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Abstract

The digital is generating a lot of interest around the world and Morocco is not spared. This transformation is transversal and concerns all sectors of economic activity. In this article, we propose to raise some of the effects that digitalization could have on the main sectors of the Moroccan economy and propose some avenues for solutions. Beyond the presumed negative impacts in terms of job loss and limited growth, measures to increase productivity, create new employment opportunities, make the labor market more flexible or increase human capital seem to be strategies to consider. The development of e-gov in Morocco must continue, especially by improving the coordination of public policies implemented as part of a global approach. The adoption of digital technologies in the financial sector will promote economic growth through access to financial services. At the same time, the deployment of e-commerce, as a sector that promotes and facilitates business, can also have a significant impact on traditional business structures. Finally, the digitization of the agricultural sector is seen as one of the solutions to address some of the many challenges faced in this sector. However, much work remains to be done to ensure that a digital gap does not develop and that the digitization of agriculture can contribute to poverty reduction in Morocco. The analysis of these different sectors confirms that the success of the digital transformation will condition the performance of the Moroccan economy in terms of employment, growth and reduction of inequalities.

JEL Classifications: G20; H11; J21; L81; O16; O33; Q16
Keywords: digitalization; agriculture ; labor ; e- commerce; governance ; finance ; Morocco

ملخص

يولد التحول الرقمي الكثير من الاهتمام في جميع أنحاء العالم وكذلك فى المغرب. ويتم هذا التحول بشكل أفقي حيث يطبق فى كل قطاعات النشاط الاقتصادي. في هذا المقال، نقترح طرح بعض الآثار التي يمكن أن تحدثها الرقمنة على القطاعات الرئيسية للاقتصاد المغربي، ونقترح بعض السبل للحلول. وبخلاف الآثار السلبية المفترض حدوثها نتيجة للتحول الرقمي من حيث فقدان الوظائف والنمو المحدود، فإن تدابير زيادة الإنتاجية وخلق فرص عمل جديدة وجعل سوق العمل أكثر مرونة أو زيادة رأس المال البشري تبدو استراتيجيات يجب دراستها. إن تطوير الحكومة الإلكترونية في المغرب لابد له أن يستمر، وخصوصاً من خلال تحسين تنسيق السياسات العامة التى يتم تنفيذها كجزء من نهج عالمي. إن تطبيق التكنولوجيات الرقمية في القطاع المالي من شأنه أن يعزز النمو الاقتصادي من خلال إتاحة الخدمات المالية. في الوقت ذاته، يمكن لنشر التجارة الإلكترونية كقطاع يعزز الأعمال التجارية ويسهلها أن يكون له تأثيرًا كبيرًا على هياكل الأعمال التقليدية. وأخيرًا، فإن رقمنة قطاع الزراعة ينظر إليه كأحد الحلول لمعالجة بعض من التحديات الكثيرة التي يواجهها هذا القطاع. ومع ذلك، لا يزال هناك الكثير من العمل الذي يتعين القيام به لضمان عدم حدوث فجوة رقمية وأن رقمنة الزراعة يمكن أن تسهم في الحد من الفقر في المغرب. يؤكد تحليل هذه القطاعات المختلفة أن نجاح التحول الرقمي سيؤثر على أداء الاقتصاد المغربي من حيث التشغيل والنمو والحد من حالات عدم المساواة.

Introduction

The digital transformation of economies and societies has a broad scope and concerns all sectors of economic activity, and Morocco is no exception. In this paper, we propose a draft analysis of its effects on some of the main sectors of the Moroccan economy.

The first section discusses the theme of digitalization and its effects on growth and inequalities as well as its implications for Morocco. We present some rather global analyses that aim to open the debate with a view to further exploring them in other works on the different sectors and areas addressed in this paper.

The second section presents an overview of the state of knowledge on the effects of digital transformation on the labor market, employment, growth, and inequalities before outlining the main challenges for the Moroccan economy.

The third section focuses on the electronic government (e-gov). Aware of the importance of e-gov services, Morocco has launched several strategies over the last two decades to modernize public administration and support digitalization in different sectors. In this section, we also present a state of performance and explore prospects for improvement in this area.

The financial sector is one of the key and cross-cutting sectors in digitalization strategies. Its digital transformation seems essential to ensure Morocco's long-term competitiveness at both national and international levels. The fourth section is devoted to analyzing this subject.

In recent years, and more in the context of the COVID-19 pandemic, electronic commerce (e-commerce) has experienced sustained development in Morocco as elsewhere in the world. Its evolution could lead to a structural transformation of traditional trade and contribute to the growth of international trade. The fifth section deals with this subject.

Considering the importance of the agricultural sector for Morocco, the sixth section examines the potential role that the digitalization of this sector could play in increasing its productivity in the face of major challenges related to climate change, growth, food insecurity, the globalization of agricultural markets, migration, and population movements, among others.

1. Digitalization, growth, and inequality in Morocco: An overview

How can the digital economy benefit Morocco and all Moroccans? This paper provides an outline of the answer to this question. In this respect, it should be noted that the structural transformation towards a digital economy would require the prior deployment of four types of complementary infrastructures: access to electricity, access to telecommunication networks, access to datacenters that would host digitalized services, and access to users' terminal equipment (computers and smartphones). It would also require reforms in terms of human resource skills and the institutional governance of digitization projects. This section provides a

brief overview of Morocco's achievements in terms of these cross-cutting conditions for digital transformation and their linkages and effects on the digitization process.

In terms of electrification (energy essential to any digitalization), Morocco has made significant progress over the last 20 years. In addition to the urban electrification carried out for decades, the Global Rural Electrification Program (PERG), which was launched in 1996, provides access to electricity for 99 percent of the rural populations. Furthermore, it should be noted that the green component in the production of electricity in Morocco remains relatively weak. However, a vast program is being implemented as part of Morocco's commitments under the Sustainable Development Goals (SDGs) to increase the share of clean energy in the national energy mix to 52 percent by the year 2030. This program would structurally reduce Morocco's dependence on fossil fuels.

Morocco has chosen to entrust the development of the telecommunication infrastructure to the private sector since the early 1990s. It should be noted that the privatization experience in this sector has been one of the most successful in the world; it has allowed the introduction of competition in the sector, which has led to a significant reduction in the cost of access to telecommunications. It should also be noted that the progress made in this sector seems to benefit most of the country's population. According to statistics from Morocco's National Telecommunications Regulatory Agency (ANRT 2020b), the rate of penetration of smartphone equipment was 137.5 percent at the end of 2020 (ANRT, 2020b). Based on this indicator, the International Telecommunication Union (ITU) (2021a) ranks Morocco fifth out of the 22 Arab countries. These statistics do not, however, give an idea of the quality of access to networks, which is very limited in rural areas compared to urban areas.[6] Indeed, due to the lack of an equalization policy imposed by the regulator, operators prefer to deploy in densely populated areas because they are more profitable.

With regard to data centers as a space for the cost sharing and outsourcing of services provided by companies, it should be noted that the development of this infrastructure has been completely left to the private sector. The local market for this type of service was almost non-existent before the policy of securing data and applications required data to be hosted in Morocco. Prior to this legislative provision, hosting providers in Morocco had more incentive to rent the services of foreign data centers, given their competitive prices, than to invest in the development of this infrastructure in Morocco. Because of this legal constraint, there has been a sustained development of private investment in this activity in recent years, which has become very lucrative but also more expensive for users because of the lack of supply in this area. It therefore appears that the development of this market is more the result of security constraints than of a vision and policy for the development of the digitalization of the Moroccan economy.[7]

[6] ANRT's network quality surveys only cover cities, motorways, and railways. They do not cover rural areas (ANRT, 2016).

[7] The Mohammed VI Polytechnic University (UM6P) of Ben Guerir inaugurated a new data center in February 2021, housing the most powerful "Supercomputer" in Africa (African Supercomputing Center) with a capacity to process three million billion operations per second.

As for access to terminals, it should be remembered that it depends on the income of users and the capacity of companies to finance their digitalization. However, the cost and quality of terminal equipment largely determine the profitability of citizens and businesses in the other three infrastructures. By way of illustration, the COVID-19 pandemic has reinforced inequalities in access to e-learning by excluding students who do not have access to high-performance terminals and has reduced their chances of benefiting from quality distance learning.

On the other hand, it should be noted that the development of infrastructure depends, to a large extent, on direct or indirect public policy by the government. It is worth noting that Morocco has pursued specific public policies for each infrastructure without setting up an institutional framework that would ensure coherence between these policies and stop one policy from becoming a bottleneck for another. This case reveals the entire problem of the coherence of the institutional framework accompanying the development of digitalization.

Similarly, given the complementarity between the four types of infrastructure mentioned above (electricity, telecommunications, data centers, and mobile and fixed terminal equipment), the speed of digitalization – and, by extension, its impact on growth – will be limited to the speed of development of the least developed infrastructure. The development of a conceptual framework to carry out this analysis is an important avenue of research to guide public policy on this issue.

Like any new technology, digitalization creates its own institutional and regulatory constraints. The sections on specific areas below confirm this. For the labor market, finance, e-commerce, e-gov, and agriculture, the problem of managing the intersectoral arises with acuteness and is a source of inefficiency and the slowing down of digitization processes because of the debates and conflicts of power between the institutions involved in the digitization processes. For example, it is not enough to decree – within the framework of the new law on the simplification of public administration procedures adopted by Morocco – that the administration must not ask citizens for the same information more than once, but the institutional problem that this decision generates must be resolved, namely: who will be responsible for collecting information from citizens and who will be responsible for sharing it between the various administrations? Conflicts of competence between institutions and administrations are an important source of the lethargy and inefficiency of many digitalization projects. This conflict was at the root of the blockage of the Moroccan single window for foreign trade operations for over a decade.

It was in response to these institutional difficulties that Morocco established the Agency for the Development of Digitalization (ADD) and endowed it with the strategic mission of coordinating the digitalization process under the direct supervision of the Head of Government.

The institutional problem is not limited to a question of power sharing; it extends to include the management and financing of projects requiring more than one player. Thus, digitization brings to the surface the issue of the management of community assets and the underlying economic models and gives them a new dimension, thereby paving the way for new research work. It also raises new issues, most notably those linked to the emergence of the supply of quasi-community goods by private interests.

It should also be noted that digitalization transforms the behavior of economic agents by modifying the conditions of access to markets and the parameters for the distribution of the wealth created. The potential improvement in productivity brought about by digitalization could lead to improved growth, but the effects on employment and the distribution of wealth would have very disparate impacts on poverty and social inequality. As we shall see in the next section, these effects are still very uncertain.

Dealing with these fundamental transformations requires a rethink of the usual behavioral models and the adoption of new specifications capable of integrating the new variables brought about by digitalization. The effects of digitalization on growth, employment, and inequality cannot be understood without taking into account the implications of digitalization on the behavior of agents and markets. The following sections raise these fundamental issues in regard to specific sectors.

2. Digital economy and the labor market in Morocco

Since the 1970s, when the term "automation" mainly referred to technologies that allow machines to perform a few tasks instead of humans, the field of automation has expanded considerably due to the development of information technology and the Internet. Today, technological changes are even transforming business models and challenging the whole structure of the labor market. The COVID-19 pandemic has accelerated this process and has paved the way for sustainable changes impacting the entire labor market.

As summarized in the first subsection below, digitalization is changing the structure of the labor market and jobs around the world. However, research is not yet converging towards a consensus on the nature and extent of its impact. One reason for this is that much of this work is still forward-looking due to a lack of perspective and evidence. The second subsection confirms this trend for Morocco. Like other countries, Morocco has not been spared from the effects of digitalization on the labor market, which have accelerated significantly in the context of the COVID-19 pandemic.

2.1. Digitalization and the labor market: An overview of the state of knowledge

Today, the field of automation spares no sector. In addition to the economic impacts attributable to the digitalization of the economy and jobs, several authors are interested in the social impacts of this process by questioning its effects on inequality, health, and safety. According to Degryse (2016) and Boccanfuso et al. (2018), digitalization affects jobs in several ways:

- It directly affects some jobs by automating them. It is then a question of transforming jobs (interface between man and machine…etc.);
- It suppresses activities because of the robotization and automation of certain tasks and creates new ones through the appearance of new sectors as well as new goods and services;
- It creates new business models through which digitalization simplifies access to the service and reduces its cost, such as the implementation of community-based digital platforms facilitating the sharing economy (for example, Uber, Airbnb, Glovo, or Careem in Morocco).

Economies also seem to be increasingly organized around service activities at the expense of industrial activities. Indeed, many authors believe that the consumer now prefers to acquire the service produced by a good rather than having the good itself (Degryse, 2016).

The debate also focuses on the impact of digitalization on the labor market in terms of productivity and the paradox observed in the literature between gains in productivity and job loss. Indeed, it seems that in each of the "revolutions," the expected negative effect has not occurred. Whereas in the third digital revolution, we talk about the emergence and importance of skilled jobs that could be obtained through education and adapted training, the Fourth Industrial Revolution is rather approached in terms of routine-based jobs and therefore affects all job categories (Brynjolfsson and McAfee, 2014; Soete, 2018). For Autor (2015), the jobs that are most at risk are routine-based jobs, whether manual or cognitive.

In the literature, two visions confront each other. On the one side are the "alarmists" who estimate that more than 40 percent of jobs are at risk of disappearing, leading to an increase in unemployment and social inequalities due to job polarization. On the other hand, many see positive consequences. Arntz, Gregory, and Zierahn (2016) look at tasks rather than occupations and estimate that job losses will range between six percent and 14 percent for Organisation for Economic Co-operation and Development (OECD) countries.

However, given the low worldwide productivity observed in recent years, Soete (2018) argues that the concerns about the negative impact of this Fourth Industrial Revolution on employment and job displacement are not convincing. Atkinson (2018) believes that many analysts overestimate both the speed of these new technologies and the impact they will have on the labor market and employment. He believes there could be gains in productivity if public policies support this change.

Using an econometric modelling applied on 73 countries, the ITU (2021b) shows that the impact of digitalization is higher in developed countries than emerging ones with a 1.35 percent and 1.04 percent respective increase in GDP for a ten percent increase in the digitalization index. This growth in the digitalization index also leads to a 2.62 percent increase in labor productivity along with a 2.28 percent increase in total factor productivity. By repeating the study to capture the pandemic, the authors show that the effects remain similar except for a smaller effect on total factor

productivity, which is only 1.9 percent instead of 2.62 percent for a 10 percent increase in the digitization index.[8]

Thus, according to some, the Fourth Industrial Revolution could even have positive effects on employment with the emergence of new jobs and new forms of employment and management. However, as Sorbes (2019) points out, productivity gains are not automatic and may take time to materialize, which highlights the importance of the role the government can play in the transformation of the labor market.

Voss et al. (2019) attempt to analyze the impact of digitalization on employment, working conditions, and labor rights in the public sector. They confirmed the positive impact on productivity, in addition to the time saved on routine tasks, particularly in the health sector. However, they raise the risk that this time saving will result in a reduction in the number of staff.

As mentioned in the World Economic Forum report (2020), what was announced as the "future of work" is now already happening. For example, Ding et al. (2020) show that COVID-19 has not only forced automation in the United States, but that it has also accelerated it for certain jobs. They also note that this acceleration has been more important for positions considered at risk before the pandemic. The authors also find that already vulnerable workers were hit harder by the pandemic and that jobs automated during the pandemic are easier to replace.

In terms of the social impact of digital transformation on the labor market, Acemoglu and Restrepo (2017) and Green and Sand (2015) believe that the effects of structural changes on the labor market will increase social inequalities and polarize the market. In contrast, Atkinson (2018) argues that the Fourth Industrial Revolution will not lead to a general polarization of the labor market. According to these authors, society would be much richer as a result of digitalization, but for some people, these technological changes could reinforce inequalities depending on how this wealth is redistributed in society.

Education and professional training also remain at the heart of the debate. The development of digital skills and more transversal organizational skills will contribute to assisting in the organization and management of new tasks (Valenduc and Vendramin, 2016). We observe another form of inequality that distinguishes "high level" workers and their ability to connect from other workers whose access to and use of digital tools remains limited (Sassen, 2015; Degryse, 2016).

Moreover, digitalization is transforming the nature and content of work and its management (Voss et al., 2019). Degryse (2016) differentiates between those who believe in the end of the social models that prevail in most economies, i.e. "no more social rights, no more regulation of

[8] It should be noted that the study was conducted on 107 countries.

working hours; […] no more collective action by workers" and the more optimistic ones who believe that this new model is a source of new opportunities because of greater flexibility.

Other social issues are also raised, such as the disappearance of the frontier between work and personal life (Degryse, 2016; Voss et al., 2019). These new models can also be a source of stress and longer working hours. On the other hand, this new modality may also be attractive for some workers, such as women.

These effects, both macroeconomic and microeconomic, will obviously differ from one country to another and may be aggravated or compensated by cyclical shocks, such as the COVID-19 pandemic. This pandemic accelerated the digitalization of the economy and forced the labor market, as well as education and health services, to adapt more quickly than many had anticipated.

2.2. Digital transformation and the labor market in Morocco

Most of the studies cited in the previous sub-section were conducted in developed countries. Research on the impact of digital transformation on the labor market in Morocco is very limited. This scarcity can be explained by two main facts: the relative novelty of research on the impact of the digitalization of the economy on the labor market, and the lack of structured data covering a sufficient period and sectors of activity to initiate research in this field.

Indeed, data covering Morocco are rare and the digitalization trend is in the process of generating intelligible effects in the current context. This sub-section will highlight the main work carried out to understand the effects of the digitalization of the economy on the labor market in the Middle East and North Africa (MENA) region in general and Morocco in particular.

Arezki et al. (2018) argue that "to accelerate growth and create jobs for millions of unemployed youth, MENA countries […] will need to develop a digital economy that takes advantage of its young and educated workforce." Moreover, digital technologies, especially broadband, are accelerating job creation, as employment growth in the technology sector was 27 times higher than in other occupations between 2001 and 2011 (Arezki et al., 2018). According to the Moroccan Institute of Strategic Intelligence (IMIS), "the digital economy could become [...] a powerful driver of Morocco's economic and social development." However, the digital shift seems to be taking place slowly for both the private sector and public administrations.

This is unfortunate since the country has significant demographic potential given that youth below the age of 30 constitute 51 percent of the Moroccan population (World Population Prospects, 2020). Benkassmi and Abdelkhalek (2020) note that the labor force participation rate in Morocco continues to decline. In the first quarter of 2020, just before the pandemic, the activity rate in Morocco was 46 percent. In the fourth quarter of 2020, this rate further decreased to 44.4 percent. Much of this low labor force participation rate is due to the participation of women. Indeed, the female employment rate in the first quarter of 2020 was 22.6 percent, representing a decline of

nearly eight percentage points since 1999 (30.4 percent). The activity rate for men was 70.3 percent just before the pandemic. In the fourth quarter of 2020, only 19 percent of women were active compared to 70.6 percent of men.[9] Benkassmi and Abdelkhalek (2020) also observe that the population continues to grow. However, labor productivity remains low in Morocco, and this has implications for the country's growth and development. Could digitalization reverse this trend?

Chauffour (2018) highlights the fact that, for Morocco, automation will have effects like those anticipated in northern economies. However, according to this author, these effects will further complicate the employment of youth, especially those with low or medium skills. The need to train tomorrow's workforce is indeed the challenge of digitalization highlighted by many since "even if digital technology destroys medium-skilled jobs, it nevertheless creates new job opportunities for highly skilled workers who can thus participate in the ongoing technological revolution" (Chauffour, 2018). Capacity building should therefore be an integral part of the New Development Model that Morocco is developing (CESE, 2019). This is even more important as the Moroccan population is young and currently being trained for tomorrow.

This is precisely at the heart of the Country Partnership Framework (CPF) signed by the World Bank and Morocco for the period 2019-2024, the primary objective of which is to contribute to the country's social cohesion through job creation and the strengthening of human capital. This will be achieved through the digitalization of the economy. For job creation in the private sector, this digitalization could be achieved through access to new systems facilitating online commerce or digital payments. The digitalization of public services (e-gov) would also be a key factor to be developed. The Maroc Digital 2020 strategy aiming to accelerate the digital transformation of the economy to improve the national ecosystem is geared in this direction.

Certain sectors, such as finance, will be more affected by the process than others. In Morocco, the digitalization of the financial sector has led to a 1.5 percent decline in employment since 2004 due to the decline in jobs in the banking sector such as agents, cashiers…etc. (BAM, 2019). However, the transformation of the labor market of this sector will not stop there. Indeed, this sector is experiencing the emergence of new professions where digital activity is important (information systems, analysts, data scientists). In addition, these institutions are subcontracting more (cash in transit, security guards), which generates jobs in other sectors.

Entrepreneurship arises as a way to promote the emergence of new technologies and create job opportunities. However, support must accompany these entrepreneurs in order to foster the structural transformation of the Moroccan economy (CESE, 2019). This must be done through the improvement of high-speed broadband access and the deployment of platforms to facilitate job creation and expand market opportunities (Word Bank, 2019). The Digital Development

[9] These data are taken from quarterly information notes on the labor market situation from the Office of the High Commissioner for Planning (HCP). See https://www.hcp.ma/La-situation-du-marche-du-travail-au-premier-trimestre-de-2020_a2503.html and https://www.hcp.ma/Taux-d-activite-selon-le-sexe_a360.html.

Agency certainly plays an important role in the implementation of the Maroc Digital 2020 strategy and the support for small- and medium-sized enterprises (SMEs) as highlighted by Salim Maalaoui at the 1st International Congress on Digital Economy and SMEs in Africa held in April 2019.

With respect to social issues, Morocco is also facing the same challenges as those previously mentioned, particularly with regard to inequality. Indeed, inequalities in access to certain services, whether in public administration, education (virtual libraries, e-learning), or financial services can be limiting factors for African economies (Nubukpo, Temple, and Alexandre, 2020). As in developed countries, digitalization dematerializes the nature of work. In the transformation of management models, Squalli (2020) argues that Morocco, like many countries, is experiencing an increase in telework and that this is exacerbated by digitalization. Legislating on new forms of work is therefore a necessity to ensure the productivity gains announced with these new models. However, as Squalli (2020) states, "the psycho-social effects of telework deserve to be closely examined, not minimized on the altar of economic growth." Some countries such as France and Italy reformed the labor market in particular on "the right to disconnect" (Voss et al., 2019).

Thus, in the case of Morocco, the challenges of digitalization on the labor market are quite similar to those observed in most economies. The Moroccan government is aware of the risks and has deployed a strategy and resources not only to go digital, but also to try to make Morocco a hub for Africa. However, this structural transformation of the labor market is taking place in a difficult context for Morocco. Indeed, unemployment, particularly among women and youth, is high (El Aynaoui et al., 2018; World Bank, 2019, Savoye, 2019, Belkassmi and Abdelkhalek, 2020). Last year, the numbers increased again. In fact, the increase in unemployment in 2020 affected all age groups, but more particularly young people aged 15 to 24, whose unemployment rate rose from 24.9 percent to 31.2 percent. Unemployment also increased for both men and women, rising from 7.8 percent to 10.7 percent and from 13.5 percent to 16.2 percent respectively between 2019 and 2020 (HCP, 2021b). Finally, the most significant increase in unemployment occurred among middle school graduates, from 12.4 percent to 15.5 percent. Job creation will only be possible if both academic and professional trainings are adapted to the new needs of the labor market.

These trends have accelerated with the COVID-19 pandemic. Morocco has not escaped the negative effects of the pandemic, which has already caused the loss of nearly 600,000 jobs in the second quarter of 2020 – essentially in the primary sector followed by the industrial sector (HCP, 2020). In the second panel of the HCP survey on the impact of the COVID-19 pandemic on the economic, social, and psychological situation of households, it appears that two-thirds of employed workers (66.2 percent) had to temporarily stop their activity during the first lockdown; 68.2 percent in urban areas and 63.1 percent in rural areas. As of June 2020, more than half (53 percent) were still in a work stoppage situation and 11 percent were looking for a new job. Only 36 percent were able to return to work by June 2020. Although there is some recovery in overall activity, with the rate of temporary business stoppages rising from 54.3 percent in April and 52.0 percent in July to reach 14.1 percent in December 2020, some sectors are still heavily affected, such as the tourism sector, for example. Indeed, 86.3 percent of the companies in this sector

reported a 50 percent and more decrease in their activity compared to the second half of 2019, and nine percent refer to a decrease from 30 to 49 percent (HCP, 2021a). Recent work by Krafft et al. (2021) confirms these results.

The sectors of construction, real estate activities, and the textile industry also report more than 50 percent declines in activity: respectively 68.7 percent, 63 percent, and 58.7 percent.

As in many countries, telework has become an alternative way of working in Morocco. In fact, 16 percent of people in employment in the country have adopted this mode of work, and it is more prevalent among women and in urban areas. However, it is mainly skilled jobs (managers) in the service sector that have been able to adapt to this new modality of work in the context of the pandemic. Again, the pandemic seems to have accelerated the process of labor market transformation in Morocco in terms of the use of telework. Indeed, more than half of the Kingdom's large firms have adopted telework (55 percent). This proportion is 29 percent in small and midsize businesses (SMBs) and 19 percent in very small firms. The services sector is particularly concerned: 65 percent in the information and communications sector, 47 percent in the energy sector, and 44 percent in the business services sector (HCP, 2021a). The need to quickly legislate these new forms of work is important as this trend or pattern is expected to continue to expand even after the pandemic. This new form of work may offer opportunities for workers looking for more flexibility, especially for certain groups of the population, such as women.

At the same time (and very quickly), several platforms have emerged to enable the continuation of economic activities. This is the case of "fdar.ma," a solidarity-based and non-profit e-commerce platform. Opened in the spring of 2020 in full lockdown, its goal is to help merchants continue their activities and encourage consumers to provide for their families while staying at home. Other initiatives of the same nature are being developed to open the market to producers. This is the case of the "Sookoa" platform, a non-profit solidarity initiative dedicated to cooperatives and specializing in local products. E-commerce seems to be a way to take advantage of digitalization in the context of a pandemic and will certainly be able to respond to the risk of job losses linked to the Fourth Industrial Revolution.

There are also emerging applications to connect self-employed workers and employers not only in Morocco but around the world (e.g. Fiverr). Digital technology would thus make it possible to expand employment opportunities by opening the labor market beyond Morocco's borders (Benabdeljalil, 2020).[10]

The education sector has also been forced to adapt to the pandemic. Distance learning courses have been introduced to ensure the continuity of schooling. However, this has reinforced the need to deploy the network considering access inequalities. In fact, only 20 percent of primary

[10] See https://www.fiverr.com/.

and middle school students attended online courses. Even if the situation was better in high schools and universities, the lack of access to the Internet in some areas hindered the continuation of schooling for many students. While distance education is becoming a solution to the education of youth in rural areas, the weakness of the network could continue to be a limitation and maintain social inequalities (Benabdeljalil, 2020). This may be even more damaging since digitalization could become an efficient means to reduce inequalities in access to education in some regions of Morocco.

Thus, between challenges and opportunities, for the structural transformation of the labor market related to this digital revolution in Morocco to succeed, it is important to make a diagnosis of the current and prospective labor market. This section illustrates that Morocco has not been spared from the structural change in the labor market and that the pandemic has exacerbated the risks associated with the digitalization of the labor market. In order to make digital technology an opportunity for Morocco, it is important that appropriate policies be implemented. This should be taken into consideration in the process of designing the Moroccan New Development Model. It is also important to set up a structure for sustainable monitoring and evaluation of the impacts of digitalization on the labor market and its repercussions on growth and distributional impacts. Successive governments have been aware of the importance of the impacts of digitalization, in a broad sense, on the labor market and the economy as a whole, and have built this into their governance strategies.

3. E-gov in Morocco: An acceleration dictated by the conjuncture

The COVID-19 pandemic has imposed a significant acceleration of e-gov programs in Morocco, which has introduced more efficient and effective public services. The following sub-sections will describe the programs implemented, the degree of maturity of the services and digital online platforms, the degree of convergence and synergy between administrations, and Morocco's international positioning.

3.1. Ambitious programs with contrasting performances

Morocco has launched ambitious programs to modernize public administration through the digital dimension. Three strategies have been adopted over the last 20 years. These are e-Morocco 2010 over the period 2005-2010, Maroc Digital 2013 covering the period 2009-2013, and, finally, Maroc Digital 2020 covering the period 2015-2020. These three strategies, developed in continuity, demonstrate the degree of commitment of the country to take advantage of the opportunities offered by Information and Communication Technologies (ICTs) with regard to their role in improving the quality and efficiency of public services and therefore create favorable conditions for the emergence of a modern and open administration. Thus, the operational actions in terms of e-gov consist particularly of facilitating users' access to public services through the dematerialization of procedures, improving services for citizens and businesses, and, finally, creating a favorable climate for exchange and communication between public administrations. Maroc Digital 2020 even aims to provide 50 percent of public services online by the end of 2020. We will, through the available data, focus on the progress

achieved by Morocco in terms of e-gov by addressing the overall e-gov index but also services developed by the Moroccan public sector to meet the needs of users.

A review of the United Nations' global E-Government Development Index shows that Morocco ranks 106th in the world (United Nations 2020). The country is ranked among the high performing countries in terms of e-gov. This is also the case for the e-participation dimension of this index. In this respect, platforms with multiple objectives and offering users the opportunity to express their opinions on public policies, regulatory texts…etc., have been set up. The same is true for the national portal for citizen participation,[11] which ensures the participation of citizens and civil society organizations in the development and implementation of public policies. Through this platform, users can even sign petitions on issues of public concern.

According to this report, Morocco ranks seventh in Africa, after Mauritius, Seychelles, South Africa, Ghana, and Namibia. In North Africa, it ranks second after Tunisia. In the MENA region, Morocco lags behind Tunisia, Bahrain, Oman, Kuwait, Qatar, the United Arab Emirates, and Saudi Arabia. With its proactive policy of leadership, particularly in Africa, a more attractive business environment, an economic dynamic that is part of the global value chains, and a commitment to achieving the SDGs of the United Nations 2030 Agenda, Morocco should take up the challenge of integrating the global dynamics of public sector digitalization. Moroccan public authorities as well as the private sector and civil society organizations should work together to give a privileged place to digitalization in order to position the country in this area.

Moreover, the level of performance of Morocco, based on the e-gov index approach of the United Nations, is confirmed through the analysis of the maturity of online public services (Department of Administration Reform, 2019). This analysis shows that the digitalization of public administrations is constantly developing, but the pace at which it is being achieved varies from one administration to another. Some are more committed and more advanced in offering users' high-performance platforms or services. Others require more work to complete their projects to digitize their public actions. Thus, services concerning taxes (IS, IR, VAT), customs declaration, job search, social contribution for employees, enrollment in higher education, public procurement, management of schooling (MASSAR program), integrated management of public expenditure, electronic national identity card, common business identifier, land registry services, the Portnet, the Exchange Office, the complaints platform, e-participation, the Morocco Post platform…etc., are already operational. Some of these services are even achieving good levels of maturity based on best practices observed in other countries such as those of the European Union (Court of Auditors 2019). This is the case for services related to taxes (IR, IS and VAT), customs, public procurement, research and employment…etc.

[11] www.eparticipation.ma

One of the criticisms noted by the Court of Auditors regarding the implementation of digital strategies, is that the different administrations work in silos. This could reduce the overall effort to achieve the expected objectives of the digital strategies and the sustainability of their impact. Users should benefit from the interaction of the entire public sector and not just the specific projects of each administration (IRES, 2018). IRES (2018) stresses that the governance dimension is "essential and requires the positioning of the digital agenda at a very high level and a clarification of roles and trade-offs, in order to enable Morocco to take full advantage of the potential of digital technology."

At the institutional level, in 2017, the government created the DDA. This institution is called upon to play a leadership role in creating favorable conditions for greater convergence and synergy in the public sector in order to establish digital administration on solid foundations that are sustainable in the long term.

Despite the delay in implementing some of the projects in the digital strategies in accordance with the expected objectives, the digital culture is progressing gradually in the country. This culture is imposed by the technological evolution and the growing demand of citizens and businesses, but especially by the adaptation to the global pandemic context. Certainly, the health emergency measures taken by Morocco following the COVID-19 pandemic crisis could be a factor in accelerating the pace of the digitalization of several public services. This is the case for services concerning the exchange of correspondence between the various public establishments and institutions, distance working, e-learning, and services relating to urban planning, in addition to a vast program of digitalization of local government services launched by the General Directorate of Local Authorities.

Therefore, one of the actions that will undoubtedly accelerate and further strengthen interactions between administrations is the adoption of Law 55.19 on the simplification of administrative procedures and formalities in 2020. This law represents a turning point in the simplification of administrative procedures in Morocco. It aims to create a climate of trust between the administration and users. It requires the administration to implement, in accordance with a well-defined agenda, the mechanisms necessary for the simplification of administrative procedures and especially the rapid processing of files within specific deadlines.

In the area of social protection, public authorities adopted an innovative approach in 2020, using, for the first time, new technologies for the payment of cash transfers to beneficiaries of the Medical Assistance Scheme (Ramed) and job loss compensation for employees in the formal sector and non-employees in the informal sector (Ajbilou, 2020). This social protection project, which today has an integrated vision and an operational action plan for the next five years, will be reinforced by two registers: the national population register and the single social register. The first provides a unique identifier for each citizen and the second aims to improve and optimize the targeting of poor and vulnerable populations requiring support within the framework of social protection. The laws concerning these two registers have been adopted. Technological solutions for both systems are being finalized.

3.2. Prospects for rationalization and acceleration

Morocco continues to show its willingness to comply with international standards in the field of digital administration as a choice to modernize public action. It even adheres to the OECD Council's recommendation on open government partnership. Certainly, efficient and well-coordinated digital services would make public action more efficient in terms of job creation, economic competitiveness and performance, financial inclusion, transparency and accountability, the fight against corruption, the development of human capital, social protection and the fight against social inequalities, territorial development, and so on. These areas are considered priorities in the country's public policies. Also, "the challenge of the efficiency of sectoral programs and public policies requires a logic of results and accountability. Technological solutions would make public decision-making mechanisms more transparent and ensure careful and methodical monitoring of the implementation of public projects, etc." (APEBI, 2019).

As a consequence of a sustained development of technological infrastructure but also of the development of social networks that are nowadays required as a means of communication and interaction, citizens and businesses in Morocco are increasingly connected, leading to new forms of social, economic, and political interaction. These interactions require public services characterized by quality, efficient responsiveness, a focus on users' needs. Such services are "better able to meet citizens' expectations and improve the overall experience of service users when they interact with the public sector," OECD (2018). The OECD (2018) adds that the emergence of data as a strategic asset in the digital age, together with techniques such as analytics and machine learning, enables governments to integrate more and more data at all stages of the policy cycle, thereby improving public sector intelligence, particularly in the form of strategic foresight, policy and service delivery, and performance management.

The choice for a high-performance and efficient digital government has multiple challenges for the transformation of public action. A transformation that will have an influence on sectoral development strategies, services for economic and social operators, services for citizens, territorial policies, and even the way society is organized (IRES, 2018).

Based on the challenges of the digital transformation of the public sector, it is necessary to strengthen the prospects for e-gov through two levels of action that remain essential for the success of any public policy in terms of the digital transformation of public administration. On the one hand, it is necessary to focus on aspects related to the conditions of the impact and sustainability of the actions of the digital transformation of the administration. Interaction, synergy, coordination between public sector stakeholders, the role of academic and private partners, local authorities…etc., are, among others, the main ingredients of these conditions. On the other hand, the territorial dimension, a vector of local development, must be considered in order to anchor and implement any policy in this area at the territorial level. Local experiences have begun to emerge in this area, such as the Casablanca experience, described as a model to be followed by the United Nations (2020). This report states that "although the

results for the services provision indicators may seem less than encouraging at this point, the fact is that many of the world's major cities are actively engaged in improving and expanding their online public services; Casablanca is a prime example of this. On 3 May 2020, the municipality of Casablanca announced the launching of a new version of its portal to provide residents with expanded access to dynamic digital content, including data, documents and services; this update constitutes part of the city's efforts to promote digital transformation. Casablanca also has a municipal portal called "Casa Store" that provides access to information and services to actively promotes user participation and engagement."

The success of e-gov strategies must be concomitant with the success of the financial sector. The financial sector is called upon to play a pivotal role between the different administrations, businesses, and households.

4. Digital transformation and the financial sector in Morocco

At the global level, during the last decade, the digitalization of financial operations has clearly accelerated. Especially in developing countries, the transition to digital payment has proved to be a crucial step in accessing the formal financial system. It enables households and small businesses to access different markets, technologies, and services. Morocco has only partially followed the wave, despite the advanced development of its financial sector.

In the following sub-sections, we summarize the recent developments and limitations of the Moroccan financial system before returning to a succinct presentation of the issues and challenges of digitalization in this sector in Morocco.

4.1. Recent developments and limitations of the Moroccan financial system

Morocco has some of the largest banks in Africa since three Moroccan banks are among the top five banking groups in the West African Economic and Monetary Union (WAEMU). Some of them have become major players in the continent and are expanding year by year. Indeed, according to the banking commission of the WAEMU, in 2018, Moroccan banks conquered 27.8 percent of the market share in the WAEMU, and more than 30 percent of the share of overall net income in the region (WAEMU, 2019).

Moreover, as Dehmej and Micou (2020) explain, the Moroccan banking system has shown resilience to various financial crises in recent years, particularly because of the rigorous supervision of Bank Al Maghrib, the Moroccan Central Bank (BAM).

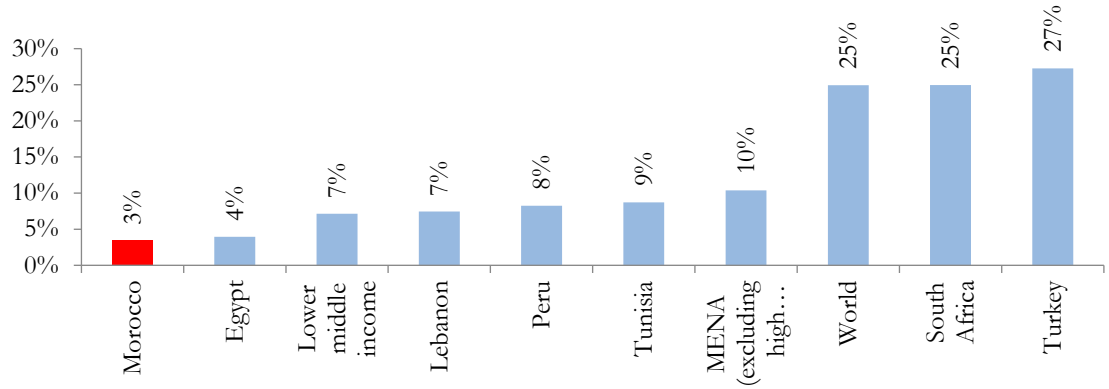
In recent years, due to several factors, Morocco's financial ecosystem has improved to rank 66th in the world.[12] Banking assets account for about 85 percent of GDP, ranking 41st in the world on this indicator. The number of bank agencies has grown steadily and nearly doubled between

[12] The data in this section are drawn principally from the Global Findex database cited in the World Bank Group's 2018 report, A New Economy for the Middle East and North Africa.

2009 and 2019. It is estimated at more than 25 agencies per 100,000 adults (Legatum Institute Foundation, 2020).

According to BAM, the bank penetration rate will be over 78 percent in 2019. However, considering people who have more than one account and only the adult population, this rate would be between 34 and 54 percent depending on the calculation methods adopted. Since 2013, the number of bank accounts has increased by 26 percent and the number of bank cards has increased by 32 percent. Today, there are approximately 13.8 million bank accounts in Morocco. However, 10 million Moroccan adults do not have a bank account.

Figure 4.1. Used a mobile phone or the Internet to check account balance



Source: World Bank (2017), World Bank (2018).

Data show that just under 80 percent of men had at least one bank account in 2017, while only 40 percent of women had one.[13] This finding can be explained, in part, by the low participation rate of women in Morocco (less than 23 percent) in the labor market.[14] Similar gaps in account ownership exist between urban (80 percent) and rural (30 percent) areas. These data illustrate the exclusion of several population groups that could be potential clients of Moroccan banks. Moreover, according to the same data, only seven percent of Moroccans out of the 5,110 surveyed have savings in a financial institution (compared with 20 percent in Tunisia and 36 percent in Malaysia).

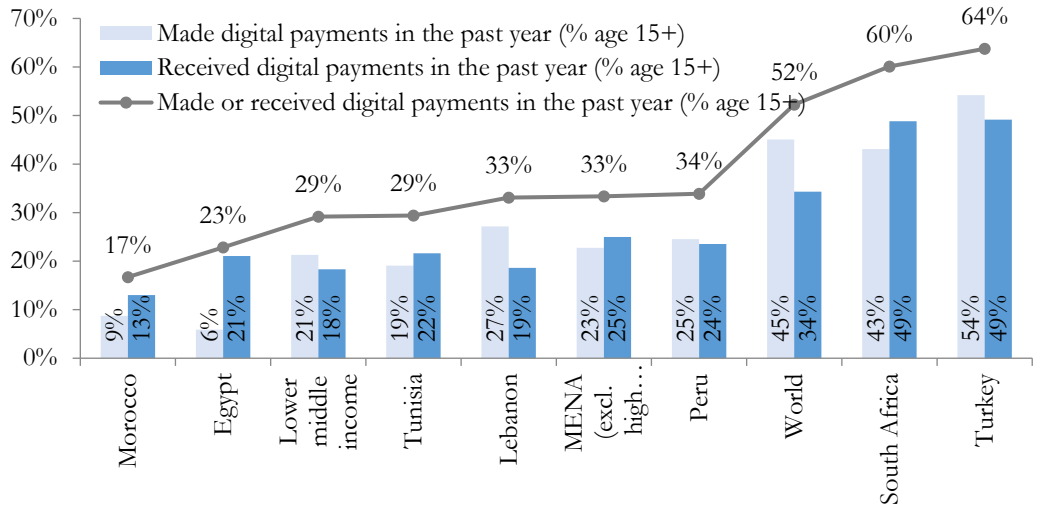
In addition, a large portion of the personal accounts opened are used only to receive salary payments or pensions and to make withdrawals. In fact, and regardless of the level of banking, the payments ratio remains low. While in Turkey, for example, there are 46 payment transactions per capita per year, in Morocco this ratio stands only at 5.5 transactions annually.

When the analysis is limited to bank account holders, three percent used a cell phone or Internet to access their account, compared with one-fourth of account holders in MENA region. This digital access to accounts is three times lower in Morocco than in Tunisia and even lower compared to the MENA region (see Figure 4.1).

[13] See World Bank Group's Findex survey - World Bank (2018).
[14] For more information about the labor market, see section 2.2 in this paper.

Other indicators illustrate Morocco's lag compared to other countries in the region. Indeed, only 17 percent of Moroccans have received or made a digital payment in a year. This corresponds to 58 percent of account holders, compared to 80 percent in Tunisia, 70 percent in Egypt, and 93 percent in Turkey. In addition, only 43 percent of bank account holders in Morocco (12 percent of the adult population) reported using their account to make or receive digital payments. The data also show that almost all utility bill payments (96 percent) are made in cash, compared to 98 percent in Egypt and 87 percent in Tunisia, while in Turkey and South Africa, cash payments are much less frequent: amounting to 50 percent and 64 percent, respectively. Online purchases and payments have not really taken off in Morocco (two percent) (far behind Lebanon (16 percent) or the MENA region or Turkey (12 percent), for example).

Figure 4.2. Digital payments in the past year



Source: World Bank (2017), World Bank (2018).

The cause of or the partial explanation for this would be the fact that 66 percent of private sector wages are paid in cash, with the remainder (34 percent) paid into an account. Virtually no Moroccans have their wages paid into a cell phone wallet. Yet, 77 percent of unbanked adults own a cell phone, 42 percent own a smartphone, and 91 percent of adults in Morocco with a dormant account have a cell phone. These data suggest that mobile channels could be used to promote active account use at different levels. Exploiting this fact could allow access to mobile money accounts and other financial services from a distance.

The low penetration of financial services among households in Morocco can be explained by the low level of household incomes in general. It could also be partly due to the inadequacy of banks' offers to meet the needs of these excluded potential customers and to the high use of informal financial services. The relatively low rates of users of digital banking solutions among adult bankers could also be explained, at least in part, by the somewhat passive role played by financial

institutions. Indeed, financial institutions did not sufficiently and clearly encourage the use of digital services among their customers, at least before the advent of the COVID-19 pandemic.

Effective means to bring this part of the Moroccan population into the system and increasing the number of financial transactions is important. Normally, the digitalization of financial services could significantly increase access to these services in Morocco, as has been observed in other countries on the African continent.

Thus, as part of its Universal Access to Financial Services initiative *(Accès universel aux services financiers)*, the World Bank Group has committed to ensuring that one billion people have access to an operating account by 2020. Morocco has been selected as one of the 25 targeted countries for this initiative.

With respect to corporate finance, and in terms of access to financing and the World Bank's "Doing Business" criteria for loan or credit availability, Morocco ranks rather poorly compared with other countries at a comparable level of development. It ranks around 100 out of some 180 countries (World Bank 2021). As a result, many very small, small, and even medium-size enterprises still have difficulty accessing credit from Moroccan banks. The sources of financing solicited during the business start-up phase are always family members, friends, or colleagues (45 percent), followed by banks and financial institutions (17 percent), and government programs and grants (eight percent) (World Bank Group, 2019).

Financial exclusion continues to be perceived particularly at the micro level, very small, and small firms, those with low business volumes and those who do not have trust in the banking system. Thus, despite the efforts made, access to financing remains an obstacle for small units. Bank loans are subject to collateral requirements that are considered very high and restrictive for the smallest firms. Finally, the ratio of private credit to GDP is around 73 percent, while the ratio of household credit to GDP is around 31 percent.

Moreover, according to the usual indicators, the capital market has recorded an appreciable level of sophistication in recent years. The Casablanca Stock Exchange (CSE) is even among the largest and most dynamic in Africa, despite some persistent problems.[15] First, there is the low level of the CSE's role in investment financing. Then, there is the low level of liquidity and the very limited number of companies listed on the stock exchange. For these reasons, among others, Morocco lost its position as an emerging market in 2013 and became a peripheral market (Chauffeur, 2018).

[15] The institutions that produce these rankings are based on several indicators. See for example: https://www.capitalmarketsinafrica.com/moroccos-bourse-eyes-ipos-short-selling-to-regain-index-status/ https://boursenews.ma/article/actualite/cfc-perd-5-places-dans-le-classement-mondial-des-places-financieres and https://www.jeuneafrique.com/mag/847644/economie/classement-2018-des-bourses-en-afrique-marque-par-la-febrilite-generalisee/

Several specialists in Morocco's financial sector believe that a new stock exchange legislation should be adopted to provide appropriate products to finance SMEs.[16]

When analyzing the regional and continental position of the Moroccan banking system, Morocco, which is located 14 kilometers from Europe, has the European Union as its main economic and trade partner, and reintegrated into the African Union in 2017, intends to play a decisive role at the regional and continental levels on the economic and financial levels. Thus, and during the last few years, the country has shown its ambition to become an economic and financial hub between Europe, the Gulf countries, and the African continent. Several of its banks and insurance companies have established themselves in several West African countries. For the banking sector, we can refer to Attijariwafa Bank, BMCE-Bank of Africa and the Banque Populaire.

In addition, in 2010, Morocco established and developed financial platform Casablanca Finance City Authority (CFCA), which has rapidly become a major financial center in Africa with more than 30 partners around the world (Casablanca Finance City 2021). The objective assigned to this platform has been to attract a greater share of foreign direct investment destined to the continent in the country, given that Morocco is already among the most important investors in West Africa since more than 85 percent of Morocco's foreign direct investment goes to Africa. Today, this platform has been successful in attracting and hosting more than a hundred national and multinational companies active in the financial sector (see, for example, Legatum Institute Foundation, 2020).

To achieve a leadership role and to increase its presence in Sub-Saharan Africa, and possibly in the MENA region, the banks and insurance companies have implemented and continue to implement technological and digital transformations. The intermediate objective is to develop the management of digital financial platforms.

However, despite the notable progress and relative success achieved, and for various reasons, the Moroccan financial system (banking and stock exchange) still has difficulties in financing economic activities at the level desired by the various economic actors. Several national and international reports on this sector point to the need for the system to become more inclusive and diversified in terms of the products it offers.[17]

4.2. Issues and challenges of digitizing the Moroccan financial system

For all the actors of the Moroccan financial sector, the challenges of digital transformation are increasingly obvious. Digitalization allows for the improvement of the productivity of Moroccan companies inside and outside the country. The current challenge in this project is to

[16] See, Finance News (2019).
[17] See, for example, Legatum Institute Foundation (2020) and Chauffour (2018).

find a way to federate the efforts of all partners around a clear vision and strategy that would be led by the DDA, which was mainly created for this reason.

The digitalization of the financial sector's services, in all its segments, seems to be an indisputable necessity. Several debates are currently underway among experts, specialists, and professionals at different levels. The conclusion is that digital finance will inevitably become, in the short term, an unavoidable leverage for sector development, and that we need to commit to it as soon as possible.

In terms of the reforms to be implemented in this regard, several axes have been identified. They require the consolidation and acceleration of digital transformation. This involves improving the digital functioning of capital markets and developing the associated basic financial infrastructure. The training and qualification of the workforce in the digital and digital-related fields related to the sector are also crucial to the success of such reforms.

A consensus then emerges among all the stakeholders and recommends that the sector strategy should be implemented in a thoughtful manner through specific, specialized, and oriented training programs that will enable the sector, in its new configuration, to act as a real source of efficiency. In this regard, the professionals cite the role that Cloud, Blockchain, and artificial intelligence techniques will occupy in the future and the need to fully master them at the national level on the one hand and at the sectoral level on the other hand. A profound revolution is in preparation in this direction according to the actors of the sector, with all its implications on the labor market of this sector. It should be stressed that this strategic direction is globally in line with the Morocco Digital 2020 Strategy implemented in 2016 (Law 61-16). It is important to recall that this strategy intends to organize and support the process of digital transformation of the national economy.

Moreover, recognizing the problems facing Morocco's financial sector in terms of financial inclusion, the government, in direct collaboration with BAM, has tried to make up for lost time by implementing a National Strategy for Financial Inclusion (*Stratégie nationale de l'inclusion financière* (SNIF)) in 2016 (MEFER 2019). The latter seeks to identify and accelerate the development of so-called alternative models, adapted to the specificities of certain target populations. These are particularly women, young people under the age of 25 who are accessing economic activity, rural residents, and very small and small enterprises (VSEs). This strategy has therefore identified priorities and mechanisms that enable these target populations to have easier access to financial services (credits, savings, insurance, and micro-insurance products…etc.). A roadmap that is quite clear was then formulated in this direction.

The Achilles' heel of this strategy has been the intense use of new information technologies to carry out the various financial transactions. The government has therefore requested the contribution of BAM, the ANRT, telephone operators, the Professional Grouping of Banks in Morocco (*Groupement professionnel des banque du Maroc* (GPBM)) and the Professional Association of Payment

Institutions (*Association professionnelle des établissements de paiement* (APEP)) to ensure the success of this strategy. Initially, the implementation of mobile payment was on the agenda. It was a "source of growth" to promote and accelerate financial inclusion and a catalyzer for the latter (distribution, microfinance, microinsurance). The major banks in the country had immediately begun to implement appropriate applications in this direction to offer new services or ranges of services to these populations.

In the same line, through the banking law of 2014, BAM had recognized payment institutions as a category of organizations assimilated to credit institutions. These payment institutions were then called upon to play a central role in the introduction of mobile payment in the country to complement or replace traditional banking operations.

However, and despite these efforts and achievements, as we have highlighted above, mobile payment has not really taken off and has not developed as expected, partly because of the issues of potential user trust and the challenges raised by the protection of personal data.

In 2020, following the COVID-19 pandemic, activities associated with mobile payments increased exponentially, according to BAM statistics. For example, 1.5 million mobile wallets were operational in September 2020. Similarly, the payment and remittance areas have experienced very strong demand, as have the fintechs for loan and personal finance management.

To support Morocco in its process of implementing digital financial inclusion, the World Bank granted Morocco USD 500 million in June 2020. The international financial institution supported its decision by the fact that "The COVID-19 epidemic has demonstrated the crucial importance of digital transformation to ensure continuity of services and foster innovation.... Today more than ever, digitalization offers Morocco new opportunities for development, whether it is to make economic transactions more fluid or to improve the delivery of services to companies and individuals."[18] This funding aims to put in place a mechanism that improves financial inclusion (promotion of microfinance programs) by allowing firms and households to have access to more competitive digital infrastructure and services. It should also stimulate the private sector by facilitating access to financing for start-ups and young entrepreneurs.

In December 2020, an important memorandum of understanding was signed by the Ministry of Education *(Ministère de l'Education nationale, de la Formation professionnelle, de l'Enseignement supérieur et de la Recherche scientifique),* the Ministry of Industry *(Ministère de l'Industrie, du Commerce, de l'Economie verte et numérique)*, BAM, and the Economic Interest Grouping of Mobile Payment in Morocco *(Groupement d'intérêt économique du paiement mobile au Maroc)*. This agreement intends to dematerialize government aid payments to households. It concerns the various conditional cash transfers that would be paid to poor and vulnerable households under the "Tayssir" schooling support program. In its implementation

[18] Declaration of Jesko Hentschel, World Bank Director of Operations for the Maghreb (Agence Marocaine de Presse, 2020).

modalities, this protocol should boost the use of mobile payment. In this sense, the protocol specifies that households would receive these transfers in their accounts opened with payment or banking institutions. They could then use their funds to purchase goods and services via mobile payments at all businesses or withdraw them from the counters of these banks. A first phase of this operation would take place in four pilot provinces before its implementation throughout the country.

To increase the financial integration of very small, small, and medium-sized enterprises, banks have also set up mechanisms to support the financing of start-ups by drawing on the capital markets and using digital applications. According to professionals, recent trends show a growing interest and an increase in investments in start-ups related to Blockchain and artificial intelligence that allow new types of financial operations.

Microfinance associations, which were previously relatively discrete actors in the financial market, have also been called upon to deploy components of this strategy. These associations are in closer contact with the target populations. It was stressed by officials that the sub-sector's legislative and regulatory framework will be modified and adjusted to transform some of these associations into official credit establishments.

For all these new mechanisms, the essential prerequisites, including financial literacy, should be ensured to guarantee maximum accessibility, but also, and more importantly, to control the risks related to the different technological choices. All operators must be involved, each in their own specific field, to increase the trust and awareness of potential users. Some of the latter are afraid for the security of their personal data.

To conclude this section, it appears that all stakeholders understand that the digitalization of the financial sector will improve and facilitate access to various financial services, particularly in rural and remote areas where there is no traditional banking infrastructure. It is particularly in these areas that live the poorest and most excluded populations that require efforts in terms of financial inclusion. If part of these populations can gain access to these services, poverty could be significantly reduced by access to savings, credit, and job creation. Households and small firms would invest more and better in more productive assets, which could help trigger economic and social transformation, as has happened in other Asian and African countries.

At the same time, digitalization can improve the efficiency of financial institutions through the virtual generalization of online operations (salary payments, transfers, withdrawals, bill payments…etc.). It can also facilitate the emergence of new services and actors through a faster diffusion of new technologies. This dynamic would allow firms to access new markets that were not previously accessible in a win-win configuration through e-commerce and digital payment.

As any structural transformation, digitalization requires the involvement and commitment of several stakeholders. It also implies the realization of investments that could be significant and that must be planned and realized at different levels. In this context, an agreement between the government of Morocco and the World Bank Group has been signed. The international financial institution committed to supporting Morocco at the juridical, technical, and financial levels in the implementation of this ambitious transformation.

Of course, there is still the demand side of households that needs to be stimulated to use these services at different levels. The adaptation of the products and services offered must consider the different profiles of Moroccan households and their characteristics (income level, education level, economic activity...etc.) to identify ways to divert them from their preference for using cash. One of the sectors that cannot develop adequately without this trust is the e-commerce sector.

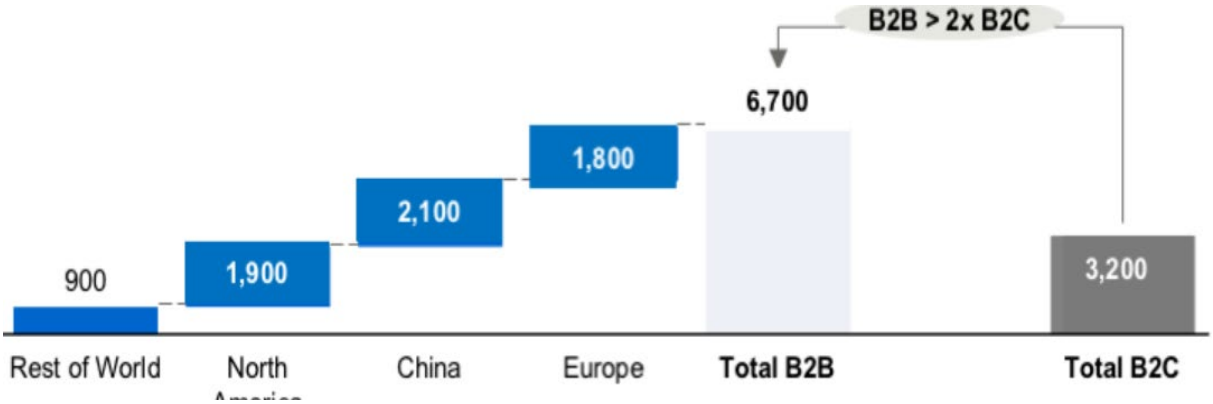
5. E-commerce in Morocco: Challenges and ways for progress

The development of e-commerce requires a set of indispensable and interdependent prerequisites. The following sub-sections examine the prerequisites for the development of e-commerce in Morocco before exploring the avenues for progress in this sector.

5.1. A timid sector that gives rise to various concerns

E-commerce is experiencing a sustained development on a global scale to the detriment of traditional trade. In doing so, it is profoundly modifying relations between companies as well as between companies and consumers. Its progression leads to the transformation of traditional trade and contributes to the growth of international trade.

Figure 5.1. Ecommerce B2B vs B2C in 2020 (USD billion)[19]



Its global value was close to USD 25.6 trillion in 2018, 83 percent of which will go to the business-to-business (B2B) segment and the rest to the retail trade aimed at end consumers (B2C).[20] This value continues to grow in double digit rates but with very pronounced inequalities both by segment and by geographical region. By region, China remains the main

[19] Source: Fostec & Company (2021).
[20] UNCTAD (2020a)

player in this sector, followed by the United States. Of the three companies that dominate the e-commerce retail sector and hold more than 60 percent of the world market, two are Chinese. They follow Amazon, the American market leader.

Contrary to common perception, the B2B segment remains more attractive for at least two reasons: its level and its low share in total B2B trade, which does not exceed two to three percent, confirm that the growth potential of this segment remains greater. Some estimates predict an annual growth rate of ten percent in the B2B segment over the next five years.[21] As for the B2C segment, its penetration rate exceeds 16 percent. This segment has been growing at double-digit rates exceeding 17 percent over the last two years.

In Morocco, as in Africa, e-commerce remains at a low level and below its potential. If we refer to the UNCTAD (2020b) index which indicates the relative strengths and weaknesses of the different elements of the e-commerce process, Morocco is ranked 81st out of a sample of 151 countries (see Table 1). This index is based on four criteria:

- Share of people using the Internet (PUI);
- Share of people with a bank account (PPC);
- Server security (SIS);
- Postal delivery services (UPU).

Out of a maximum score of 100, Morocco attained a score of 50.9 in 2018 compared to 44.3 in 2015. Morocco is thus among the top ten African countries according to the UNCTAD 2016 index. It occupies fifth place. It is preceded by Mauritius (first), Nigeria (second), South Africa (third), and Tunisia (fourth). Morocco moved up one position ahead of Egypt, which ranked third in the 2015 index ranking.

Table 5.1. Comparative ranking of Morocco in relation to the index

Pays	PUI	PPC	SIS	UPU	e-CI	Evo[22]	Rank of Africa	Rank of world
Netherlands	**95**	**100**	**100**	**90**	**96.1**	**-0.1**	**-**	**1**
Singapore	**84**	**98**	**98**	**100**	**95.2**	**1.8**	**-**	**2**
Mauritius	55	90	56	66	66.9	-7.2	1	55
Nigeria	42	40	52	85	54.7	5.5	2	75
South Africa	59	69	83	0	52.9	-1.9	3	77
Tunisia	56	37	51	63	51.7	2.1	4	79
Morocco	**62**	**29**	**54**	**59**	**50.9**	**NA**	**5**	**81**
Ghana	39	58	45	53	48.8	7.6	6	85
Chad	**5**	**22**	**2**	**0**	**7.4**	**0.7**	**43**	**150**
Niger	**10**	**16**	**0**	**0**	**6.6**	**2.4**	**44**	**151**

* Source: Adapted from UNCTAD (2020b)

[21] See Forester (2019).
[22] Variation of index from date of 2016-17.

ANRT (2020b) reveals that Moroccan companies make about 8.4 percent of their purchases online, for an amount not exceeding four percent of the total volume of purchases in 95 percent of cases. This poor performance could be explained by the lack of trust in legal guarantees and the low use of online payment solutions.

The impact assessments predict positive effects of e-commerce on job creation in NTI-related activities and contribute to the transformation of jobs in traditional commerce. It promotes the growth of companies that succeed in increasing their turnover through their online presence and boosts their exports. It also presents the risk of increased imports at the expense of local producers and raises concerns among governments about its impact on employment, tax erosion (especially in the face of transfer pricing by multinationals and the development of C2C trade), the proliferation of fraudulent activities, and the circulation of illicit goods.

Whatever the drawbacks or concerns that e-commerce may cause, experts agree that it will continue to develop and will invite itself by its own momentum, even in the most remote countries of the world, as it meets new needs with tools that are increasingly effective and adapted to consumer requirements. It would therefore be appropriate to accompany its development instead of suffering from its development and reacting late to its drawbacks.

5.2. Complementarity and competition with traditional commercial channels

E-commerce is considered capable of eliminating channels of commercial intermediation in favor of a direct relationship between producers and consumers. Far from being verified by proven scientific research, this issue is giving rise to great fears at both wholesale and retail levels with its various segments (local, large, and medium-sized stores and informal trade).

Regarding wholesale trade in Morocco, certain segments of this sector benefit from substantial margins, which constitutes an incentive for the development of e-commerce. This is particularly problematic for wholesale trade in the broad agri-food industry. If we take these products as an example, a distinction should be made between the wholesale trade in agricultural products, the network of which is dominated by local authorities and the wholesale trade in agrobusiness products, which is dominated by the networks of wholesalers generally based in Casablanca.

The first generates local taxes and rents to agents who fiercely resist change. The second finds its roots in the extension of the commercial structures built by the large families of the Souss region, which have dominated the network of local trade distribution in Morocco for decades. The wholesale trade sector in Morocco has been able to resist the wave of modernization induced by the advent of large supermarkets. However, the introduction of e-commerce in these sectors may effectively upset the established rents.

Regarding the relationship between e-commerce and the large and medium sized supermarkets (GMS), the latest analyses rather confirm a tendency towards

complementarity. International trends confirm that supermarkets are increasingly turning to the Internet as a distribution channel to improve efficiency and take advantage of the productivity gains it generates. At the same time, e-commerce players are moving towards traditional points of sale.[23] The two types of business models are converging towards an integrated multi-channel system bringing positive synergies between the traditional stores and the Internet to get closer to the customer and their requirements.

This trend is confirmed in Morocco, where the main supermarket chains are increasingly launching the development of applications enabling Internet shopping and home delivery. The COVID-19 pandemic has accelerated this process, which is likely to be reinforced in the short and medium term.

Moreover, the analysis of the potential complementarity and competition between e-commerce and traditional retail trade remains difficult to identify, especially in the context of developing countries where retail trade remains one of the main distribution channels both in its formal form (sedentary retailers such as grocers, drugstores, butchers, vegetable growers…etc.) and in its informal form (street vendors).

From the outset, we can highlight that this type of trade remains the direct competitor of e-commerce in the context of developing countries. Because of its proximity to customers, retail trade considerably reduces the attractiveness of the main advantage offered by e-commerce, namely delivering to the customer on time and at the desired location. In addition, traditional retail trade does not require any computer knowledge from the side of customers, which allows it to monopolize the entire illiterate population.

Similarly, it often offers flexible payment modes to its customers. Moreover, in some large Moroccan cities, and particularly in neighborhoods where the relatively high-income middle classes are concentrated, traditional retail responded to this market transformation by implementing a home delivery service through courier networks paid for delivery by the customers' tips.

In terms of market share, urban retail trade in Morocco accounts for nearly 55 percent of total retail trade, a major part of which (45 percent) goes to traditional grocery shops and artisan distributors (butchers, vegetable growers…etc.). Urban itinerant merchants and weekly rural souks represent a share of 28 percent, while the share of large and medium-sized stores is limited to 17 percent. The retail trade employs 1.4 million people. According to internal studies from the Moroccan administration, the sector provides one out of five urban jobs.[24]

[23] As an example, Ebay has again realized that product presentation and display are paramount and has started to use catalogues and physical points of sale. Carrefour, for its part, has implemented an e-commerce strategy to position itself in the non-food trade.
[24] We were able to consult this report which is not available for public dissemination.

The urban retail trade suffers from significant weaknesses linked to the pressures it is subject to from both itinerant informal trade and that of large and medium-sized stores, among other things. These pressures are likely to push urban retail trade more towards itinerant informal trade than towards modern forms of commerce. The figures for the last few years confirm that it has a greater tendency to decline in favor of itinerant traders than in favor of large and medium-sized stores.

For several years now, the classic traditional commerce sector has been undergoing a difficult transition with a high risk to employment. The support measures implemented today have attempted to ensure its modernization and reduce the effects of its decline in favor of medium and large stores and itinerant traders.

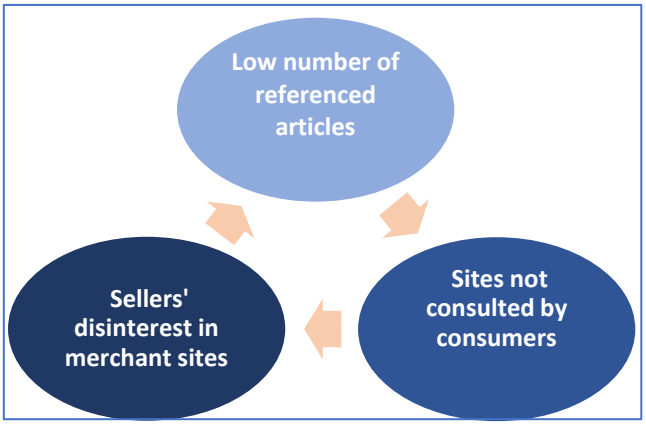
The advent of e-commerce would be a third factor in the destabilization of traditional stores unless bridges of complementarity between the two types of commerce succeed in modernizing traditional stores and ensuring their transformation towards a new positioning in the value chain of e-commerce and large and medium-sized stores.

Finally, informal trade is a real competitor to e-commerce because it meets the needs of a large part of the population with limited income. It benefits from channels that are developing on the fringes of legality and are fed, among other things, by smuggled low-end products and a range of informal production activities. Given that this sector serves the most underprivileged sections of the population with a predominantly low level of education or even higher illiteracy, it is not likely to be disrupted by e-commerce and will continue to provide hundreds of thousands of precarious low-paying jobs.

5.3. A vicious cycle to be broken

E-commerce is an area of trade which makes both supply and demand converge for finished goods through B2C and B2B transactions. Like any market, e-commerce platforms would be better served if a larger variety of products could be exchanged. Indeed, a merchant site cannot interest consumers without a minimum mass of products and services referenced, nor can it interest sellers without a mass of potential customers visiting the site.

Figure 5.2. Vicious cycle of under-referencing



As with e-commerce platforms in developing countries, Moroccan e-commerce sites suffer from the vicious cycle of under-referencing which constitutes a first handicap to the development of this sector. This vicious cycle becomes more debilitating when one opts to open to international trade. Indeed, the more international trade is liberalized, the more accessible foreign sites become. If they have a more diversified and competitive offer, they will attract more referencing and reinforce the vicious circle of under-referencing because even national producers would prefer sites that would give them more visibility on the web. This vicious cycle seriously handicaps the emergence of Moroccan e-commerce platforms capable of competing with the international giants of the sector such as Amazon or Alibaba.

Moreover, e-commerce is a two-way business for the company. It can be a means of supply and a sales channel. The company could order its inputs using B2B e-commerce sites and, on the other hand, it can sell its products and services on B2C sites if it manufactures finished products or on B2B sites if it manufactures semi-finished products. The e-commerce development strategy of SMEs should integrate both the procurement aspects of the company and the marketing of its products and services.

In this respect, an e-commerce strategy cannot be developed independently of a strategy for the digital transformation of companies. E-commerce requires a reactivity adapted to the virtual world, which is in constant transformation. Traditional management and marketing methods cannot satisfy this requirement. Companies wishing to develop e-commerce must have a digital transformation strategy.

It is clear from the above that without a strategy to support digitalization, particularly for SMEs, it would be difficult to envisage the development of e-commerce on a sound basis. In Morocco, SME support agencies (such as Maroc PME) offer some support for digitalization and integration into e-commerce, but their impact remains limited and deserves to be reconsidered in the context of a global vision of development of the digital economy.

Moreover, e-commerce does not recognize borders. Any strategy in this area must be based on the goal of integration into the new global economy. This integration cannot take place without a competitive supply capacity and positioning in global value chains. Morocco has already initiated sectoral strategies capable of ensuring the development of its production supply and its adaptation to the evolution of the international context. It is necessary, in this respect, to define the ways and means to integrate the requirements of e-commerce into these strategies.

In this respect, the Moroccan export supply can be stratified into four main sectoral categories:

– Global, with value chains articulated around the buyer that can be the subject of B2C e-commerce at destination:

- All markets for non-perishable goods (clothing, leather goods, basic hosiery, argan oil, canned sardines, handicrafts…etc.) and services such as tourism and certain segments of the NIT;
- Local markets for perishable or short-cycle goods (tomatoes, oysters, fresh frozen vegetables, fast-fashion textiles…etc.);

– Global, with value chains articulated around the producer that can be the subject of B2B e-commerce at destination:
  - All markets for goods such as phosphate and its derivatives, electrical equipment, medicines, and services, such as Information Systems (IS) services;
  - Local markets for goods and services, such as aircraft parts, cars and spare parts, offshoring-call centers, cement…etc.).

Morocco does not fully exploit its export potential. In Europe, an important potential for B2C and B2B exchanges remains untapped both at the level of the traditional markets (France, Spain) and at the level of the adjacent markets (Germany, Italy). In Africa, the export potential of the continental commodity chains is also poorly exploited. In the other regions of the world, the presence of Moroccan exports can be reinforced for the global commodity chains.

5.4. Relatively expensive and unevenly accessible infrastructures

The development of e-commerce depends on telecommunication infrastructure and e-payment platforms, as well as the cost of using them. The telecommunications infrastructure includes all equipment and subscriptions to fixed and mobile telephony, Internet access, Internet service providers, the stock of microcomputers and servers, and all the other essential equipment without which e-commerce cannot take place and develop.

In Morocco, nearly 80.8 percent of households have access to the Internet, but less than 4.8 percent have access to fixed-broadband. The number of smartphones is estimated at more than 15 million and the mobile penetration rate exceeds 128 percent. Morocco's progress in terms of telecommunications infrastructure places it among the best performers in Africa, but this infrastructure is more suited to communication needs and its use remains limited in terms of e-commerce (ITU 2021a).

The infrastructure necessary to take full advantage of e-commerce requires high-speed connections both nationally and for international connections. The access price in an important factor for e-commerce development. Similarly, a reliable and affordable electricity network infrastructure is essential for the continuity of telecommunication services.

According to the ITU, 64.9 percent of the population benefits has access to mobile broadband subscriptions (ITU 2021a). This rate has reached more than 80 percent in developed countries and does not exceed 33 percent in most developing countries. Internet use is more prevalent in the 15 to 24 age group. The low purchasing power, the high illiteracy rate, the relative dispersion

of rural populations, and the lack of a real equalization model are at the source of the low coverage in rural areas by mobile and fixed telecommunication networks. Similarly, the proportion of women using the Internet is 12 percent lower than the proportion of men. This gap reaches 25 percent on average in Africa.

In Morocco, mobile Internet access accounts for more than 94 percent of Internet subscriptions. Moreover, the country is considered one of the countries in the region where the Internet has been accessible more rapidly. The liberalization policy adopted by the government since the end of the 1990s contributed to this development. This policy has been consolidated in recent years by the launch of the 4G/4G+ networks and the introduction of very high-speed fiber-optic connections.

The elements set out above show that, notwithstanding the cost of Internet access, which remains relatively expensive in Morocco, the offer of Moroccan operators is varied and is in line with what is done in other countries. As a result, Internet access could not, in our opinion, be considered an obstacle to the development of e-commerce, at least in urban areas.

One way of reducing this inequality would be to impose a kind of equalization on Internet access providers, to make urban users bear part of the additional costs of access to rural areas (induced by the low use of networks for reasons of consumer density) or by allocating part of the providers' margins to finance these additional costs.

Online payment conditions seem to be one of the handicaps of e-commerce platforms in Morocco. Payments on delivery and cash payment for purchases on e-commerce sites represent more than 90 percent of payments when excluding government services and tourism services (hotels, airplanes, car rentals).

It is clear from the above that despite a relatively advanced rate of bank penetration, the use of e-payment remains limited, if not marginal. The lack of digital trust among consumers and the cost of electronic payments for vendors combined with a large proportion of merchants' preference for cash are the main reasons limiting the use of electronic payments.

In terms of transport infrastructure and logistics, Morocco has made undeniable progress. However, the logistics infrastructure remains relatively inadequate to the requirements of e-commerce. These requirements include having fast, traceable parcel delivery services covering both the national territory and the rest of the world at affordable prices and using universal systems of addresses and postal codes, among other things.

The transport and logistics infrastructure must also be based on simple, efficient and dematerialized trade procedures, particularly in foreign trade, in order to avoid bottlenecks at

ports and airports or customs clearance problems. These procedures must also facilitate international returns and tax refunds.

Morocco has several transport and delivery providers for e-commerce both nationally and internationally. According to these operators, the average delivery time in Morocco is around one week. The price of the delivery of small parcels (below one kilogram) compared to the prices of the most sold products online (clothing, beauty products, cosmetics) is high, which constitutes a significant constraint to the development of e-commerce in Morocco.

The high cost of logistics for delivering abroad is a major constraint to the development of exports via e-commerce platforms. The prices proposed by national and foreign service providers for the service of dispatching parcels, especially of low weight, are expensive compared with the prices of the products sold for export by Moroccan e-commerce service providers.

5.5. Digital trust, support for SMEs, and governance to be strengthened

Morocco has already put in place a legal mechanism to create and strengthen the conditions for digital trust, such as the law supplementing the penal code on offenses relating to automated data processing systems and the law on the electronic exchange of legal data and the protection of personal data.

Moroccan legislation does not contain a specific law on e-commerce. This type of commerce is governed mainly by the Commercial Code and Law 31-08 enacting consumer protection measures. Aspects specific to e-commerce are specified in the laws governing Internet promotion, online sales, electronic payment, and delivery. Overall, more than eight laws regulate e-commerce directly or in a complementary manner in Morocco.

The Moroccan legislative framework, particularly Law 31-08, includes aspects relating to the online publication of the legal notices that e-commerce sites must contain (the commercial name or company name, the address of the registered office, the company's telephone number, the name and address of the host of the company's website, the name of the person responsible for the content of the site), and the general terms and conditions of sale (stages of the sales contract, information on delivery times and methods, withdrawal periods, information on the conditions of reimbursement…etc.).

The banking law revised in 2014 allows for the development of new means of payment, such as the electronic wallet (e-wallet) and electronic money (e-money). The law contains a new definition of payment institutions, such as relay points, for the collection of payments upon withdrawal of purchases.

Morocco has also undertaken other initiatives to support the development of the e-commerce sector, including the development of the Code of Conduct of the “e-thiq@” Label, which is a

hallmark of trust for merchant sites, and the development of a General Terms and Conditions of Sale model that sets the conditions for online sales.

In addition to the aforementioned national legal arsenal, and with a view to strengthening its regional and international cooperation in the field of digital confidence building and the fight against cybercrime, which are essential pillars for the development of the digital economy and e-commerce in particular, Morocco has acceded to several regional and international multilateral conventions. Analysis of the consistency of the Moroccan legislative framework with the main aspects of the European Union's "community acquis" (*acquis communautaire*) confirms that Moroccan legislation converges with that of the community, except for certain provisions relating to conditions on the transparency of online advertising, the limitation of prices of telecommunication services and online payment charges, and banks' reimbursement of fraudulent or duplicate online payments, among other things.

Despite these advances, digital trust is difficult to establish and remains one of the main obstacles to the development of this activity; Moroccan consumers are still struggling to take the step of e-commerce. According to the ANRT (2020a) survey, the lack of digital trust is the biggest reason for reluctance to buy online.

The low level of consumer understanding of the benefits of e-commerce also makes it difficult for the sector to develop. A proportion of Internet users in Morocco have a poor understanding of the mechanisms of e-commerce and of the benefits of online payment. The language barrier is largely behind this; most Moroccan commercial sites present content only in French. A certain proportion of consumers needs access to Arabic content in order to be able to better choose the products and services to be purchased and understand in detail the general terms and conditions of services. In addition to this language barrier, Moroccan consumers have a low level of information on the legal and regulatory measures put in place for the development of the digital economy and the enhancement of the digital security of e-commerce.

Furthermore, as mentioned above, the development of e-commerce must be part of a global approach to the digitalization for companies. An e-commerce project requires a transformation of the commercial and marketing activity, a definition of the offer, a digital management of resources, an adaptation of operations, human resources training, integration of the information system…etc.

The support provided to companies by public agencies must give priority to shared and collaborative solutions. In this respect, it would be advisable to give priority to sector-based approaches and to differentiate support according to the nature of the products and the target markets.

Moreover, having appropriate human resources is an essential condition for the development of e-commerce. In fact, e-commerce requires the availability of workers with specific skills grouped into three categories:

- Communication and e-marketing professions: web product manager, online sales manager, Internet committee leader, referencing manager, affiliation manager, web marketer…etc.;
- Interface design and digital creation professions: web functional project manager, web technical project manager, web designer, web developer, multimedia developer, web integrator, web ergonomist, web graphic designer…etc.;
- Production and content management professions: e-merchandising manager, webmaster, web editor…etc.

In addition, several non-specific professions are also essential for the implementation of an e-commerce solution. At least four categories are concerned:

- Sales and customer relations professions: partner relations manager, customer relations manager, business developer…etc.;
- Supply chain professions: supply chain project manager, warehouse manager, logistics agents…etc.;
- Information technology professions: functional analysts, database architect, network systems architect, web security engineers, test and qualification managers, production and operations engineers…etc;
- Sourcing and other professions: purchasing and procurement managers, CRM managers, data managers…etc.;
- Information technology professions: functional analysts, database architect, network systems architect, web security engineers, test and qualification managers, production and operations engineers…etc.

Educational institutions in Morocco offer several vocational training courses in information and communication technologies, the Internet, and the development of e-commerce sites. However, this offer needs to be further diversified.

Support must also focus on organizing the collection and processing of information on e-commerce, the aim being to enable both public and private operators to be attuned to the dynamics of international exchanges and to adapt quickly to their trends. This requires a capacity to process "big data" through a high-performance economic intelligence and monitoring system.

The public institutional management of e-commerce in Morocco is split between several ministerial departments and public and semi-public establishments. Non-governmental organizations with an interest in e-commerce have been created and their development reflects an awareness of the issues of the digital economy. Being horizontal in nature, e-commerce cannot develop without the coordination of all the contributors to its value chain. To date, this coordination has not taken place in a formal and institutionalized manner.

6. Digitalization of agriculture in Morocco

The agricultural and agri-food sector is a central cog in the Moroccan economy and can contribute to economic growth, job creation and the improved well-being of citizens. According to the World Bank (2019), the sector contributes 15 percent of GDP, 23 percent of exports, and 30 percent of employment. The sector has grown faster than the rest of the economy since 2000. In rural areas, 80 percent of jobs are in the agricultural sector. (World Bank 2019).

Like other countries in the world, Morocco's agricultural sector is facing major challenges related to climate change, population growth generating increased demand for food, globalization, population movements, water stress and increased pressure on arable land, the digital divide, low literacy in rural areas…etc. (HCP 2011). For Louali (2019), Morocco's agricultural sector faces several challenges. These are the challenges of water management in the context of climate change, sectoral integration and value added through the transformation of agricultural production, the balance of trade balance in agribusiness, and adaptation to changes in global markets for food. Louali (2019) also raises two major issues facing the agri-food sector, namely the challenges of inclusiveness of agricultural policy and the challenges of digitalization of agriculture. According to Lacirignola and Albis (2016), Mediterranean countries add to these challenges the scarcity of natural resources and produce more and better. In this context, all available options should be considered and permanent innovation in the agricultural sector should be at the center of the adopted strategies.

Faced with these challenges and the inadequacies of the Plan vert Maroc, the government launched the Green Generation strategy, which aims to modernize the agricultural sector. A component of this new strategy is based on the digitalization of agricultural services. According to Lahlou (2019), the digitalization of agriculture will be done at two levels: 1) to assist agricultural governance for the implementation of the Green Generation Plan, and 2) to use it as a decision-making tool for farmers and agribusiness.

Strengthening the digitalization of Moroccan agriculture was announced by the Moroccan Minister of Agriculture since the beginning of 2019 at the World Food and Agriculture Forum in Berlin, highlighting the progress made in this area, including the use of satellite images, the Internet, and cell phones in agriculture.

According to the World Bank (2019), there is a potential to leapfrog from traditional agriculture to digital agriculture. This is key as the next shift in agricultural productivity will come from the digital agricultural revolution. All parts of the chain will be transformed to ensure real-time optimization, lead to greater food security, and improve the profitability and sustainability of the agricultural sector (World Bank 2019).

There are many challenges to transform this sector with the risk of installing a digital divide. The World Bank (2019) and Trendov et al. (2019) highlight three conditions for the transformation of the sector: availability of infrastructure in rural areas, education and digital literacy, and the

implementation of policies and programs to enable the transformation. For Louali (2019), the digitalization of agriculture offers great opportunities. It would transform the intensive production into precision agriculture. Digitalization should concern several areas of agriculture through various tools, including drones (to map plots, measure water needs…etc.), connected tractors, probes (to measure temperature, precipitation, humidity…etc.), as well as connected stables (automatic milking machines, supply of adapted food rations). These new data sources, combined with the connected networks and weather data, provide a flow of information that contributes to improving the efficiency of agricultural activities. These tools would help reduce risks and introduce automated monitoring by improving economic and environmental performance.

Lahlou (2019) identifies five technological innovations that will contribute to the digital transformation in Morocco, namely IoT, big data, blockchain, machine learning, and analytical tools. He also identifies the eight challenges facing the agri-food sector that can be addressed with digitalization: asymmetric information, access to inputs, access to information and training, access to markets, access to financial services, traceability, warehousing and logistics problems, and, finally, quality and real-time information for governments and regulators. According to Lahlou (2019), the digitalization of agriculture is a central objective of the department of agriculture and it is implemented under four main axes: increasing organizational synergies; providing the steering and performance monitoring information necessary for governance arrangements for the department; promoting exchanges internally with the departments and organizations and in cooperation with partners; and, finally, building an open and scalable IS guaranteeing security and availability.

Isaac et al. (2015) make a series of recommendations to meet the challenges of inclusive digital agriculture. The 16 proposals include: guarantee broad network coverage, support farmers' equipment with digital tools, involve cooperatives in the digital training of farmers, set up open data programs on certain commodity chains, use sensors to facilitate traceability, encourage automatic and intelligent traceability, and free up funding to support foodtech champions.

According to the Ministry of Agriculture, the digitalization of agriculture will strengthen innovation and improve productivity, traceability, and marketing. In addition, it promotes the social and financial inclusion of the rural world through mobile banking and new products that make banking and financial services accessible to the entire rural population (the ministry press release was included in Moroccan newspaper *Le Matin* on 13 February 2020). As part of the Green Morocco Plan (2008), the government has implemented a number of programs contributing to the digitalization of the agricultural sector such as the IS on the prices of agricultural products (Asaâr), the Crop Growth Monitoring System, the digital agricultural management service offered to large cooperatives or producers (World Bank 2019). For example, the Ministry of Agriculture's System of Agricultural Aid and Subsidies (SABA) allows for the digital processing of files for all agricultural support programs. The ministry also set up an international market monitoring system (EACCE) and an identification and traceability system (SNIT) (Lahlou 2019).

There are also private sector initiatives, including electronic banking solutions (fintech) such as Onepay, which will offer digital wallets, electronic payment services, and e-commerce platforms that increasingly integrate the agri-food sector. OCP AgriEdge developed e-commerce platform AgriSoo9 in 2020. This platform is dedicated exclusively to farmers and agriculture cooperatives to sell their production. OCP Group has also set up several initiatives such as the NPK smart blender technology, which allows for the production of a fertilizer adapted for each producer according to the soil analysis (carried out by the Al Moutmir-Mobile Labs program) and the type of production planned, as well as the Agribooster initiative (OCP Group 2020 and Lahlou 2019). French company ISAGRI has also been a key player in the deployment of agricultural production management software in Morocco. This software is used for the management of plots and orchards. SOWIT has also been active in providing access to drones to improve cost management and increase productivity for farmers. Finally, we can cite the case of the ATTASSIR digitalization project of Cosumar (major and lone sugar producer). This project was awarded a digitalization prize by the Food and Agriculture Organization (FAO). This project involves more than 80,000 farmers and all stakeholders in the production chain of the company in Morocco, including digital start-ups. Their system has been very effective and useful for production management during the pandemic (Vie Eco 2020). These initiatives are coherent with the Maroc Digital 2020 Strategy, which provides the vision for the development of the digital economy of which agriculture holds a central part. The three pillars of the plan will contribute to stimulating and accelerating the transformation of the agricultural sector.

As HCP (2011) points out, the agricultural sector is an important tool for poverty reduction in Morocco. Thus, the transformation of the sector would be a central condition for the achievement of this objective. It would be timely to explore these different avenues of technical progress and analyze their impact on employment in the agricultural sector, income disparities, and poverty reduction. An important dimension that deserves attention would be to analyze the impact on social disparities in the rural world in the context of the risk of the digital divide cited above.

7. Conclusion

As we have seen, Morocco is also faced with uncertainty related to the impact of digitalization on the labor market. The country needs to prepare itself in order to reap the benefits of this transformation, but also to limit the negative impacts it could have in terms of employment and growth. Means are already in place, such as the Maroc Digital 2020 strategy. The pandemic has highlighted the need to accelerate this transformation in order to offset the negative impacts on the Moroccan economy. Also, according to Benabdeljalil (2020), “it is possible that the solution for the victims of the digital transition will come from digitalization.”

Continuing efforts, particularly by facilitating access to a quality network, will increase productivity, create new job opportunities, and make the labor market more flexible. In addition, this access should also enable the development of human capital from school to vocational training. Finally, the government's role will be predominant in this transformation to ensure the redistribution of the wealth that will be created in society and thus reduce inequalities that could increase if action is not taken.

To this end, several e-gov strategies have been implemented in Morocco with mixed impacts and low levels of coordination. This has limited their scope and effectiveness in relation to their objectives. The COVID-19 pandemic has certainly accelerated the process of digitalization of public administration in Morocco, but without overcoming the handicaps related to the low level of coordination of the programs implemented within the framework of a global approach.

In addition, the digitalization of the Moroccan financial sector seems to be essential to ensure its sustainable internal and external competitiveness. The adoption of digital technologies in this sector will promote economic growth. In recent years, there has been competition among the various national banking and financial institutions to introduce the innovation of new digital products and for the adoption of new financial technologies (fintech). The objective is naturally the provision of efficient banking products and services to the population (households and companies).

The low penetration of financial services among households in Morocco can be explained by low income levels. It can also be partly due to the mismatch of banks' products and the needs of part of their potential clients and to the high use of informal financial services. The most effective way for the bank to reach this part of the Moroccan population and increase the number of financial transactions needs to be found as soon as possible. Thus, the digitalization of financial services could significantly increase access to financial services in Morocco, as has been observed in other African countries.

At the same time, e-commerce, as a sector that promotes and facilitates business, may also have a significant impact on traditional business structures. However, it does not seem to grow sufficiently fast in the country. Several prerequisites are not fully in place to ensure an appropriate level of development and growth of this sector. The rents from commercial intermediation and their resistance to change, combined with the development of street and informal commerce, constitute major challenges to the development of this sector, with a cross-cutting impact on all economic activities.

The agricultural sector plays a central role in Morocco's economy and society. This sector here and elsewhere faces many challenges. The digitalization of the agricultural sector is seen as one of the solutions to meet some of the many challenges of the sector. However, for this digitalization to be effective, three conditions must be met or satisfied: infrastructure, education, and support programs. In this context, the Moroccan government, through its digital strategy in general and through the Generation Green program, places digitalization at the center of its future development strategy (whether for the agricultural sector or for the economy as a whole). The Ministry of Agriculture has already put in place several programs and projects to digitize the agricultural sector and the private sector is also very active at this level. However, much work remains to be done to ensure that a digital divide will not take hold and that the digitalization of agriculture can help reduce poverty in Morocco.

The analysis of these different sectors confirms that success in digital transformation will shape the performance of the Moroccan economy in terms of employment, growth, and reduction of inequalities. It also confirms that the state of evidence available and the current level of scientific research hamper the emergence of academic work that could eventually provide effective support for business strategies and public policies. Strengthening research in this field is becoming a task of utmost urgency. This paper is only the first step in this direction.

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