A Strong Dynamic Financial Growth of Moroccan Family SMEs: What Feasibility of Artificial Intelligence?

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ABSTRACT: Artificial Intelligence (AI) has become a priority for the Moroccan government recent years. As a tool "of today and the future," artificial intelligence interferes in all economic aspects, allowing better decision making and evolutionary financial growth of companies in the market. Between fear and excitement, artificial intelligence is frequently perceived by the public as a very sophisticated and complex technology to implement. For some, cognitive AI takes on a human form, a rather caricatured perception that echoes within some organizations. To optimize the digital transformation of family firms, demystifying AI is an essential prerequisite. This work highlights the importance of adopting intelligence in the practices of Moroccan family SMEs. An empirical study corroborates our postulates regarding the dynamism and feasibility of artificial intelligence for the financial growth of Moroccan family SMEs.

KEYWORDS: Intelligence, financial growth, Moroccan family SMEs, Digital transformation, challenges, opportunities

Introduction

Mid-sized companies want to integrate AI and are most likely to reap the benefits of early adopters, typically AI-based software companies that address business problems. According to a study commissioned by Dell Technologies & Intel, companies that have invested in AI have, on average, improved their customers' spending by 18% (Statista 2021). Yet, 40% of European startups considered AI companies are not using the technology in any meaningful. So, for small and medium-sized companies where investments can be key, understanding AI in its entirety is crucial to fully benefit from it. The interest and desire of companies to innovate with the implementation of new applications embedding AI is undeniable. Artificial intelligence is a very promising market with a global value that is expected to reach 89.9 billion euros by 2025, compared to 4.06 billion in 2016. The number of companies that have adopted AI-based technologies has increased by 270% between 2015 and 2019 (Statista 2021). However, the term "AI-based technology deployment" is still too generalized and can mean many things. To grasp the true scope of this phenomenon, we need to get back to basics.

Artificial intelligence analyzes and responds to mathematical algorithmic logic and is inspired by natural intelligence. It covers a series of missions, which could require natural intelligence such as problem-solving, translation, speech recognition, and visual perception (Dick 2019). We can already see the major impact of AI in all sectors. Contrary to popular beliefs from science fiction classics, AI does not appear in human form and is far from reaching the level of complexity needed to surpass human intelligence (Acemoglu and Restrepo 2019).

In the early days of AI, there was Data Science with a high degree of interaction between humans and programs (Fetzer 1990). Then, AI can be divided into two categories. The first category is the most recognizable: "general artificial intelligence,"

which is the hypothetical intelligence of a machine with the ability to understand or learn any intellectual task that can be performed by a human being. The second category is "narrow artificial intelligence," which refers to specific aspects of human intelligence and perception, such as face or voice recognition. Today, AI is mostly used in two types of operation: deep learning based on enormous datasets, which keeps learning by penetrating a PB of unstructured data, and expert systems, which allow the progress of an intelligent and interactive environment (Haenlein and Kaplan 2019).

Today, these technologies are everywhere with the growth of automation, from targeted advertising to smart home devices. AI is positively redefining the future of many industries. For small and medium-sized businesses, it is more likely to see AI used for approaches such as document analysis, fraud detection, marketing activities, or sales optimization (Thiebes, Lins and Sunyaev 2021).

Whether descriptive, predictive, prescriptive, or cognitive, the common thread between all forms of AI is the insatiable need for computing power. With the exponential growth of data, there is a real opportunity to collect information to support innovation and the creation of new products and services (Huang and Rust 2018). Nevertheless, there is no single solution since not all data requires the same processing, it is important to keep in mind that the quality of AI depends on the data that feeds it. The first step for companies is to sort through their data and make sure they are compliant with the various regulations, and then become familiar with the AI tools at their disposal.

Beyond the basics, successful implementation of artificial intelligence requires an enabling environment. Like humans, AI is a technology that needs time to learn and solve specific problems. The key to its success will therefore depend on the confidence of organizations in this new technology. Allowing time for these learnings until the desired results are achieved and the application is deployed is essential. Companies also need people who can guide the advancement of AI because often the major issue is that business and IT are not aligned on a data-driven strategy and do not have a clear vision of the expectations of AI projects (Lee, Suh, Roy, and Baucus 2019).

To facilitate the design of AI projects, many frameworks are developed by different companies. Moreover, to simplify access to AI, high-performance computing servers integrate middleware for managing, sharing, and optimizing computing resources, especially GPUs. Finally, to offer a well-structured and flexible approach to AI projects, reference architectures have been designed around use cases. Organizations will be able to understand the importance of AI and question its operational necessity while reducing business risks.

There is no longer a shadow of a doubt about AI and its ability to energize companies large and small. However, mastering this complex technology is not always easy, regardless of company size. Implementing AI strategies is a collaborative process. In the age of technological innovation, the time has come to start harnessing the potential of AI, whose improvement will certainly be boosted by the advent of these new technologies (Thiebes, Lins, and Sunyaev 2021). This paper examines the perception of SME managers towards the opportunities brought by AI. The objective is to explore the results of the adopted empirical study. This study allows a good understanding of the definition of AI in Moroccan family SMEs, as well as identifies the opportunities brought by this revolution and the challenges to be overcome for Moroccan family SMEs.

Firstly, our study has defined the concepts of digital transformation and traces its effects on the strategies of the Moroccan family SMEs. Secondly, the used methodology for the exploratory study is described to highlight the issues and challenges of Moroccan family SMEs. The synthesized results and contributions of this research will finally be discussed.

1. Digital transformation: a promising opportunity for Moroccan family SMEs

Digital transformation, also known as digitization, is still a protean concept; some practitioners characterize it as the changes made about by digital technologies in all aspects of human life (Stolterman and Fors 2004).

As soon as computers appeared, companies found in information technologies an opportunity to organize their work. In many areas, the results of the integration of information technology are very beneficial for the company (an increase in its productivity). Computerization in companies has also contributed to the advancement of computer learning by individuals. The equipment was very expensive at the beginning, the individuals who had access to these technologies were rare. The use of these technologies in the work practice allowed the discovery of the use of information technologies. The company was the institution that advocated the use of these technologies. This is no longer the case with digital technologies. For the first time, technologies are accessible to individuals on a massive scale before they are taken over by the enterprise. If we look at the previous technological disruptions (telephone, fax, Internet, etc.), companies were the drivers (and therefore controllers) of their deployment. In the case of digital technologies, the phenomenon has been reversed and companies are questioning the opportunity to deploy this type of technology to improve their work practices. The company is now short behind the innovations and uses developed by its employees. These technological evolutions, as well as the progressive learning of new practices of information diffusion and management by individuals, have made companies' representations of the impact of information technologies on the organization evolve.

Digital Transformation refers to all actions implemented by a company to integrate digital (Internet-related) technologies into its business (Hamon 2015). In other words, a digitalized company is not only:

- A company that has an e-commerce site because the digital transformation cannot be reduced to support, to the technique. The change is more profound and concerns the company's business models, its approach to the market, its customer relations.
- A company that invests in start-ups, because digital transformation is not only external but also, above all, internal. It concerns above all the processes and mentalities.
- A company that is present on social networks because must first and foremost listen to its customers, suppliers, employees, and all stakeholders.

The digital economy is based on the exploitation of data and more specifically on the valuation of free labor provided by users, "who produce an activity whose positive externalities will, in the form of data, be incorporated into the production chain without monetary compensation for the latter, and from which the digital company creates its value chain" (Fuchs and Fisher 2015). In addition, the management of personal customer data is now at the heart of the company's daily business. Data security and confidentiality are essential enablers for companies, but also potential obstacles. They will have to identify new models of protection and privacy guarantee capable of meeting their expectations and those of their customers.

Digital visibility is expressed less and less on the internet and more and more on social networks. The value of a company is no longer measured by the product manufactured or the service rendered but by the quality of the software, the platform or the application proposed. An icon on as many smartphones as possible has become more profitable than a store in the most prestigious of locations. "But, already, the relationship between the company and its customers is moving from the internet to messaging and social networks" (Belleguic, Coutard, and Doueihi 2011). Also, brands are diversifying their digital communication and are also using influencers, people active on social networks who, by their status, position, or media exposure, can influence consumption

habits. The digital revolution has empowered the consumer who is no longer captive but has become a zapper. The customer now can interact with the company. "Communication has become two-way and interactive, it no longer goes only from the company to the customer, but the latter also has the possibility to respond, react, speak, express an opinion or dissatisfaction. Through his comments on social networks, the consumer becomes, in turn, a consumer prescriber" (Colin et al. 2015). Consumers want tailor-made products. He wants to be produced for him, with him, he wants to be a co-creator, to be listened to, and have his opinion taken into consideration. They have become unpredictable, chameleon-like, and in search of emotions and new "experiences." The new consumer demands mean everything, right away, to be talked to, informed, answered, and treated in a personalized way. Customer relationship management (all the tools and techniques designed to capture, process, and analyze information about customers and prospects, to build loyalty by offering or proposing services to them) has also been revolutionized by artificial intelligence.

2. Issues and challenges of artificial intelligence in Moroccan family SMEs

Long considered a frightening science fiction subject, artificial intelligence today offers new perspectives to companies (Žigienė, Rybakovas, and Alzbutas 2019). In Morocco, as in the rest of the world, the race for data (big data) is launched and its exploitation creates many opportunities. However, the repercussions on the job market and the private life of each individual raise questions that sometimes remain unanswered.

2.1. Demystifying artificial intelligence

Between fantasies, hopes, and worries, artificial intelligence (AI) probably represents a great debate of our time. If the theories on intelligent machines are not new and go back to the 1950s (to Alan Turing's works) (Morgan 2018), it is during the last decade that computers have reached the necessary computing power to realize a good number of projects that were previously confined to science fiction! Marvin Minsky, one of the creators of AI, challenges it as "the construction of computer programs that engage in tasks that are, for the moment, more satisfactorily accomplished by humans, because they require high-level mental processes such as perceptual learning, memory organization, and critical reasoning" (Asaad et al. 2021). AI thus deals with the study, design, and implementation of intelligent machines, involving many areas of computer science and applied mathematics. Here, the term "machine" does not designate a physical object, but rather an automatic system capable of managing information. It is not necessarily a question of robots. Moreover, in an increasingly digital environment, AI does not need to wait for the progress of robotics to have an impact on the world.

2.2. Data at the heart of AI

In the face of the famous big data, which operate with the help of large calculation capacities, AI makes it possible to implement algorithms or more autonomous environments to manipulate these large quantities of data. Today, the latter is democratized thanks to the "clouds", which allow companies to access them remotely at very reasonable costs. Therefore, algorithms are progressing rapidly and responding to a growing number of businesses problems, provided that they are supplied with relevant data, as shown in figure 1. Purchased or recovered via various tools, websites, and connected objects in particular, "data" is at the heart of AI, the information is often available, but it is essential to process it efficiently before hoping to get anything out of it. Indeed, the collection and use of data are governed by a strict legal framework: Law 09-08 in Morocco and the RGPD (General Data

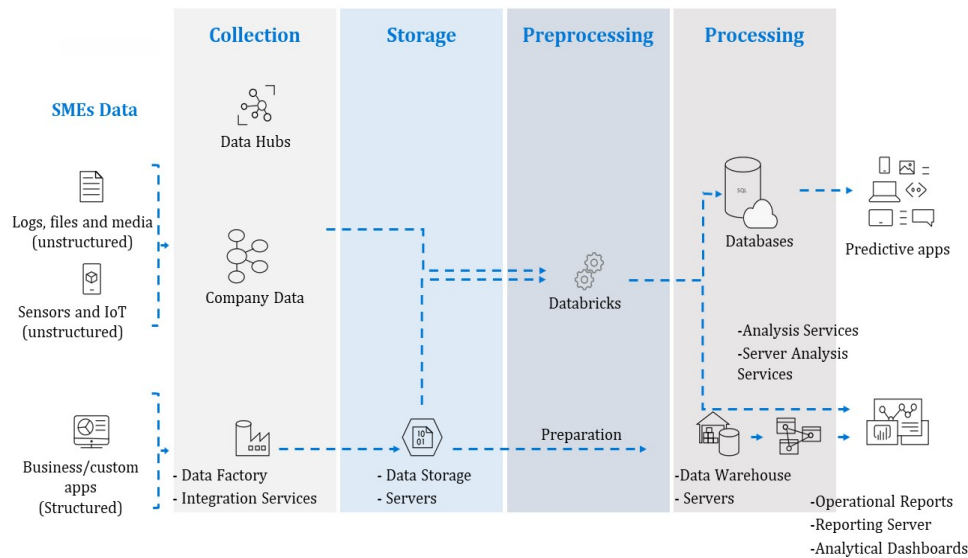Protection Regulation), for companies working with the European Union, impose numerous rules on companies.

Figure 1. AI importance for data management in a Moroccan family SMEs

3. AI adoption in Moroccan family SMEs: an empirical study

3.1. Methodology

The methodology proposed in this study is based on a qualitative approach. This method of analysis favors the search for rich and extensive information. Indeed, the implementation of a qualitative study allows for an in-depth exploration of the phenomena related to the adoption of AI, to the adoption of the function, and to the adaptation strategies to respond to it, the collection of information was established by individual semi-directive interviews.

3.2. Data collection techniques

We opted for remote semi-directive interviews (via telephone, meet and zoom), which lasted, on average, 45 minutes for each case. Through open-ended questions, we let the interviewees express themselves freely to generate the maximum amount of information. We guided them from time to time once they went beyond the subject. Similarly, follow-up questions were asked, using the last words of their answers, to make sure of the meaning they wanted to convey. This interview guide is organized around three research themes, which are:
- The company's perception and maturity towards the adoption of artificial intelligence.
- The opportunities that AI represents for the company.
- Challenges and issues.
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Selected population

The sampling is based on the objectives of our study and aims to constitute its empirical corpus. The size of a convenience sample depends on criteria based on imperatives related to the target population, the context in which the data is collected, and the time available for the survey. Regarding these guidelines, two criteria are highlighted to justify our sample: the size of the sample to know at what point we can stop, and the respect of the context of the study. The choice of the studied SME was made selectively to ensure that the selected case studies meet several criteria. Thus, the use of owner-managers or managers is considered

as a source of information to understand the logic and the digital trend of the studied EMS. This method is recommended by many researchers for its purpose of collecting information and validating the data collected.

Table 1. Description of the information from the Family SMEs studied and the interviewees

Code	Interviewee	Years of experience	City	Activity
SME 1	Manager	10	Agadir	Agri-food
SME 2	Manager	12	Agadir	Agri-food
SME 3	Manager	7	Agadir	Insurance
SME 4	Manager	11	Agadir	Tourism
SME 5	Manager	15	Agadir	Agri-food
SME 6	Manager	11	Marrakech	IT Services
SME 7	Manager	7	Marrakech	Tourism
SME 8	Marketing Manager	8	Marrakech	Studies and consulting
SME 9	Manager	15	Marrakech	Tourism
SME 10	Manager	14	Marrakech	Tourism
SME 11	Manager	15	Marrakech	Tourism
SME 12	Manager	19	Marrakech	Tourism
SME 13	Manager	5	Casablanca	Agri-food
SME 14	IT Manager	12	Casablanca	IT Services
SME 15	Manager	20	Casablanca	Textile
SME 16	Manager	17	Casablanca	Textile
SME 17	Manager	11	Casablanca	Textile
SME 18	Manager	9	Casablanca	Insurance
SME 19	Manager	5	Tangier	Textile
SME 20	Manager	10	Tangier	Textile
SME 21	Manager	12	Tangier	Agri-food
SME 22	Manager	7	Tangier	Studies and consulting

A total of 22 EMSs agreed to participate in the survey, with their owner managers expressing interest in sharing their experiences with us. We assigned codes to the different units of analysis to guarantee the anonymity of the actors interviewed. The coded names assigned to the companies and the information derived from them are shown in Table 1.

In a qualitative study, data analysis "consists of reducing the information to categorize it and relating it to each other before arriving at a description, explanation, or configuration" (Wacheux 1996). The collected information is formatted in a written "verbatim," which represents the raw data of our survey. The transcription is done manually to faithfully record what the interviewees said. It notes word for word everything the interviewee says, without changing the text, nor interpreting it and without abbreviation to facilitate the reading and to have a faithful trace. To process all the interviews conducted, a thematic content analysis was carried out. The combination of the vertical analysis (interview by interview) and the horizontal analysis (theme by theme) allowed us to highlight a certain number of results.

4. Results and discussion of the qualitative study

Three main themes are highlighted in the presentation of the results: the importance of SME maturity, the opportunities offered by AI, and the challenges hindering the adoption of AI in Moroccan family SMEs.

4.1. *Analysis of the Moroccan family SMEs' maturity towards AI*

The variation between the different companies regarding the perception of AI is no longer marked, as 16 respondents say they are aware of the trend. Thus, the Moroccan company seems quite aware of this revolution. Despite a rather classical or traditional vision of automation or IT functions a weak presence of AI-based functions. Indeed, the terms used by companies speak of IT in general, rather than new intelligent technologies or artificial intelligence, as described in Figure 2.
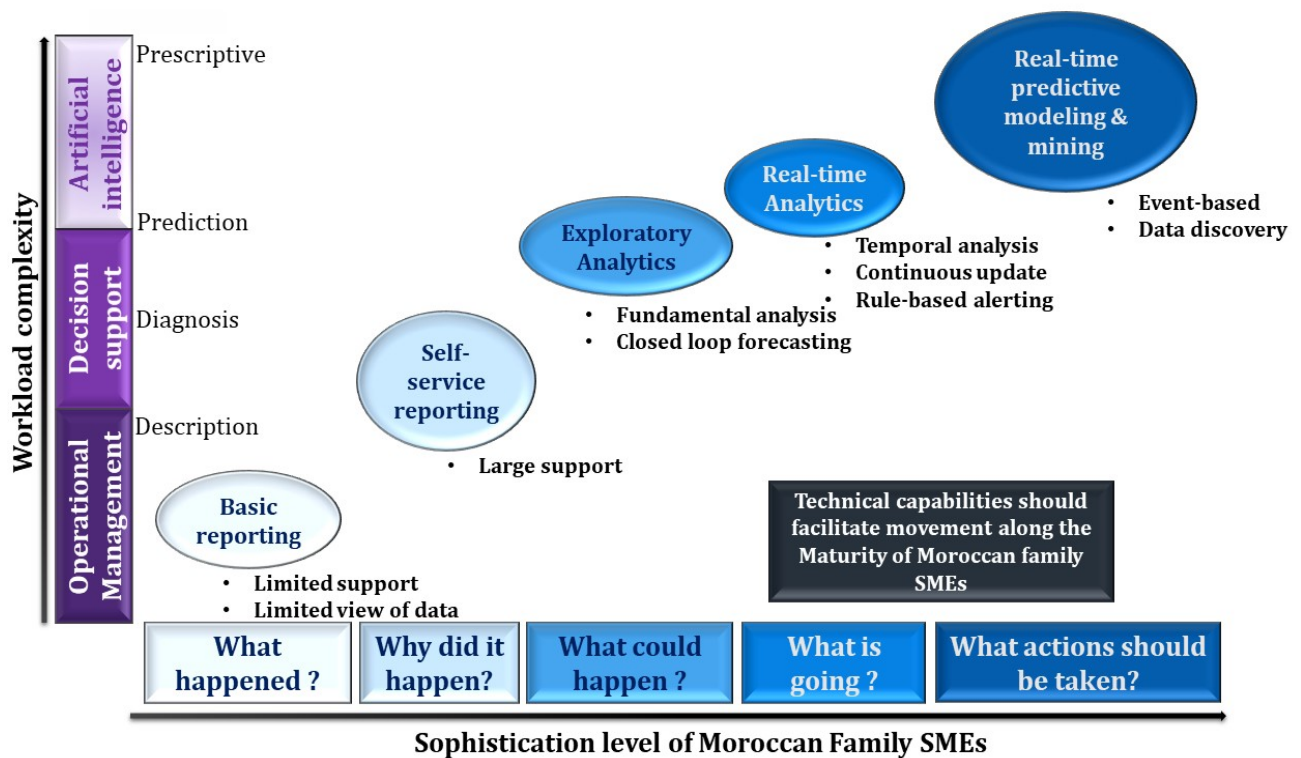

Figure 2. Maturity analysis of Moroccan family SMEs

Source: Authors

In addition, nearly a third of SME managers indicate that AI is part of their plans. In this context, at the level of the implementation of projects related to the subject, the interviews have ensured a diversity of profiles between companies that have carried out projects in AI (2 companies), this is reflected by their field of activity. However, for the others, the computerization of their systems is translated by the creation of a website or a page on social networks. Companies with projects in progress (2 SMEs) and companies with projects that have not yet started or do not have AI projects (3 SMEs). Another very important finding is that these companies did not know that AI could boost their e-commerce activities. And even nearly 75% of respondents are not present on the e-commerce channel.

4.2. *The opportunities of AI adoption*

The combination of factors generated by AI should help stimulate economic growth, few economists venture to measure the effects of AI on future GDP. In this study, business representatives estimate that the specific contribution of AI to Moroccan GDP will be around 11,300 billion MAD by 2025, an increase of 14%. AI could double the growth rates of Moroccan family SMEs, thanks to "new relationships between the seller and the customer and between man and machine". The impact of AI-based technologies is expected to improve work efficiency by up to 40% in some Moroccan family SMEs.

We note that many surveyed Moroccan family SMEs in this study stated that the benefits of IA for them could be numerous to:

- Improve workflow.
- Access to globalized marketplaces.
- Favors export, especially for the agri-food and textile sectors.
- Organization and automation of tasks.
- Improve the supply chain.
- Strengthen the performance of the company.
- Develop new services.
- Ensure better quality productions.
- Optimize production costs.
- To better develop the skills of the employees.
- To give the image of a modern company.
- Facilitate the work of employees or professionalize certain administrative processes.

4.3. Challenges and issues

Our study shows that AI adoption presents several major challenges for the companies surveyed, namely the lack of technical digital skills. Most (10 respondents) of the Moroccan family SMEs believe that the human challenge is one of the main challenges to face, they insist on the development of new skills. While others believe that financial means can be a major challenge. In the broadest sense, the human factor, therefore, weighs more heavily than the lack of budgetary resources.

A human challenge in terms of increasing the skills of internal resources to be able to support this transformation. The second challenge concerns the financing of this transformation because it involves an investment. Of course, there is a return on investment, but for the SME, it is first necessary to succeed in mobilizing the resources. We can also add that the lack of time and means, but also a concern for confidentiality and a lack of trust, the complexity of the process, and the lack of knowledge of existing possibilities are other obstacles to be mentioned.

This work brings together, in an exploratory manner, three important dimensions, namely, the perception of Moroccan SME managers and executives, challenges, and issues related to the adoption of AI. The findings on the impact of AI on business practices are widely shared by research studies. Other than the financial and human challenges, the debate between those who consider that AI is a tool for the elimination of employment and those who believe that it is a liberating tool, allowing the employee to focus more effectively on his task.

4.4. New perspectives

It must be said that the prospects offered by AI to professionals seem infinite and whet many appetites. All sectors are potentially concerned. Companies such as Google, Apple, Facebook, Amazon, and Microsoft are investing more and more in this field. While in 2015 the global AI market was valued at $200 million, it is expected to reach $90 billion by 2025. Also, the number of startups developing new businesses around AI is constantly increasing, expanding the fields of application: health, education, finance, commerce, etc.

Multiple applications of artificial intelligence are already very present in our lives, obviously through our smartphones - new GPS, voice assistants, etc. - and increasingly in our cars. - and more and more in our cars. The same is true in companies, where we often use many other tools such as machine translation or chatbots to answer consumers

on the Internet. But AI allows us to go much further and offer more innovative solutions to our customers. It is no longer about winning at chess or beating champions, but about making companies more productive, more efficient, and more innovative! For example, it is becoming possible to perform predictive maintenance. For example, Kone, the elevator manufacturer, has implemented a solution that helps predict breakdowns by using sensors that constantly transmit information. This information is analyzed by the AI, thanks to millions of data collected previously in similar situations, and allows to anticipate problems by replacing a part at the right time. In this way, the algorithms learn to detect the warning signs and are constantly improving.

The same approach is used in the legal sector, where we talk about predictive justice. Some large law firms train their AI with data from millions of court decisions, to be able to advise their clients on the appropriateness of a lawsuit, considering many parameters.

AI represents a major opportunity for Morocco. There are currently eight sectors mature enough to take full advantage of these technologies: banking, telecoms, insurance, automotive industry, agriculture, energy, self-employment, and e-gov (electronic administration). For the moment, observers point out that Moroccan companies are not very advanced in this area. Large companies seem to be reluctant to capitalize on their data, except in the banking and insurance sectors, or in telecoms, where digitalization and competition are pushing towards these new approaches. More generally, the march towards AI is gradual, with, for example, the multiplication of chatbots to respond to customers. Last April, Royal Air Maroc announced the launch of its chatbot on WhatsApp, becoming one of the five companies in the world to offer this service. On the SME side, some startups are playing the AI card, but again, the phenomenon seems to be in its early stages.

To accelerate the trend, the Ministry of National Education, Vocational Training, Higher Education and Scientific Research has just launched, in partnership with the Ministry of Industry, Trade, Investment, and Digital Economy and the National Center for Scientific and Technical Research (CNRST), a call for research projects on artificial intelligence. With a budget of 50 million dirhams, this program aims to adapt AI to Moroccan contexts to generate a real socio-economic impact. The role of research is indeed essential in this field, but AI only exists through the uses we make of it. Hence the importance of developing real "use cases" that can convince Moroccan companies to play the game.

Finally, artificial intelligence should be approached with caution while questioning the ethics of these new approaches. Algorithms are not immune to errors, quite the contrary. Design flaws, faulty hardware, biased data... the risk factors are multiple and remind us that no machine is infallible. Similarly, AI behaves as it has been programmed, which can alter its decisions. Ethics are also at the heart of the matter. With the big data frenzy and the craze around personal data, the question of privacy arises more than ever. While legislative frameworks are evolving and trying to adapt to these new international issues, few measures are taken, for the moment, against companies that do not observe them. The safeguards exist, but the contours are probably still vague. For example, a few weeks ago, the Bloomberg news agency revealed that thousands of people were listening to recordings from Alexa, the voice assistant offered by Amazon. The same practice is reportedly underway at Apple, Google, and Microsoft: officially to "improve the customer experience". More generally, a few media scandals regularly alert international public opinion to the use of personal data. But, in everyday life, who cares about their data?

For Moroccan family SMEs, AI is a promising field that offers several advantages:

- More transparency through the implementation of an intelligent tool for process management. This has the advantage of bringing more transparency between departments and thus bringing better visibility to employees.
- Harmonizing the company's processes will not only secure procedures but also help newcomers to become familiar with the company's operations more quickly.
- Reduce costs by visualizing malfunctions more quickly to anticipate risks and accelerate decision-making.
- Improve customer satisfaction by improving operations, exchanges will become more fluid, and the reactivity of the teams will improve, thus improving customer satisfaction.

At the same time, for many Moroccan family SMEs, this adoption of AI still seems too expensive and too complex to implement. In addition, the investment to be made is to be carried out over time. Companies also identify risks inherent to the transition to new technologies.

Conclusion

The analysis of the average level of digital maturity indicates that the various managers perceive the potential of AI as a factor of business development. But there is still little investment in AI and the implementation of a really smart strategy. The main finding of the study is that the priorities of companies in terms of digital remain rather basic and oriented on a traditional vision of the IT function. The issue of support for these companies is identified as a challenge to be met to help them take the plunge and engage in an approach to AI. Along with this challenge, the availability of qualified resources or the increase in skills in this area is also often problematic. It is, therefore, essential for the SME to surround itself with professionals who will be able to support it in this beneficial, even essential, way for its development. The development of sectors dedicated to innovation and robotization of production and operating processes will enable Moroccan companies to gain a competitive advantage and, consequently, ensure their sustainability and expansion in virtual markets with high growth potential.

Given the importance of these elements, this study has led us to identify a few recommendations, of varying nature and importance, that can help accelerate and succeed in the adoption of artificial intelligence within Moroccan family SMEs:

- Strengthen the support of Moroccan family SMEs regarding AI.
- To offer a legal and fiscal framework that is incentive and protective.
- Develop sectors dedicated to innovation and robotization of production processes and operations.
- Develop digital education through initial and continuing education.
- Mobilize training resources to facilitate the adoption of AI.
- Integrate AI concepts into the core knowledge of companies.
- Place AI at the heart of professionalization and bridges between professions.
- Put AI at the service of the quality of life at work.

At the end of our study and given the potential of AI and its effects on the activities of Moroccan family SMEs, this research is far from complete. An effort of a comprehensive study, including other stakeholders such as employees, will also have to be made to enrich our understanding of the phenomenon. We consider that the main limitation of this research is our sample, which could be the subject of future research.

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