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Duality between online and offline shopping in the age of Covid-19

What future for e-commerce in Algeria?

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Abstract:

The main objective of this paper is to explain this major turning point in world trade, particularly in a context of the Covid-19 health crisis and confinement. In this study, we rely on the theory of uncertainty to justify consumer choices, and we look at the situation of e-commerce in Algeria. The obtained results predict a more intensive digital revolution, which requires an adaptation to this possible trend, especially for developing countries that are lagging far behind in popularizing the use of ICTs.

Key words: Digitalization, ICTs, Covid-19, e-commerce, Algeria.

JEL Classification Codes: D1, C5, M1, O3

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1- Introduction :

E-health, e-government, e-learning, e-payment/m-payment and e-commerce are words that are being added to our vocabulary as we go along, all of which sum up what we now call e-life. It is the result of a process of digitalization that is becoming more and more important, and which is disrupting our habits.

Indeed, since the outbreak of the Corona virus pandemic, also known as Covid-19, these new habits have further disrupted our daily lives, particularly with regard to containment and the risk of contamination. Citizens around the world have found themselves forced to rarely go out, making it more difficult to access shops, and procuring one's daily needs has become an arduous task. **As a result, online shopping has become a natural alternative to offline shopping, which leads us to wonder about the fate of offline shopping in the face of the rise of e-commerce.**

Algeria, like all other countries in the world, has had a digitalization plan since 2008, this plan known as "e-Algeria 2013" is designed to generalize the use of the Internet and to digitalize public services while developing a legal framework necessary for this process. However, in 2020, Algeria is still far from achieving this objective, ranking 98th (among 121 countries) in terms of generalization of Internet use (Dutta and Lanvin, 2020). Algerian citizens were caught off guard during the lockdown, several dysfunctions negatively affected economic activity in different sectors due to difficulties related to the use of the internet, at the same time as in other countries the daily life of the citizen was not strongly affected, telework, e-learning, e-health ...etc., have greatly facilitated life during the lockdown. On the other hand, Algerians have experienced difficult times, even claiming aid and compensation for the losses that most of them suffered during the confinement, which suggests that the economic impact was enormous. **This is merely a justification for the urgent need to adapt to the global economic reality in the future.**

However, this great turning point in world trade, which is summed up in the massive shift to digital, and the intention of consumers to buy online, must be justified before discussing this issue. **It is therefore essential to return to the question of the individual's behavior when faced with risk, how can we explain this tendency to buy online rather than in shops on economic grounds?** This research work aims to raise this issue from an academic and theoretical point of view, particularly for the case of Algeria.

2- Literature Review and Research Methodology:

Several authors have already examined the question of the economic behavior of the individual faced with risk. It is clear that elements of the answer to the question raised above can be found in these analyses. Indeed, the microeconomics of uncertainty and the theory of expected utility partly address this situation.

A. Marshal (1966) concluded that individuals generally reason in terms of subjective utility, and this explains their choices. Later, the work of Akerlof (1970) revealed that certain hypotheses put forward by the classical school are called into question in certain situations, in particular, when the rationality of the consumer is not verified, and in situations of informational asymmetry.

The beginnings of the analysis of the economic choices of the individual in a situation of uncertainty were born thanks to the work of Von Newman and Morgenstern (1944), the theory of expected utility came to embed the new theory of risk initially developed by Bernoulli (1928). This work made it possible not only to understand the economic behavior of consumers faced with risk, but also to predict their reaction.

This paper aims to highlight, in a theoretical context, this rivalry between online and offline purchasing, which became apparent during the Covid-19 health crisis, by returning to the theory of uncertainty to justify the consumer's choices and to predict its future evolution in Algeria. To this end, this paper is divided into four main parts, the first of which is dedicated to the analysis of consumer behavior in the face of risk

according to microeconomic foundations. In the second part, we have tried to describe, in a general way, the resurgence of digital technology and its generalization in the context of the Covid 19 pandemic. In the third part, we looked at the situation of countries lagging behind in the digital field, and we confined ourselves to the case of Algeria, in order to predict the economic consequences of this major shift in consumption patterns. Finally, we have tried to make a kind of synthesis in the form of a discussion of the results of the previous analysis with the aim of clarifying certain aspects of the change in consumption patterns in order to prevent certain failures in production and distribution patterns.

3- What economic behavior of the consumer in the face of risk?

In the early 1950s, Arrow, Debreu, Von-Neuman and Morgenstern proposed a new model of general equilibrium theory in an uncertain world, which forms the crucible of modern economic theory. In the conception of this new model, producers, consumers and financial investors are all players, they know approximately the possible outcomes, and they choose a given decision on the basis of a comparison between the levels of expected utility they receive from different situations.

Knowing that a risky situation is synonymous with uncertainty and randomness, Von-Neuman and Morgenstern were able to identify three different behaviors; riskphobia, riskophilia, and risk neutrality. All decisions are based on choices made differently based on subjective utility units. (According to Liao et al. 2010), people are generally more inclined to avoid mistakes rather than maximise utility when engaging in activities where there is risk in making a purchase decision. Furthermore, consumers are generally concerned when they cannot be sure that purchases will achieve their goals, (Sahli, 2020).

The foundations of consumer theory were those developed by Becker (1965, Lancaster (1971), Muth (1967), which are also based on the work of Marshal (1966) treating the consumption process in a similar way to the production process (Lancaster, 1971). However, their hypotheses are conceived for favorable, not to say utopian, situations,

and economic reality has revealed situations of crisis, informational asymmetry, consumer irrationality, etc., which makes these hypotheses unrealistic, and consequently calls into question the previous analysis under certain conditions (Akerlof, 1970).

It is commonly accepted in the economic literature that in risky or crises, uncertainty increases and the consumer facing the risk of contamination will be indifferent, and his purchasing decisions will not be made under usual conditions. Thus, his behavior will also be different.

Referring to the work of VNM, embedding the new risk theory of (Bernoulli, 1928), if the economic agent evaluates outcomes by their utility and not by their material value, the choice of individuals in a situation of uncertainty can be described as follows (Newmann, Morgenstern, 1947):

$$U[(w_1, p_1), (w_2, p_2), \dots, (w_n, p_n)] \neq \sum_{i=1}^{i=n} p_i w_i = \sum_{i=1}^{i=n} p_i u(w_i) = EU(w)$$

Such that: U = the utility, $W1$ = the wealth in situation 1 of the world, P = the probability associated with each situation, E = the mathematical expectation.

This equation is the formula for the expected utility of an economic agent in a situation of uncertainty (faced with risk). Thus, any individual faced with the choice of decision in an uncertain world makes a trade-off between the level of utility arising from each situation, in other words, it will be a question of choosing between

$$U[(w_1, p_1), (w_2, p_2), \dots, (w_n, p_n)] \text{ and } EU(w)$$

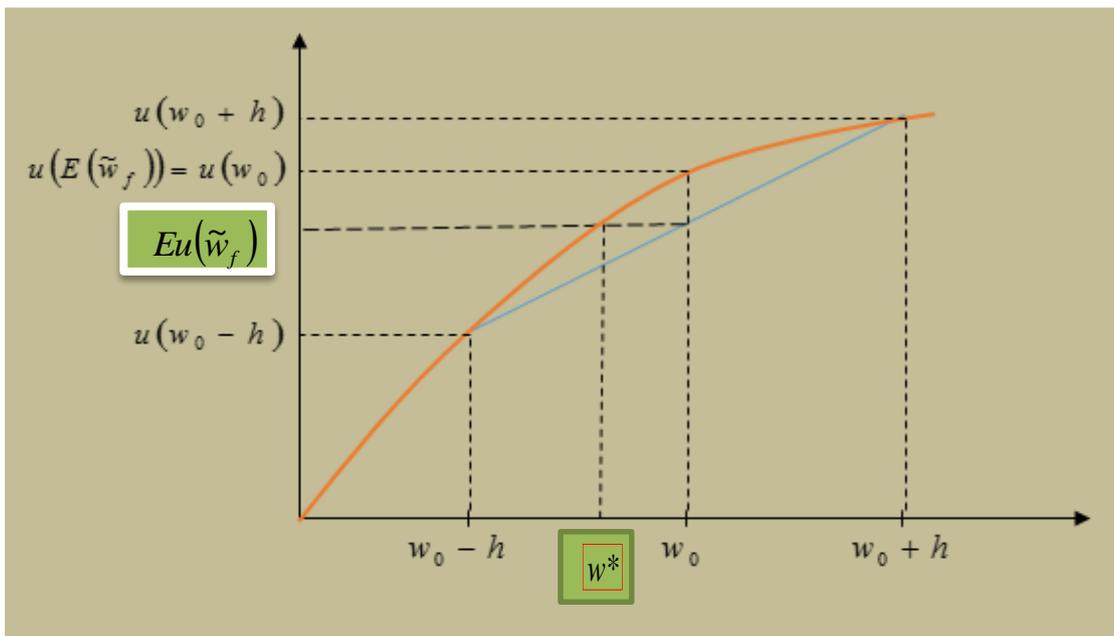
In fact, economic agents make decisions by choosing between the mathematical expectation of the utility of possible outcomes (the mean), and the utility of each possible outcome: $UE(W) \sim EU(W)$. Therefore, three types of behavior of economic agents under uncertainty are distinguished; each behavior is described as follows:

Economic agents who prefer $E(wf)$ to $(\tilde{w}_f) / (\tilde{w}_f)$ being the final wealth.

$$\Rightarrow UE(\tilde{w}_f) > EU(w_f)$$

This is risk averse behavior, or risk phobia. The utility function can be represented by a logarithmic function () for example. The utility function of a risk-averse economic agent will take the following form:

Figure 1: Risk aversion



Source : Realized by the authors

Another category of economic agents who prefer (\tilde{w}_f) to $E(wf)$

$$\Rightarrow UE(\tilde{w}_f) < EU(w_f)$$

This is the typical behavior of an agent attracted by adventure and risk, risk-philia. His utility function can take the form of a positive exponential function ($U(w) = e^w$).

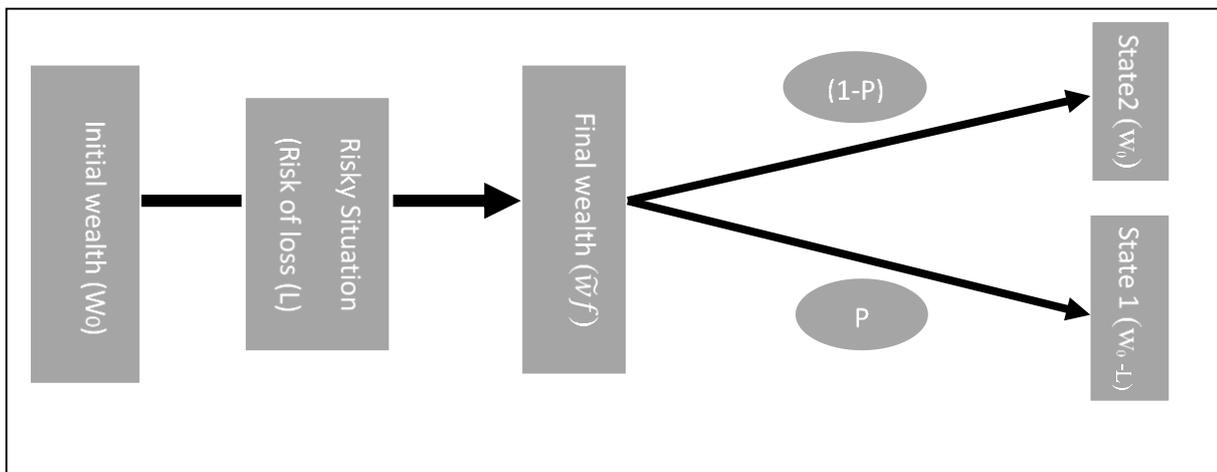
The other type of behavior is indifference, or risk neutrality;

$$\Rightarrow UE(\tilde{w}_f) = EU(w_f)$$

Generally, the utility function of a neutral agent is linear ($U(w) = aw + b$), taking the geometric form of a straight line.

Indeed, (Bernoulli, 1928) in his new theory of risk described only one type of behavior, that of a riskphobia which is represented by a logarithmic function (Tebache, Chakour, 2018). Thus, the consumer can make his choice, supposed to maximize his utility, on the basis of a comparison between two situations as follows, knowing that (p) represents the probability of contamination:

Figure 2: Representation of wealth in a risky situation



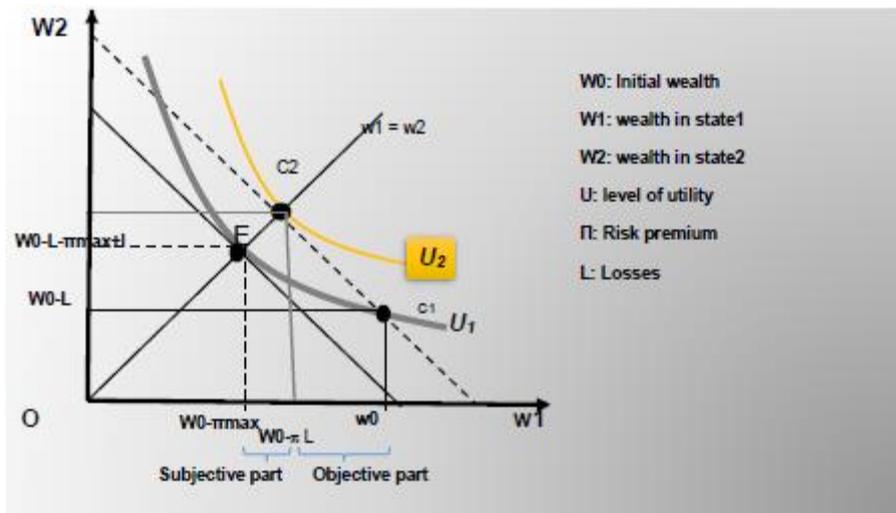
Source: Realized by the authors.

In other words, its final situation can be represented mathematically by the following equation:

$$Eu(\tilde{w}_f) = p.u(w_0 - L) + (1 - p).u(w_0)$$

Moreover, one can represent one's consumption choices under uncertainty in the form of indifference curves as follows:

Figure 3: Consumer risk preferences:



Source: Realized by the authors

In our study, we are interested in the first case, which corresponds to a behavior of riskophobia. We can therefore, by analogy, take up the same analysis and represent the health of the individual by the wealth (w), knowing that the typical behavior of an individual, who is exposed to the risk of illness, or even death, is a behavior of riskophobia. Thus, if the consumer exposes himself to risk, he may be contaminated with Covid-19 with the possibility of losing his life completely. Consequently, a distinction can be made between two situations, if the consumer goes out and shops as usual; the first situation, he will not be contaminated, and he will keep his initial wealth (W_0). The second situation corresponds to a possible contamination reducing his wealth to ($W_0 - L$), or L can be equal to (W_0).

Assuming now that there is a possibility to shop online without leaving the house, and therefore with zero probability of contamination. We have to add the extra cost of connection and the tool used electricity ...etc, that he will assume, how will his situation be?

In an uncertain world, the final situation of the individual can be defined as follows:

$$Wf = (W0 - C - L' + R)$$

Such as; C represents the additional cost to be borne. L', losses due to containment, stress of staying at home, non-compliant products and possible loss of warranty...etc. R, compensation for defective product.

It is therefore clear that the advantage of this second situation, compared to the first, is that it is safe, as shown in the graph (Figure 3).

4- The state of the world's digital economy in the age of Covid-19 :

Taking into account the previous analysis, and in the context of a health crisis, consumption habits must be modified, and economic agents will certainly prefer online purchases. This health crisis therefore confirms what has been said about companies that do not plan to catch up in e-commerce being the biggest losers.

In some parts of the world, where companies have a strong e-commerce platform, they have demonstrated their ability to be there when consumers need them. As a result, most of their customers will already be loyal, and there should be a strong chance that they will continue to buy online and businesses will gain trust. Several research studies claim that positive online shopping experience positively influences shoppers' perception of the channel, (Chaudary et al., 2014; Nwaizugbo and Ifeanyichukwu, 2016) and their intention to buy online (Forsythe and Shi, 2003; Kuhmmeier and Knight, 2005). The example of Nike, which saw a 30% increase in sales during containment, can be cited as an example of successful adaptation. Nearly US\$11,000 was spent every second on the Amazon website while Disney lost US\$1.4 billion over the same period[†]. In terms of turnover, websites such as Alibaba, Amazon, Ebay, continue to make huge amounts of money, and this can only be explained by the trend to buy online rather than offline. This

[†] <http://www.economiamatin.fr/news-amazon-argent-depense-chiffre-affaire-confinement-covid-bezos>, visited on 15/05/2020.

trend bodes well for e-commerce and for the leaders who have already established themselves.

Despite the dark side of the current health crisis, techniques to avoid the risk of contamination continue to develop; contactless payment or m-payment, no longer needing to go to the checkout, has become widely used in the US and Canada. Walmart shops were the first to announce the possibility of paying in-store and retrieving purchased items with a simple click, using the Walmart pay option. Other applications in the form of mobile payment have appeared, such as Apple pay, Scan and Go, Amazon-Go...etc (McKibbin, W. and R. Fernando, 2020), This is how virtual shops will come to conquer physical shops, especially as this kind of crisis like Covid-10 will continue to plague the world, according to experts, at least for the next two years.

The containment of the population imposed by this pandemic has enabled a shift from e-commerce to e-conferencing, e-learning, e-gov, e-health, etc. As consumer behavior evolves in this context, the consumer has already largely adapted to e-life. Dematerialization is set to advance dramatically in the future as the number of internet users continues to grow. The share of developing countries in world trade could rise from 46% in 2015 to 57% by 2030, according to the WTO report (2018)[‡], the same report underlines the marked effect of new technologies on consumption habits. Thus, the containment imposed by Covid-19 has reinforced this analysis to the delight of e-commerce.

UNCTAD estimated in 2015 that the total value of domestic and cross-border e-commerce transactions worldwide was \$25 trillion (UNCTAD, 2018a).

In these circumstances, the market will also rapidly transform to become increasingly competitive. Businesses looking to capitalize on this trend may be better served with the possibility of search engine optimization (SEO), content marketing, conversion rate optimization (CRO), Pay per Click (PPC) and Social Ads. In this new world, with

[‡] WTO (2018), World Trade Report "The future of world trade, how digital technologies are transforming world trade", Geneva, PP ,11 and 12

customers having to spend much more time shopping online, even small changes to a site's user experience and page load times are likely to have a much greater impact on customer retention and conversion rates. All of this is likely to be the major concern of companies in the future to capture more market share.

5- The future of digital technology in Algeria and the opportunities to be seized in the context of the current health crisis:

In the light of what has been said above, there is an urgent need to develop digital platforms in all countries of the world in order to conform to the global economic reality. To this end, several authors insist on the need for a compulsory transition to digitalization of the various sectors in order to counteract the Covid-19 Virus, we cite in this case the works of (Van Spall et al, 2020), (Kapoor et al, 2020), (Crawford et al, 2020), (Arner et al, 2020). Other ICT specialists believe that the barrier that prevented consumers from going digital is now ready to give way in the face of this pandemic that has not spared a single region of the world, including Algeria: *"At a time of confinement, Algerian consumers are ready to reconsider their choice. It is essential, today, to encourage people to go towards this solution"*, says Iheb Tekkour* .

Indeed, this pandemic is likely to last for a long time according to virologists, and other health or other crises are possible in the future, which does not rule out harmful effects on the economic level, particularly for countries that are lagging behind in the digital field. Start-ups, SMEs (considered as cells of an economy), risk being swept away in the wake of this pandemic, following the containment measures, and in the face of the Algerian government's silence regarding the acceleration of the process of digital popularization, the development of e-payment and the regulations linked to it, notably teleworking and freelance activities. At present, the public authorities do not seem to be in any hurry to regularize and legalize e-commerce, but rather to be satisfied with a

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secondary activity of distance or mail order sales. This stage is only the beginning of e-commerce. The popularization of ICT, the legal framework and the promotion of e-payment are also necessary prerequisites for the establishment of a solid digital platform. However, there has been a certain willingness in this direction with the generalization of CIB and Edhahabia cards, which should give, in the near future, a boost to financial transactions via the Internet, if this process is accelerated while gaining, of course, the confidence of customers who must become familiar with this new payment system.

In the area of ICT literacy, several indicators can be taken into consideration. The Networked Readiness Index (NRI) launched in 2001 takes into account 53 indicators to identify the importance of technology and innovation in the world, these indicators are grouped into four main clusters divided into about ten pillars (see table below).

Taking into account the NRI index, Algeria obtained a score of 3.2 in a report published by the World Economic Forum in 2016, moving from 131^{ème} place in 2013 to 117^{ème} place in 2016 (<https://www.arpce.dz/>). The details of this ranking according to the different indicators are set out in the following table:

Table 1: Algeria ranking according to the different indicators

Indicators	Rank/139	Value (1-7)
Networked readiness index	117	3.2
Networked readiness index 2015 (out of 143)	120	3.1
Networked readiness index 2014 (out of 148)	129	3.0
Networked readiness index 2013 (out of 144)	131	2.8
A.environment subindex	131	3.1

1st pillar : political and regulatory environment	123	3.0
2nd pillar: business and innovation environment	133	3.2
B.Readiness subindex	96	4.3
3rd pillar: infrastructure	80	3.9
4th pillar: affordability	99	4.4
5th pillar: skills	89	4.6
C.Usage subindex	125	2.8
6th pillar: individual usage	103	2.8
7th pillar: business usage	133	2.9
8th pillar: government usage	130	2.7
Impact sub index	129	2.6
9th pillar: economic impact	124	2.6
10th pillar: Social impact	132	2.7

Source: Silja Baller, SoumitraDutta, and Bruno Lanvin, editors, the Global Information Technology Report 2016, World Economic Forum, P57.

6- Results and discussion:

Before going into the worrying situation and the delay recorded in Algeria in terms of digital technology, as the table above indicates, we must first of all go back to consumer choice to justify the profound change in the mode of consumption which obviously requires a change in the mode of production as well as in the mode of distribution.

From the previous analysis (part 3), we can easily conclude that a rational consumer can make a decision to buy online or offline by considering both situations and making the trade-off according to the level of utility that each situation provides. He will opt for the second situation (buy online and remain free from contamination by assuming an additional cost) if, and only if:

$$U(W_0 - C - L' + R) \geq E(U(wf)) \text{ or also } U(W_0 - C - L' + R) \geq P \cdot U(W_0 - L) + (1 - P) \cdot U(W_0)$$

Thus, according to the VNM analysis, if this optimal situation is verified, the rational consumer will certainly opt for online purchases when he finds that this situation provides him with a higher, or at least equivalent, level of utility.

This analysis allowed us to demonstrate, by analogy, the predisposition of individuals to change their consumption habits in a situation of uncertainty or risk. It has become clear that the consumer will opt for a situation of certainty (not risky) which provides him with a maximum of utility, or, at least, an equivalent level of utility, according to VNM.

According to this analysis and in the case of a pandemic or the risk of contamination and of losing what is precious (health/life), the consumer will prefer to buy online and remain safe from contamination. Thus, a new mode of production and distribution is needed, in other words, a digital platform in all sectors has become an emergency for all countries in the world, including Algeria, which remains far from the objectives set in 2008.

However, despite this last place ranking, justified among other things by macroeconomic and political instability, the modernization of institutions, education and health (...etc), the Algerian government's desire to establish the foundations of a digital economy took shape in the 2000s, with the adoption of Law No. 2000-03 of 5 August 2000. This law defines the general rules relating to the post and telecommunications with the major objective of introducing competition in the telecommunications sector, and Law No. 18-05 of 10 May 2018 on electronic commerce. To support this programme, the Algerian government has set up a fund to help finance public or private bodies, the User Ownership and Development of Information and Communication Technologies Fund

(FAUDTIC) (UNCTAD, 2019). For the past ten years, the launch of the e-Algeria programme in 2008 has boosted public investment in ICT, which has led to a marked improvement in the popularization of the Internet and online services, as in the case of Sonelgaz, CNAS, Seaal and others. In addition, in anticipation of a possible m-payment system, the development of 3G and 4G mobile internet has been on the agenda of the Ministry of Post and Telecommunications in recent years. Thus, the beginnings of e-commerce have appeared with the emergence of pioneers, who seem determined to develop this activity in Algeria; note the arrival of Jumia in 2014, with more than 1.5 million visitors, with orders up to 20,000 per month (during 2017). Other similar sites such as Batolis, Ouedkniss, Zawwali, Dzboommet...etc, have rushed to the Algerian market, this phenomenon is a good sign of a flourishing market of online trade, despite some obstacles that are to be deplored, including the legal vacuum and e-payment which is not yet developed. However, in 2021, the Prime Minister mentioned a clear improvement for the current year by advancing an increase of 220% in the commercial operations of the TPE (electronic payment terminals), and about two million commercial operations via the TPE worth 15 billion DA recorded during the same year (www.algerie360.com)[§]. This news augurs well for a possible adaptation of the modes of production and distribution to face this brutal change in the mode of consumption.

7- CONCLUSION :

Globalization and digitalization were already shaking up the world of trade. However, the Covid-19 health crisis has reinforced this upheaval. The world of the internet has transformed many aspects of our lives, our consumption habits have been profoundly modified, particularly with the confinement of the population. This study has also allowed us to show to what extent digitalization allows us to take advantage of such situations. Our findings do not rule out a consumer trend that is adapted to the current situation, with constantly changing preferences towards better online service at the

[§] www.algerie360.com/epaiementenalgerieschiffresexploitent. Visited on 23/12/2021.

expense of offline shopping. This situation is much more of an opportunity than a threat for developing countries like Algeria, and for newly born startups, as this pandemic has reset the clock, even for other large companies already in business that need to build momentum to establish solid digital platforms.

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