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Electronic means of payment in the world and in Algeria: investigation into the factors influencing the use of withdrawal and payment cards

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Abstract:

With the growth of e-commerce on a global scale, we are witnessing the emergence and development of several electronic payment methods. The purpose of our contribution consists of analyzing the problematic of diffusion of electronic payments in the world and in Algeria. To do this, we first look at successful examples of electronic payments around the world. We then present the results of a survey on a sample of withdrawal and payment card users, in order to analyze the factors determining the use of electronic payments in Algeria. The results indicate that the use of electronic payments is influenced by individual, technological and cultural factors. Payment for purchases in cash nevertheless remains the rule, because the culture of electronic payments is not yet common in Algeria; the consumer uses their card mainly to withdraw money; few merchants have acquired electronic payment terminals.

Key Words: *electronic payments, bank cards, electronic commerce, Internet, Algeria.*

JEL Classification: *E42, E49, L81, L86, O55.*

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1. Introduction:

Over the last decades, the field of payment has undergone profound transformations due to the development of Information and Communication Technologies (ICT), the digital economy and the Internet, which has enabled the emergence of a new payment method: electronic payment. This offers many benefits to consumers, businesses and governments. Indeed, electronic payments are simpler, safer and faster than traditional cash or check payments. They also allow consumers to pay for their purchases from anywhere in the world.

Likewise, electronic payments have advantages for governments. They make it possible to simplify the collection of taxes, fight against fraud and stimulate the economy. Thus, the adoption of electronic payments can have a positive impact on the economy; they can help increase GDP, create jobs and improve productivity**.**

Regarding electronic payments around the world, they have developed rapidly in developed and emerging countries in recent years. In North America, Europe and Asia, electronic payments have become the dominant payment method. While in emerging or developing countries like Africa and the Middle East, the adoption of electronic payments is slower, due to factors such as transaction security, Internet access and consumer habits.

From there, the purpose of this article is to answer the following main question: What are the factors that influence the diffusion of electronic payment methods in the world and in Algeria? Several questions arise from this question, in particular: How can we define and characterize electronic means of payment? What are the conditions for their emergence? Which countries represent successful experiences in electronic payments around the world? What characterizes the process of adoption of electronic payments in Algeria? What are the explanatory variables for the use of withdrawal and payment cards by users in Algeria?

To achieve this, our contribution is based, first, on a theoretical approach to electronic payments, in order to delimit this notion conceptually and semantically. Furthermore, we present, through an empirical approach, a number of experiences which represent examples of success in terms of electronic payments around the world. Finally, we rely on the results of a survey that we carried out among a sample of 200 withdrawal and payment card users, in order to analyze the personal and environmental factors which determine the degree of use of electronic payments in Algeria. We present our main research results through the IMRaD method (Introduction, Methods, Results and Discussion).

Thus, three main areas of reflection will be successively examined in this article: basic notions of electronic payments, experiences of countries which have succeeded in the field of electronic payments in the world, analysis of electronic payments in Algeria based on a survey on withdrawal and payment card users.

2. Basic notions of electronic payments

After having defined and characterized electronic payments, we first examine the major stages marking their evolution. Next, we will provide a summary overview of the

advantages and disadvantages of this type of transactions.

2.1. Definition of electronic payment

Electronic payment has received a lot of attention from researchers over the past two decades, due to its positive impact on business activity. As such, among the definitions of electronic payment we retain that of Brun. According to this author, electronic payment in the strict sense refers only to payment which does not require the use of direct contact between natural persons. In the broad sense, it corresponds to any payment of a sum of money involving the use of electronic mechanisms (Brun, 1999, p. 5).

For Etienne Werry (2003), electronic payment brings together a set of means of payment initialized with a system which uses electronics, in particular: « payments by card, payments which are made on the Internet and payments which are made on mobile» (Gaber, 2013, p.8).

Finally, according to Adeoti and Osotimehin (2012), electronic payments refer to electronic means that allow payments to be made for goods and services acquired online or in supermarkets and shopping centers (Boussouf, Belkaid, 2022, p. 155).

2.2. Evolution of electronic payment methods

An electronic means of payment can be defined as any method of transferring currency through electronic messages, circulating in communication networks such as the Internet and telephone networks (universalis, 2024).

In this regard, it should be noted that the first electronic payment systems began to be implemented in the United States at the beginning of the 1950s, notably with the introduction of credit cards and automatic teller machines (ATMs). By the 1960s, credit cards had taken over in most developed countries. As an illustration, we can mention: « American express »and «Diners club »in North America in 1950 and the blue card in France in 1967 (Ivinza Lepapa, 2018, p.27).

In the 1970s, the growth of electronic payment was favored by the development of ICT, which notably allowed the appearance of electronic payment terminals (Hallepée, 2012). However, it was the advent of the Internet in the 1990s that truly accelerated the development of e-commerce and electronic payments. The following table presents the main stages in the evolution of electronic means of payment since their origins (Forel, 2015, p.94).

Table n° 01: Evolution of electronic payment methods

Period	1950-1970	1970-1990	1990-2000
Type of electronic payment means	- Birth of the first cardboard payment cards Diners Club American Express -Birth of the first credit cards: Franklin National Bank Cetlem, Sofinco, Eurocard	-Introduction of magnetic stripe cards. -Deployment of the first automatic teller machines (ATMs) in Belgium and Japan. - Creation of the Visa and MasterCard networks.	-Launch of smart cards for increased security. -Arrival of electronic wallets: Proton and GeldKarte.
	2000-2010	**2010-2020**	
	-Birth of electronic wallets like PayPal. -Advent of contactless bank cards. -Birth of the cryptocurrency Bitcoin	-The rise of contactless mobile payment via NFC technology. -Development of mobile payment applications using QR code scanning	

Source: Established by the authors from Ivinza Lepapa, 2018, pp.27-29.

PayPal is one of the online payment methods; it is a system for transferring funds between accounts identified by an email address. The transfer order is authenticated using a password defined when registering with PayPal. Currently, in the world, 20 million people have a PayPal account, and 28,000 new accounts are created per day (Paillès, 2003 p.27).

An electronic payment terminal (EPT), also called a bank card reader, is an electronic device that allows us to accept payment methods instantly. To do this, EPTs are often connected to a cash register and/or a professional account (in particular, a mobile EPT which allows a customer to pay via a cell phone). To carry out a transaction, you will need to insert a payment card and enter the personal code (Pin Code). From now on, in certain cases, it is no longer necessary to insert a card, you just need to place the card on the electronic payment terminal (EPT) to carry out the transaction without having to enter the code: this is the payment contactless, it is a new innovative means of payment made thanks to the NFC chip contained in bank cards (blank, 2023).

You should know that NFC (Near Field Communication) is a technology allowing data to be exchanged between a reader and any compatible mobile terminal or between the terminals themselves. This is the technology used by bank cards for contactless payment, or transport cards. The advantage of this technology is no application is required. All you need to do is bring two supports together (frandroid, 2024).

QR code payments, whose full name is “Quick Response Code”, is a contactless payment method that allows users to make transactions by scanning a QR code using their smartphones. These codes, made up of black squares arranged on a white background, can store a significant amount of information, including payment details. By simply scanning the QR code displayed at the merchant's point of sale, users can authorize the payment and finalize the

transaction securely and quickly (faster capital, 2023).

Cryptocurrencies, for their part, are electronic currencies that are created from a peer-to-peer cryptographic protocol, without a central bank. In the case of virtual currencies, the issuer of the currency is not the work of an agent, but of a collaborative network open to all. Several hundred of these currencies are in circulation. The most important of these is bitcoin, which exploded its previous record on March 11, 2024, surpassing $71,000. A capitalization which allows it to overtake silver in 9th place among the largest capitalizations in the world with 1,400 billion dollars, compared to 1,380 billion for the metal (Le Bescont, 2024).

The emergence of these virtual currencies constitutes a major innovation. Each agent can obtain bitcoins by purchasing them on exchange platforms against traditional currency (euro, dollar, etc.), by carrying out transactions in bitcoins, or by participating in monitoring the network and creating new ones. The currency is stored in a virtual wallet attached to an account. All accounts are listed in the blockchain, which is a decentralized and tamper-proof register due to the cryptographic protocol. Blockchain is an algorithmic technology that establishes trust between two unknown parties without a trusted intermediary (Figuet, 2016, p.327).

2.3. Advantages and disadvantages of electronic payments

Electronic payments have multiple advantages on the microeconomic and macroeconomic levels. However, they face several risks or uncertainties.

2.3.1. The macroeconomic benefits of electronic payments

Electronic payments present multiple advantages at the macroeconomic level, such as: increasing liquidity and reducing informality, establishing an economy based on transparency and facilitating the collection of state revenues (Harbi, Kerkache, 2016, p.18).

2.3.1.1. Increasing liquidity and reducing informality

Electronic payments allow more liquidity to be channeled into the banking circuit, which promotes financial inclusion and economic development. Indeed, the traceability of electronic transactions facilitates the monitoring of economic activity and the fight against money laundering and trafficking financing. In addition, reducing cash transactions helps reduce informality and increase tax revenue.

2.3.1.2. The establishment of an economy based on transparency

The traceability of electronic transactions helps fight corruption and tax evasion. Indeed, authorities can easily identify financial flows and suspicious transactions. This helps to clean up the economy and guarantee a better distribution of wealth.

2.3.1.3. Facilitating state revenue collection

Electronic payments facilitate the collection of government revenues, such as taxes and social security contributions. Citizens can pay their obligations online simply and quickly, reducing collection costs for the State and improving the efficiency of public management.

2.3.2. The microeconomic benefits of electronic payments

Among the advantages of electronic payments on the microeconomic level, the following should be noted in particular:

2.3.2.1. Convenience and simplicity for individuals

Electronic payments provide great convenience and simplicity to individuals. They are available 24/7 and allow easy and instant access to services, whether for local payment in different businesses or for online commerce. Additionally, they reduce the risk of theft and loss of money.

2.3.2.2. The multiplication of sales and the diversification of points of sale for traders

Electronic payments have many advantages for merchants. They help minimize the risk of theft and avoid counterfeit tickets, and increase sales. In addition, they make it possible to create and diversify points of sale at lower costs and reach a global market thanks to e-commerce websites.

2.3.2.3. Increased liquidity, reduced transactions and increased security for banks

Electronic payments draw more unpaid liquidity to banks, which allows them to improve their profitability. Additionally, they reduce the number of manual cash and check transactions, which lowers operating costs. Finally, they reduce the risk of fund manipulation and counterfeit notes.

2.3.3. The disadvantages of electronic payments

Although electronic means of payment facilitate transactions in local purchases and stimulate the development of e-commerce, they nevertheless constitute a market very exposed to fraud. Indeed, several financial fraud techniques exist such as the risks of phishing or pharming (Merbouhi, Hadid, 2017, p.26).

2.3.3.1. Phishing

Phishing is an operation intended to impersonate a bank to create a false online identification interface. It consists of sending an unsolicited e-mail to a person with the aim of obtaining their confidential contact details, most often banking data.

For example, on March 27, 2024, Algérie Poste called on its customers to be vigilant against the practice of phishing through suspicious links circulating on social networks, in particular via the WhatsApp application. Algérie Poste has warned against malicious individuals who usurp the identity of the company by disseminating fraudulent links. These links encourage users to participate in fictitious games and competitions, promising them high-value gifts (Aouadi, 2024).

2.3.3.2. Pharming

Pharming directs targets to a counterfeit site from which personal data is stolen. A pharming attack involves hijacking the user’s browser settings or running a background process that automatically redirects users to a malicious site. The attacker uses redirects or pop-ups on the user's desktop that display the phishing site in a hidden link. Often, the attackers goal is to obtain financial data or the users authentication information, so that the redirect is triggered when the user navigates to a banking website.

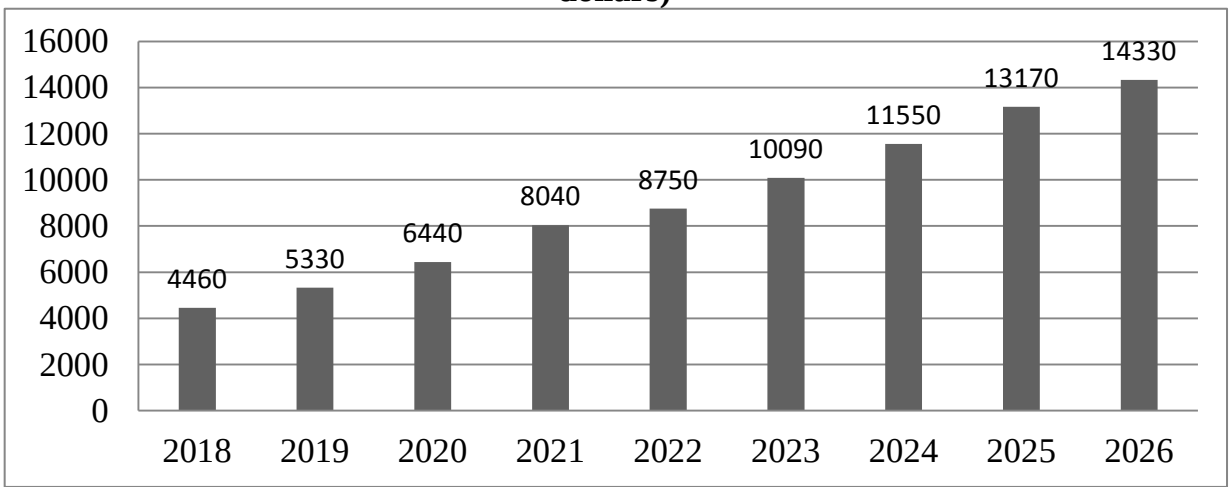
3. Experiences of successful countries in the field of electronic payment around the world

Electronic payments are becoming more and more popular around the world, particularly in developed and emerging

countries. This is due to several factors, including: changes in technology, as the rise of smartphones, tablets and other devices electronic payments made electronic payments more accessible and easier to use; e-commerce which has developed rapidly in recent years, leading to an increase in electronic payments, etc.

According to Statista.com, the online statistics portal, the value of global transactions through electronic payment means increased from $8.75 trillion in 2022 to $10.09 trillion in 2023, an increase of 15.31%. Estimates predict that by 2026, the value of global transactions will reach $14.33 trillion. E-commerce represents the largest segment of the market with a transaction value of $6690 billion in 2023. The figure below provides a general overview on the estimated growth of electronic payments worldwide by 2026 As such, China is the largest electronic payments market in the world with a value of 3744 billion US dollars.

Figure n° 01: Estimated growth of electronic payments worldwide by 2026 (in billions of dollars)



Source: https:// www.statista.com/outlook.dmo/fintech/digitalpayments/worldwide, consulted on March 20, 2024.

The adoption of electronic payments varies widely around the world. In developed countries, electronic payments are becoming more and more widespread and represent a large part of financial transactions.

On the other hand, in emerging and developing countries, electronic payments are not as widespread, due in particular to the low penetration of these payment methods and the lack of infrastructure related to this area.

Some countries represent successful experiences in the field of electronic payment in the world, such as: China, Norway, Sweden, Denmark, Canada, the United States, the United Arab Emirates, Brazil and Kenya. We analyze these experiences in the following:

3.1. China

China leads the world in adoption of electronic payments, both in e-commerce and at point of sale, with platforms like Ali Pay and WeChat. In 2022, China led in mobile transactions, accounting for more than 75% of online sales.

For example, Alipay is a mobile payment platform launched in China in 2004 by the Chinese e-commerce giant Alibaba. It is an electronic wallet that can be downloaded to mobile devices. Alibaba's e-commerce platform, Taobao, required an escrow

service acting between the buyer and seller, holding payment until the customer receives the purchased goods (play google, 2024).

Another example, WeChat, is more than a messaging and social media application that has been launched since 2011, it is a way of life for more than a billion users around the world (play google, 2024).

3.2. Norway

Norway is the most advanced country in adopting electronic payments in Europe. According to Global Payment Report, in 2022, more than 75% of total online payment transactions and 44% of points of sale payments are settled by cards. Norway is the country that uses the most maps in the world. Cards are the preferred payment method for Norwegian users for payments.

3.3. Sweden

Sweden is one of the most advanced countries in the adoption of electronic payments after Norway. According to Global Payment Reports, in 2022, more than 92% of points of sale payments are made electronically. Mobile applications notably Swish (created in 2012), constitute the payment method preferred by Swedes for payments or for the transfer of money from one account to another account (P2P). In 2020, Swish has around 8 million users and 600 million transactions and 260,000 acceptance points (pcdn, 2024, p.22).

3.4. Denmark

Denmark, like Norway and Sweden, is one of the most advanced countries in the adoption of electronic payments in the world and in Europe. According to Global Payment Reports, in 2022, more than 91% of points of sale payments are made electronically. In both Denmark and Norway, cards are the preferred payment method for online and local payments. In 2022, they continued to represent a majority of the value of points of sale transactions and 84% of the value of electronic transactions.

In e-commerce, digital wallets, bank transfers and BNPL (Buy Now Pay Later) are widely used in Denmark, with almost half (48%) of total payments in 2022. Additionally, there is a very popular mobile payments application in Denmark called Mobile Pay which is a mobile payments application, launched in 2013 by Dansk Bank. You should know that Mobile Pay first started as a P2P service before adding other features over time. Mobile Pay has around 5.9 million users and 395 million transactions and 200,000 acceptance points in 2020(mobile pay, 2024).

3.5. Canada

Canada is the most advanced country in the adoption of electronic payment methods in North America. According to Global Payment Reports, in 2022, more than 80% of the value of point-of-sale transactions and more than 49% of the value of e-commerce are settled by cards. Cards are the preferred payment method among Canadian users for payments. In recent years, common alternative payment methods in Canada are: Paypal, Apple Pay, Google Wallet, Intrac Online, After Pay.

3.6. United States

The United States comes after Canada in electronic payments in North America. American consumers are very favorable to the use of credit and debit cards, in 2022 they represent more than two thirds of the value of transactions at points of sale (71% of the value of transactions) and half of online spending (50%) of e-commerce value.

Other alternative payment methods common in the United States exist, such as:

Paypal, Apple Pay, Google Wallet, Intrac Online, After Pay, Affirm, Amazonpay, Klarna (France Payments Forum, 2024).

3.7. United Arab Emirates

The United Arab Emirates is one of the most advanced countries in the adoption of electronic payments in emerging countries. According to Global Payment Reports, in 2022, more than 57% of total online payment transactions and 41% payments at points of sale are made by cards. Cards are the preferred payment method for online and convenience at points of sale payments in the UAE.

Additionally, a very popular mobile payments service in the UAE is Payit. This service allows customers and affiliates to purchase products and different services in kind, including, payment of bills such as electricity bills, cable TV subscriptions, tolls, airtime recharges, mobile antenna, internet subscriptions, mobile data plans, delivery services, food orders, taxi reservations, flight and hotel ticket reservations, etc.

3.8. Brazil

Brazil is leading the adoption of electronic payments in South America. According to Global Payment Reports, in 2022, more than 74% of points of sale payments are made electronically, an increase of 28% compared to 2019. Cards are the preferred payment method for online payments and for proximity payments (at points of sale) in Brazil. Indeed, in 2022, 52% of total online payment transactions and 57% of payments at points of sale are paid by cards.

Moreover, there is a new mobile payments service adopted since 2020 called Pix ,which represented 18% of the value of electronic transactions in e-commerce and 13% at points of sale in 2022. Separately, Pix quickly achieved its stated goal of digitizing the retail payments market in Brazil. For comparison, in 2018, cash represented an absolute majority (52%) of the value of points of sale transactions.

The share of digital wallets in the value of points of sale transactions almost doubled from 8% in 2021 to 15% in 2022, led by São Paulo-based PicPay, which had more than 65 million users as of July 2022.

3.9. Kenya

Kenya is the leading country in Africa for mobile payments, according to the Ecoin Agency. The country recorded mobile transactions worth 55.1 billion US dollars in 2021, an increase of almost 20% compared to 2020 (statista, 2024).

As such, M-Pesa has been the most used mobile wallet in Africa since 2007. Launched for the first time in Kenya by the mobile operator Safaricom, it has become the leader in the African market with more than 50 million active monthly users across the continent.

4. Analysis of electronic payments in Algeria based on a survey of withdrawal and payment card users

After having given a general overview of electronic payments in Algeria, we present on the one hand our survey methodology and on the other hand, our results and discussions according to the IMRaD method.

4.1. Status of electronic payments in Algeria

Article 6 of Law n° 18-05 of May 10, 2018 relating to electronic commerce, defines the electronic means of payment as any payment instrument, authorized in accordance with the legislation in force, allowing its holder to make payments

locally or remotely through an electronic system.

Electronic payments in Algeria have seen significant growth in recent years, but this growth still remains low compared to other countries. As such, in 2023, the number of electronic transactions via EPTs reached 3.9 million, an increase of 80% compared to 2021 (giemonetique, 2024). Furthermore, still in 2023, the number of electronic transactions on the Internet reached 15.35 million, an increase of 96% compared to 2021. Finally, the number of interbank cards and EDAHABIA cards is 16.32 million in the end of 2023, an increase of 40% compared to 2021 (giemonetique, 2024).

However, there are still many obstacles preventing the development of electronic payments in Algeria such as the lack of card acceptance points and the lack of user confidence and many other constraints.

In this context, at the end of 2023, the number of Electronic payment terminal(EPT) reached 53,191 throughout the national territory, a figure which remains insufficient given the overall number of traders registered with the NRC which reached 2,246,725 traders in March 2023(algerie-eco, 2024). Even more, in January 2024, the number of web merchants who have integrated the Internet payment platform is 475(giemonetique, 2024).

4.2. Survey methodology

The objective of our research is to evaluate the degree of introduction of electronic payment methods in Algeria, by analyzing the personal and environmental factors which explain the use of withdrawal and payment cards. To do this, we adopted an analytical approach on the different indicators of electronic payment and an empirical survey of 200 Algerian users of withdrawal and payment cards. The survey period is from November 2023 to February 2024. Our questionnaire was originally administered to a sample of 210 ATM and payment card users. However, after eliminating the questionnaires whose responses were incomplete with missing values, we ultimately retained a sample of 200 individuals. From a statistical point of view, we opted for the simple random sampling method. It is a statistical method in which each member of a population has an equal chance of being selected in a sample. Regarding the variables of our survey, you should know they are quantitative.

To determine the profile of our sample, we analyzed six variables, these are: gender, age, level of education, profession, monthly income and residential area. After counting and analysis, our sample is composed of 56.50% women and 43.50% men. The results of our survey also indicate that most respondents are between 18 years old and 25 years old (i.e. 35.50% of the total sample) and 26.50% of withdrawal and payment card users are between 26 years old and 35 years. For the level of education, 80.50% of respondents have a higher level. Regarding the profession variable according to the monoculture of socio-professional categories, more than 36.50% of respondents are civil servants; students, for their part, come in second position, representing 30% of the study sample. The results of the survey show that half of the population surveyed receive a salary estimated as low or average. Finally, depending on the geographic location of residence, 63.50% of respondents live in rural areas and 36.50% live in urban areas **(see the table below).**

Table n°: 02: Distribution of people surveyed according to their profiles

Variables	Profiles	Number	Part (%)
Genre	Woman	113	56,50%
	Man	87	43,50%
Age	18-25 yo	71	35,50%
	26-35yo	53	26,50%
	36-45 yo	46	23,00%
	45-60 yo	23	11,50%
	60 yo and more	7	3,50%
Education Level	Primary	7	3,50%
	Middle	12	6,00%
	High School	20	10,00%
	College	161	80,50%
Profession	Unemployed	25	12,50%
	Student	60	30,00%
	Civil servants	73	36,50%
	Retired	6	3,00%
	Liberal Profession	11	5,50%
	Tradesman/woman	5	2,50%
	Worker	20	10,00%
Revenue	Weak	65	32,5%
	Moderate	33	16,5%
	Average	63	31,5%
	High	31	15,5%
	Very high	8	4%
Housing Area	Rural	127	63,50%
	Urban	73	36,50%

Source: Results of our survey of Algerian withdrawal and payment card users, November 2023 - February 2024.

4.3. Explanatory factors that influence individuals to pay by CIB/EDAHABIA cards: results and discussions

In this paragraph, we present the main results of our survey of Algerian withdrawal and payment card users, after using the SPSS 2019 data processing software, version 26. More precisely, based on our working hypotheses, we examine in what follows the individual and environmental factors that influence individuals to adopt electronic payments by CIB and EDAHABIA cards.

4.3.1. Individual factors

To analyze the individual factors that influence the adoption of electronic payments, we put forward the following six (06) hypotheses:

-**H.1.1.** : There is a relationship between the gender of individuals and the adoption of electronic payments.

-**H.1.2**. : There is a negative relationship between the age of individuals and the adoption of electronic payments.

-H.1.3. : There is a positive relationship between educational level of individuals and the adoption of electronic payments.

-H.1.4. : There is a relationship between the profession of individuals and the adoption of electronic payments.

-H.1.5. : There is a relationship between the monthly income of individuals and the adoption of electronic payments.

-H.1.6. : There is a relationship between where people live and the adoption of electronic payments.

The chi-square test of independence is a statistical hypothesis used to determine whether or not two categorical or nominal variables are likely to be related (jmp, 2024).

The contingency test is used to measure the intensity of this relationship if it exists. This measurement is between zero and one: zero (0) shows us a zero relationship; less than 0.10 shows a very weak relationship; from 0.10 to 0.20 shows a weak relationship; 0.20 to 0.30 shows a medium relationship; from 0.30 to 0.40 shows a strong relationship, a (1) tells us a total relationship between the two variables (lms.fun-mooc , 2024). The analysis by the SPSS software has made it possible in particular to obtain the following results:

Table n ° 03: Testing the hypotheses of individual factors

	Test chi-square		Contingency Test	Covariance
	Observed chi-square	Theoretical chi-square		
Genre	0,007	38,72	-	-
Age	25,685	3,12	0,337	-0,203
Education Level	31,580	3,12	0,369	0,131
Profession	15,146	2,23	0,265	-0,127
Monthly Income	8,353	3,56	0,200	0,022
Housing Area	0,539	32,49	-	-

Source: Results of our survey of Algerian withdrawal and payment card users, November 2023 - February 2024.

-Relationship between gender and making an electronic payment:

The chi-square test indicates that there is no relationship between the two variables, since the observed chi-square value (0.007) is lower than the theoretical chi-square (38.72). Thus, we must accept the null hypothesis (H0) and conclude that there is no influence of the "gender" factor on the making of an electronic payment.

- Relationship between age and making an electronic payment:

The chi-square test indicates that there is a relationship between the two variables, since the observed chi-square value (25.685) is greater than the theoretical chi-square (3.12). Thus, we must reject the null hypothesis (H0) and conclude that there is a dependence between the two variables: age and the adoption of electronic payment. The contingency coefficient is equal to 0.337. Reading the contingency test table indicates that there is a "strong" influence of the age factor on the making of an electronic payment. A Covariance of -0.203 between age and making an electronic payment indicates a negative relationship between the two variables; this means that older people tend to use electronic payments less than younger people.

-Relationship between the level of education and the making of an electronic payment:

The chi-square test indicates that there is a relationship between the two variables, since the observed chi-square value (31,580) is greater than the theoretical chi-square (3.12) Thus, the level of education has an impact on the making of an electronic payment. The contingency test will determine the intensity of this relationship. The contingency coefficient is equal to 0.369. Reading the contingency test table indicates that there is a "strong" influence of the educational level factor on the completion of an electronic payment. A Covariance of 0.131 between the level of education and making an electronic payment indicates a positive relationship between the two variables; this means that people with higher levels of education are often more inclined to adopt electronic payments, due to their proficiency with digital technologies.

-Relationship between the profession and the making of an electronic payment:

The chi-square test indicates that there is a relationship between the two variables, since the observed chi-square value (15,146) is greater than the theoretical chi-square (2.23). Thus, we must reject the null hypothesis (H0) and conclude that there is a dependence between the two variables: profession and adoption of electronic payment. The contingency coefficient is equal to 0.265. Reading the contingency test table indicates that there is an "average" influence of the profession factor on the making of an electronic payment.

- Relationship between monthly income and making an electronic payment:

The chi-square test indicates that there is a relationship between the two variables, since the observed chi-square value (8,353) is greater than the theoretical chi-square (3.56). Thus, we must reject the null hypothesis (H0) and conclude that there is a dependence between the two variables: income and the adoption of electronic payment. The contingency coefficient is equal to 0.200. Reading the contingency test table indicates that there is a "weak" influence of the income factor on the making of an electronic payment.

-Relationship between place of residence and making an electronic payment:

The chi-square test indicates that there is no relationship between the two variables, since the observed chi-square value (0.539) is lower than the theoretical chi-square (32.49). Therefore, we must accept the null hypothesis (H0) and conclude that there is no influence of the "place of residence" factor on the making of an electronic payment.

4.3.2. Environmental factors

To analyze the technological and cultural factors that influence the adoption of electronic payments, we put forward the following four (04) hypotheses:

-H.2.1. : There is a negative relationship between the lack of card acceptance points and the likelihood that an individual will adopt electronic payments.

-H.2.2. : There is a negative relationship between lack of Internet access and the likelihood that an individual will adopt electronic payments.

-H.2.3. : There is a negative relationship between the preference of cash payment and the likelihood that an individual will adopt electronic payments.

-H.2.4. : There is a negative relationship between lack of confidence in the security of transactions and the likelihood that an individual will adopt electronic payments.

The following table presents the results of the analysis of factors that reduce or prevent individuals from carrying out electronic payment transactions.

Table n° 04: Testing the hypotheses of environmental factors

	Test chi-square		Contingency Test	Covariance
	Observed chi-square	Theorical chi-square		
Lack of acceptance points	116,271	2,67	0,606	-0,371
Lack of access to the Internet	29,569	10 ,68	0, 359	-0,105
Cash payment preference	93,496	2,23	0,564	-0,335
Lack of confidence in transaction security	140,800	5,79	0,643	-0,244

Source: Results of our survey of Algerian withdrawal and payment card users, Nov2023 - Feb 2024.

-Relationship between the lack of card acceptance points and the completion of an electronic payment transaction:

The chi-square test indicates that there is a relationship between the two variables, since the observed chi-square value (116,271) is greater than the theoretical chi-square (2.67) with zero alpha error risk. Thus, we must reject the null hypothesis (H0) and conclude that there is a significant dependence between the two variables. The contingency coefficient is equal to 0.606. The reading in the contingency test table indicates that there is a "very strong" influence of the factor of lack of card acceptance points on the making of an electronic payment. A Covariance of -0.371 between the lack of card acceptance points and making an electronic payment indicates a negative relationship between these two variables, this means that when the number of card acceptance points is low, individuals are less likely to adopt electronic payments.

-Relationship between lack of access to the Internet and the completion of an electronic payment transaction:

The chi-square test indicates that there is a relationship between the two variables, since the observed chi-square value (29.569) is greater than the theoretical chi-square (10.68). Thus, we must reject the null hypothesis (H0) and conclude that there is a dependence between the two variables: the lack of access to the Internet and the completion of an electronic payment transaction. The contingency coefficient is equal to 0.359. The reading in the contingency test table indicates that there is a "strong" influence of the factor lack of access to the Internet on the making of an electronic payment. A Covariance of -0.105 between lack of access to the Internet and making an electronic payment indicates a negative relationship between these two variables, this means that limited access to the Internet hinders the ability of individuals to make online payments.

-Relationship between cash payment preference and completion of an electronic payment transaction:

The chi-square test indicates that there is a relationship between the two variables, since the observed chi-square value

(93,496) is greater than the theoretical chi-square (2.23) with zero alpha error risk. Thus, we must reject the null hypothesis (H0) and conclude that there is a significant dependence between the two variables. The contingency coefficient is equal to 0.564. Reading the contingency test table indicates that there is a "very strong" influence of the preference for cash payment on making an electronic payment. A Covariance of -0.335 between the preference of cash payment and making an electronic payment indicates a negative relationship between these two variables. Individuals who prefer cash payments are less interested in electronic payments, even when adequate infrastructure is in place.

-Relationship between the lack of confidence in the security of transactions and the completion of an electronic payment transaction:

The chi-square test indicates that there is a relationship between the two variables, since the observed chi-square value (140,800) is greater than the theoretical chi-square (5.79) with zero alpha error risk. Thus, we must reject the null hypothesis (H0) and conclude that there is a significant dependence between the two variables. The contingency coefficient is equal to 0.643. Reading the contingency test table indicates that there is a "very strong" influence of the factor lack of confidence in the security of transactions on the making of an electronic payment. A Covariance of -0.244 between lack of confidence in the security of transactions and making an electronic payment indicates a negative relationship between these two variables; when individuals lack confidence in the security of transactions, they are less likely to use them. Fear of fraud and identity theft can limit people's adoption of electronic payments, leading them to favor traditional payment methods like cash.

5. Conclusion:

To conclude, it should be said that Information and Communication Technologies (ICT) have led to a profound change in the methods of commercial transactions. Indeed, we are increasingly witnessing the disappearance of traditional money in favor of electronic money and the dematerialization of transactions with the emergence of electronic payments. As such, on a global level, several countries are leaders in this field, we have presented in our contribution several typical examples of success, such as: China, Norway, Sweden, Denmark, Canada, the United States, the United Arab Emirates, Brazil and Kenya.

Regarding Algeria, despite the various initiatives in favor of electronic payments, many efforts still remain to be undertaken. As such, bank cards represent the most innovative means of payment in terms of speed of operations. However, since their implementation, we can say that their use has been very limited, due in particular to several factors, namely: the culture of cash payment which predominates in Algeria in commercial transactions; the banking rate which remains quite low, due in particular to the lack of confidence in the banking system; the weight of the informal economy and tax evasion; the slowness of the Internet; lack of bank card acceptance points, etc. Under these conditions, the objective of our investigation was to determine the personal and environmental factors influencing the adoption of electronic payments by Algerian consumers. To do this, we defined ten (10) independent variables, including six (06)

personal and four (04) technological and cultural. The analysis results confirm eight (08) hypotheses, four (04) in the personal context, namely: age (H.1.2.), level of education (H.1.3.), profession (H.1.4.) and income (H. 1.5.), and four (04) in the environmental context, namely: the lack of acceptance points (H.2.1.), the lack of access to the Internet (H.2.2.), the preference of cash payment (H.2.3) and lack of confidence in the security of transactions (H.2.4).

Indeed, the older individuals get, the less likely they are to adopt electronic payments. In terms of education, individuals with a higher level are often more into adopting electronic payments, in particular due to their mastery of digital technologies. A person's income does not necessarily have a strong influence on the propensity to make electronic payments, as even low-income people such as students can make online payments: Internet bills, phone top-ups and money transfers funds by mobile. The same goes for people's professions.

Technological factors, such as lack of card acceptance points and lack of Internet access, negatively influence the adoption of electronic payments. The lower the access to the Internet, the lower the probability of using electronic payments, because users do not have sufficient access to the Internet, therefore they cannot use online banking services and mobile applications.

The preference for cash payments may hinder individuals' adoption of electronic payments. Indeed, some people are more or less accustomed to using cash and are systematically wary of new technologies.

The factor of lack of confidence in the security of electronic transactions can also hinder the adoption of electronic payments by individuals. Indeed, rightly or wrongly, individuals may be afraid of fraud and/or computer hacking when they use electronic services. Therefore, the greater the lack of confidence in the security of electronic transactions, the lower the probability of using electronic payments.

Furthermore, our analysis rejects two hypotheses in the personal context, namely: gender (H.1.1.) and the place of residence of individuals (H.1.6.). Indeed, gender and place of residence are not considered determining factors in the ability of individuals to make electronic payments. Men or women with payment and withdrawal cards have the same possibility of adopting electronic payments, regardless of their place of residence.

Finally, among our recommendations, we should note in particular: acceleration of the banking process and establishment of a climate of trust with banking customers, in order to change the culture and payment habits of economic agents; expansion of the network of electronic payment terminal (EPT) and acceptance points, which will increase the use of payment and withdrawal cards; improvement in the speed of execution of transactions (increase connection speed) for use efficiency of electronic payment instrument; introduction of advantageous pricing to retain users who use debit cards, which will encourage consumers to make a choice between traditional and modern payment methods.

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