research* (pp. 3-33). University of Rochester Press.

Yi, Y. (1990). A Critical Review of Consumer Satisfaction. In V. A. Zeithaml (Ed.). In *Review of Marketing 1990* (pp. 68-123.). Chicago: American Marketing Association.

### **IV. Rapots:**

CONILH, A. (2020). *les effets de la digitalisation des banques de detail en France sur la satisfaction des clients*. Dissertation, MONTPELLIER BUSINESS SCHOOL, France.

Kane, S. E. (2019). *la révolution bancaire avec l'avènement du numérique*. Thèse (Essai de deuxième cycle), Université du Québec en Outaouai., Sciences administratives.

Niehues-Jeuffroy, H. (2023). *Développement de l'entrepreneuriat vert et digital en Algérie*. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

Severt, D. E. (2002, 04 23). *THE CUSTOMER'S PATH TO LOYALTY: A PARTIAL TEST OF THE RELATIONSHIPS OF PRIOR EXPERIENCE, JUSTICE, AND CUSTOMER SATISFACTION*. Dissertation , the Faculty of the Virginia Polytechnic Institute and State University in partial fulfillment of the requirements for the degree of , Blacksburg, Virginia.

PwC. (2013). *Digitale Transformation – der größte Wandel seit der Industriellen Revolution*. Frankfurt: PricewaterhouseCoopers. Frankfurt.

## **V. Conference:**

Ross, J. W., Beath, C., Mocker, M., Sebastian, I. M., Fonstad, N. O., & Moloney, K. G.

(2016). Designing and Executing Digital Strategies. ICIS. *Thirty Seventh International Conference on Information Systems*. Dublin.

Sudjtmoko, A., Caesar, L. A., Gumuljo, S. Y., & Jeremy, R. (2022). Effect of E-Service Quality, Customer Perceived Value, and Price on Customer Satisfaction in Healthcare Application. *Proceedings of the 3rd South American International Industrial Engineering and Operations Management Conference*. Asuncion, Paraguay.

# *APPENDIX*

## ***APPENDIX I: QUESTIONNAIRE***

**Description:**

As part of our Master's thesis research in Management Marketing, we are investigating the impact of digitalization on customers' satisfaction, focusing on the case study of the mobile application "NAFTAL KHADAMAT." We kindly request a few minutes of your time to complete our questionnaire. Your candid responses will be kept confidential and utilized solely for academic purposes. We sincerely appreciate your valuable contribution. Thank you in advance.

<b>Section 01: Demographic profile of the respondent</b>	
<i>Q01</i>	What is your gender? (One possible answer)
	<ul style="list-style-type: none"> <li>▪ Female</li> <li>▪ Male</li> </ul>
<i>Q02</i>	How old are you ? (One possible answer)
	<ul style="list-style-type: none"> <li>▪ 18-25</li> <li>▪ 26- 35</li> <li>▪ 36-45</li> <li>▪ 46-55</li> <li>▪ 56-65</li> <li>▪ 66 and more</li> </ul>
<i>Q03</i>	What is your current family situation? (One possible answer)
	<ul style="list-style-type: none"> <li>▪ Single</li> <li>▪ Married</li> <li>▪ Widow</li> <li>▪ Divorced</li> </ul>
<i>Q04</i>	What is your level of education? (One possible answer)
	<ul style="list-style-type: none"> <li>▪ Middle school</li> <li>▪ Secondary school</li> <li>▪ University</li> <li>▪ Professional training</li> <li>▪ Other</li> </ul>
<i>Q05</i>	Which region do you currently reside in? (One possible answer)
	<ul style="list-style-type: none"> <li>▪ North</li> <li>▪ South</li> <li>▪ East</li> <li>▪ West</li> <li>▪ Center</li> </ul>
<b>Section 02: User profile</b>	
<i>Q06</i>	Do you own a vehicle? (One possible answer)
	<ul style="list-style-type: none"> <li>▪ Yes</li> <li>▪ No</li> </ul>

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<i>Q07</i>	Do you have access to a smartphone or mobile device capable of running mobile application? (One possible answer)	<ul style="list-style-type: none"> <li>▪ Yes</li> <li>▪ No</li> </ul>
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<i>Q08</i>	Are you currently a user of "NAFTAL KHADAMAT" mobile application? (One possible answer)	<ul style="list-style-type: none"> <li>▪ Yes</li> <li>▪ No</li> </ul>
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### Section 03: Digitalization

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<i>Q09</i>	Please rate your level of agreement with the following statements regarding the <b>digitalization</b> .	<ul style="list-style-type: none"> <li>▪ Strongly Disagree</li> <li>▪ Disagree</li> <li>▪ Neutral</li> <li>▪ Agree</li> <li>▪ Strongly Agree</li> </ul>
	<ul style="list-style-type: none"> <li>▪ Digitalization has made it easier to interact with [Company/Organization] as a customer.</li> <li>▪ Digitalization increases convenience, raising satisfaction levels.</li> <li>▪ Personalization through digitalization enhances overall customer experience, leading to greater satisfaction.</li> <li>▪ Digital tools provide customers with more control over interactions, contributing to increased satisfaction.</li> </ul>	
	(One possible answer)	

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### Section 04: Quality assessment.

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<i>Q10</i>	Please rate your level of agreement with the following statements regarding the <b>quality</b> of "NAFTAL KHADAMAT" mobile application.	<ul style="list-style-type: none"> <li>▪ Strongly Disagree</li> <li>▪ Disagree</li> <li>▪ Neutral</li> <li>▪ Agree</li> <li>▪ Strongly Agree</li> </ul>
	<ul style="list-style-type: none"> <li>▪ The navigation is fast and easy.</li> <li>▪ The information provided is clear, and relevant.</li> <li>▪ The features and functionalities offered meet the expectations and requirements.</li> <li>▪ The overall design and visual appeal are modern and aesthetically pleasing.</li> </ul>	
	(One possible answer)	

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### Section 05: The free nature

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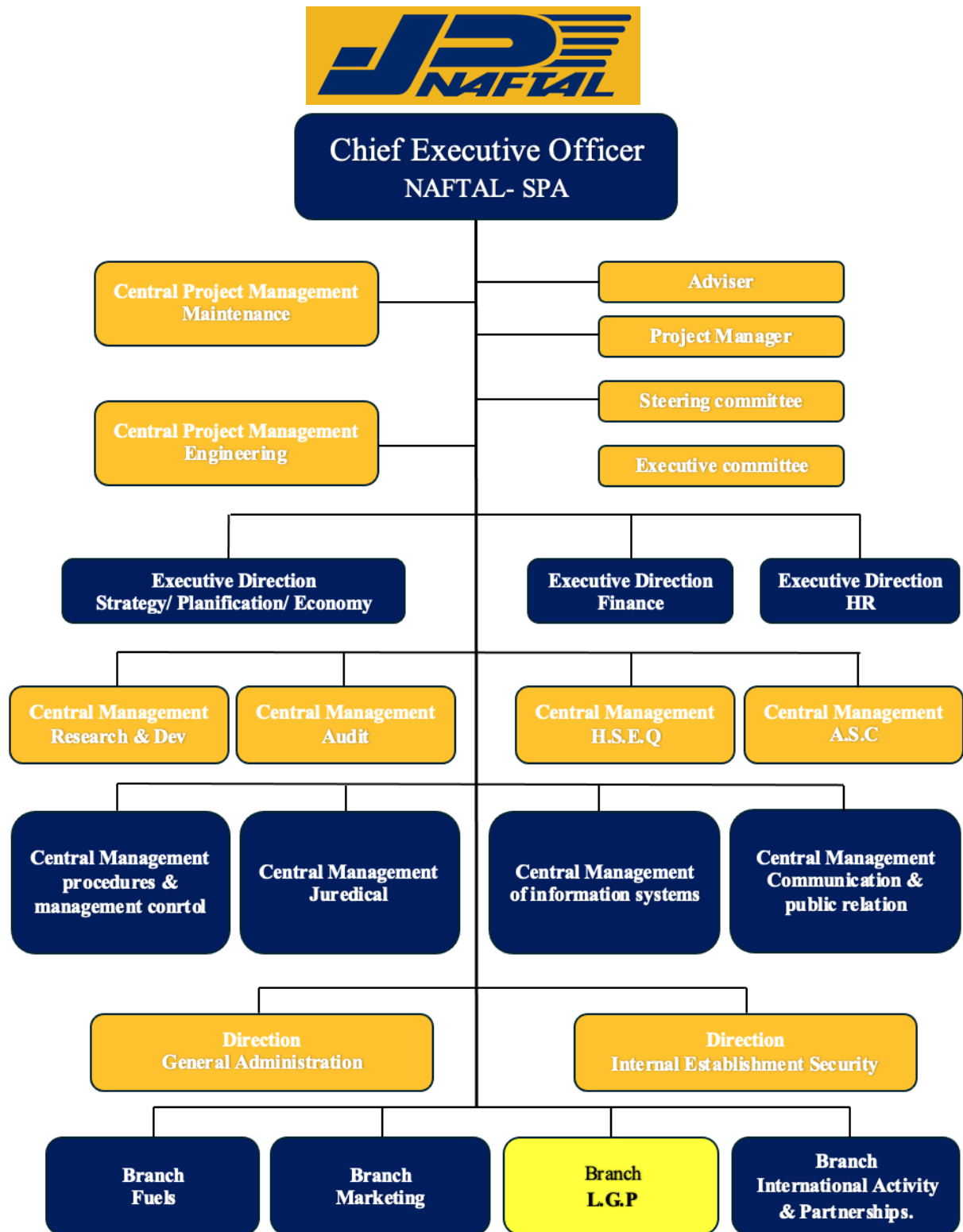
- 
- Q11** Please rate your level of agreement with the following statements regarding the **free nature** of "NAFTAL KHADAMAT" mobile application.
- Strongly Disagree
  - Disagree
  - Neutral
  - Agree
  - Strongly Agree
- The free nature enhances users' satisfaction with the service. (Kane, 2019)
  - The free nature influences users' decisions to continue using it.
  - The free nature contributes positively to users' overall experience.
  - The free nature motivates users to engage more frequently with the application's features.
- (One possible answer)
- 

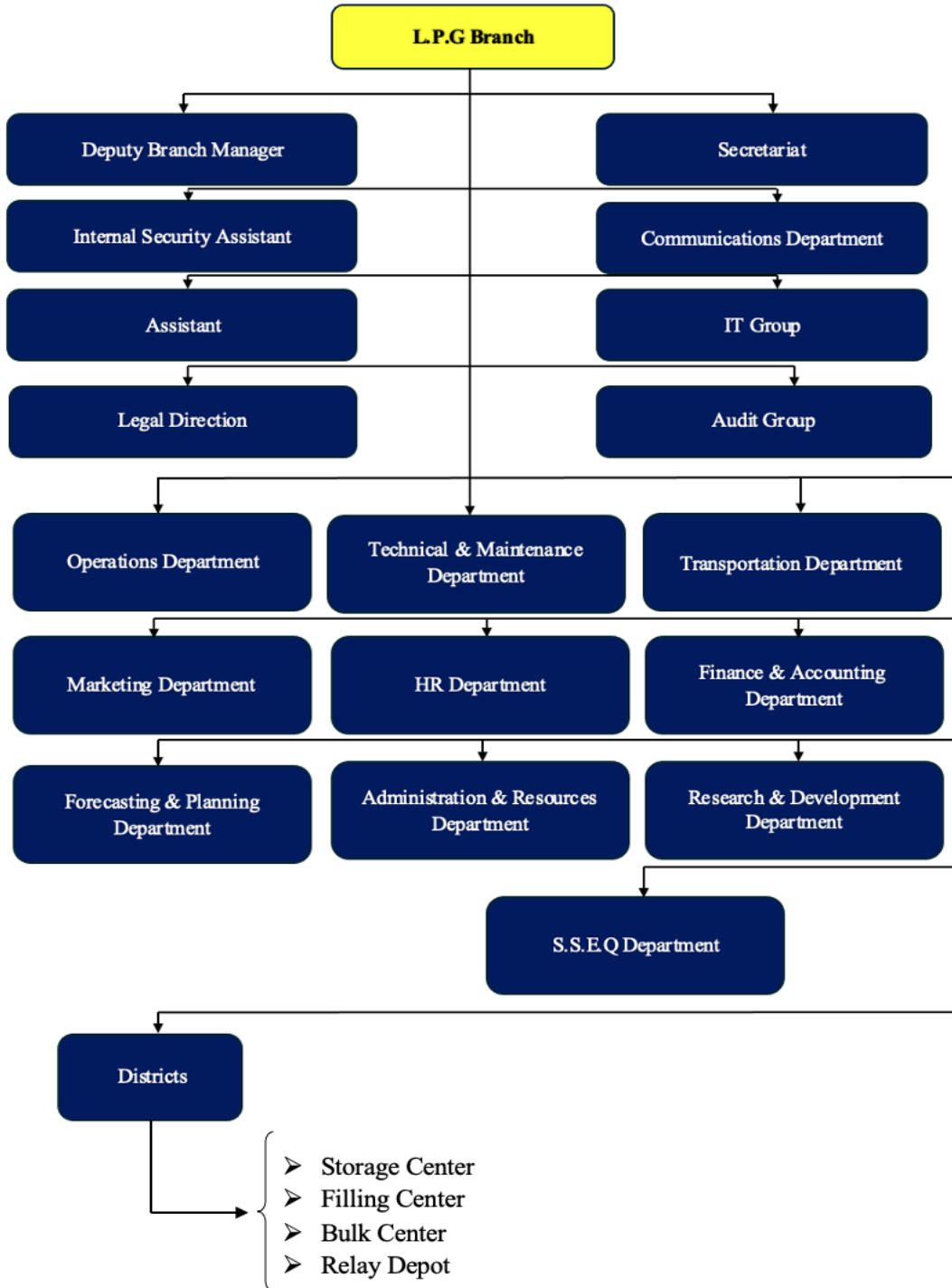
#### Section 06: Satisfaction

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- Q12** Please rate your level of agreement with the following statements regarding your **satisfaction** with "NAFTAL KHADAMAT" mobile application.
- Strongly Disagree
  - Disagree
  - Neutral
  - Agree
  - Strongly Agree
- Users' satisfaction is high.
  - Overall performance enhances user satisfaction.
  - users are satisfied with the range of services available.
  - Users are satisfied with the level of support and assistance provided by NAFTAL employees through the mobile application
- (One possible answer)
-

***APPENDIX II: THE ORGANOGRAMS OF  
THE COMPANY NAFTAL***





***APPENDIX III: TABLES OF  
PRELEMINIARY TESTS***

**Reliability Statistics**

Cronbach's Alpha	N of Items
.806	4

**Reliability Statistics**

Cronbach's Alpha	N of Items
.785	4

**Reliability Statistics**

Cronbach's Alpha	N of Items
.715	4

**Reliability Statistics**

Cronbach's Alpha	N of Items
.946	16

**Reliability Statistics**

Cronbach's Alpha	N of Items
.804	4

**Reliability Statistics**

Cronbach's Alpha	N of Items
.806	4

**Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.956 <sup>a</sup>	.914	.909	.22313

a. Predictors: (Constant), m3, m1, m2

**ANOVA<sup>a</sup>**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	24.480	3	8.160	163.905	.000 <sup>b</sup>
	Residual	2.290	46	.050		
	Total	26.770	49			

a. Dependent Variable: m4

b. Predictors: (Constant), m3, m1, m2

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.308	.181		-1.695	.097
	m1	-1.036	1.042	-.943	1.705	.011
	m2	1.828	1.086	1.661	2.005	.014
	m3	.265	.090	.265	2.95	.005

a. Dependent Variable: m4