

The Importance of Digital Transformation in the Agricultural Sector and Hindering Challenges

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Received: 17.02.2026 Accepted: 14.07.2026 Publishing: 22.08.2026

Abstract

In this intervention titled "The Importance of Digital Transformation and Hindering Challenges," I will address the concept of digital transformation, outlining the variables it encompasses, as previous studies have not provided us with a precise definition for this new term (digital transformation). I will also demonstrate through this that this concept is fundamentally linked to technology.

Furthermore, this intervention aims to highlight the importance of digital transformation in illuminating pathways and addressing problems that hinder the progress of development projects, especially in the agricultural sector.

In addition, through this study, we also aim to reveal the manifestations of the shift towards digital transformation via modern technologies in various fields, particularly the scientific field, which receives significant attention in terms of using and exploiting digital transformation.

Through this research paper, we also aim to identify the most important and prominent characteristics that distinguish digital transformation technology.

Alongside our objectives, we seek to identify the most prominent obstacles facing the agricultural sector in Algeria, which are considered a barrier to achieving sustainable development in this sector.

- **Keywords:** Digital transformation, importance, manifestations, characteristics, challenges.

Introduction

There is no doubt that greenery, whether natural or man-made through agriculture and the planting of fruitful and non-fruitful trees, is considered by thinkers as the first manifestation of civilization in its material aspect. According to thinkers, no people can embark on urbanization and civilization except through agriculture in its comprehensive sense.

Since its independence, Algeria has been striving to achieve self-sufficiency and food security, and now, thank God, it has almost achieved that.

This is what led the authorities concerned with this sector to attempt to digitize it, realizing that agriculture is no longer limited to traditional methods but is in dire need of modern

technologies capable of accelerating decision-making, moving the wheel of sustainable development, and multiplying it.

The importance of this study for this topic lies in the fact that it is a vital new subject that attracts the researcher and draws them to delve into its multiple angles, including raising awareness of the importance of digital transformation in the agricultural sector.

In fact, its great importance in academic research is what made it at the forefront of studies and journals that cannot all be listed here, but nevertheless, we mention:

- **The First Study:** A study by professors "Nawal Shamma" and "Bouziane Al-Ajal" titled: "Sustainable Development: Determinants and Challenges".
- **The Second Study:** A study by researcher "Mezlef Souad" titled: "Mechanisms for Upgrading the Agricultural Sector to Achieve Economic Development in Algeria: A Comparative Analytical Study with Morocco during the Period 2000-2017," which is a published doctoral thesis discussed at the University of Djelfa during the academic year 2019.

For your information, the shift towards digital transformation is no longer an optional matter but has become an imperative necessity. Therefore, the question that faces us is: How can digital transformation be embodied as a lever for development in light of the challenges facing the agricultural sector?

To answer this problem, this study was structured around four main axes (the concept of digital transformation, its manifestations, its importance in the agricultural sector, and hindering obstacles), in addition to an introduction and a conclusion, relying on a set of references.

Finally, this research paper concluded with a summary that included a set of results and recommendations, relying on both descriptive and analytical approaches due to their suitability for this study.

1. The Concept of Digital Transformation

1.1 Linguistic Meaning of Digital Transformation

- It means moving from one state to another (Ouf, 2025).
- As for the word "Digital" (Raqaam): To number a garment means to stripe and decorate it (Ouf, 2025).

1.2 Idiomatic Meaning of Digital Transformation

Definitions of digital transformation have varied, as it is a term that intersects with many other terms. The term digital transformation is considered one of the modern contemporary terms that emerged at the end of the last century in light of rapid technological development and the invention of the Internet, alongside its increasing spread in the business field. This has led to radical changes in the business environment and various areas of life. Like other terms, researchers' opinions and viewpoints have varied and multiplied regarding its definition, especially with the emergence of many similar terms such as digital transition and digitization, which led to a failure in reaching a common definition for the phenomenon of digital transformation (Strohmeier, 2020).

Naturally, given the recency of this term, it overlaps with synonymous terms like digitization, where we find many studies using a single concept in their definition. This confirms that the term digital transformation is among those terms whose definition has not been precisely determined, and definitions have multiplied depending on the context used, even though many references used digital transformation as a synonym for digitization (Krairi, 2023, p. 49).

On the other hand, we find that some researchers in their studies differentiated between the term digital transformation and digital disruption, as the latter differs in concept from the former. Digital transformation is a phenomenon that includes essential strategic changes for the entire institution, and it also indicates strategic opportunities arising from modern technology. Meanwhile, digital disruption poses strategic threats and is a reality imposed on institutions due to technology (Samaa, 2018, p. 49).

Among the definitions of "digital transformation" is that it is the reshaping of the way people live, work, think, interact, and communicate, relying on available technologies with continuous planning and constant pursuit to reformulate practical experiences (Samaa, 2018). If we look at the term "digital transformation" as a newborn imposed by contemporary reality, it should be seen as an absolute necessity, especially for business enterprises aiming to compete in a rapidly fluctuating business environment on the one hand, and to protect their market position on the other, due to the value achieved by digital institutions compared to traditional ones (Samaa, 2018, p. 50).

Digital transformation is also defined as the process of strategically and thoughtfully reorganizing an organization's business, including business models, organizational structure, human resources, data employment, applications, and digital capabilities, to facilitate the beneficiaries' experience and thus achieve greater benefit and return (Al-Qarawi, 2022, p. 40). It is also defined as the gradual transition of an organization from being engrossed only in dealing with material things to paying attention to information, knowledge, and investing in what opportunities and capabilities reveal, in order to reach the highest level of achievement and efficiency (Al-Salami, 2002).

It becomes clear to us that the concept of digital transformation is closely linked to technology and its optimal exploitation through the employment of new methods to keep pace with the contemporary era.

2. Manifestations of the Shift Towards Digital Transformation

There is no doubt that the interest in what is called digital transformation is one of the manifestations of society's response to the requirements of the era, which views the use of this technology as narrowing the existing gap between the social and economic aspects. The manifestations of digital transformation are evident in:

- Equipping institutions and workshops with various electronic devices, as well as the widespread use of the Intranet. This explains the rapid growth in the number of digital platforms, as data indicates an increase in the number of active Facebook users by about 25 percent from 2009 up to 2017, while the search rate on Google's engine increased from 1999 up to 2016 by 50 percent annually. The reason for this growth is

the scalability and expandability of digital platforms, in addition to the impact of digital networks on the one hand, and the low costs of using these platforms on the other (Krairi, 2023, p. 54).

- Competition among digital companies. In the past decade, the list of the top global companies included only one digital company, which was Microsoft. In 2018, after this period, the tables turned, and the five digital companies (Apple; Alphabet; Microsoft; Amazon; Facebook) became the top companies. This reflects the impact brought about by the broad use of modern technology (Krairi, 2023, p. 50).
- Generalizing fiber optics: We find that the process of generalizing fiber optics falls at the core of the sector's strategy. Therefore, massive investments have been initiated to deploy fiber optics on a large scale to modernize the current electronic communications network on the one hand, and expand it on the other... with the aim of reducing digital divides, enhancing social inclusion, and stimulating economic development... in recent years, regarding access to fixed internet through FTTH technology, where the number of subscribers rose from 53,394 in 2020 to 1.7 million by the end of the fiscal year 2024 (Major Files: Generalizing Fiber Optics, mpt, 2025).
- Electronic Banks: One of the manifestations of the shift toward digital transformation is the emergence of dozens of electronic banks in the world. The most famous of them all is PayPal, which is characterized by security and speed in conducting financial transactions and offers multiple payment options. It is the first electronic bank that appeared 26 years ago and now counts more than 426 million customers (Yazza, 2024).
- Expansion of the chat framework: The existence of chatting represented the primary interest on the internet in the Kingdom of Saudi Arabia, at a rate of 51 percent among a sample of teenagers and youth in 2005. In the United Arab Emirates, the rate reached 60 percent (Nazmi, 2007). This cannot be proven effective except by comparing the near-interest in serious topics in developed countries with their counterparts in our Arab countries.

3. The Importance of Digital Transformation in Sustainable Development

In truth, this new arrival has come to occupy a significant position, even becoming an urgent necessity. This phenomenon, considered one of the most important aspects of technological advancement, has brought about a qualitative leap in various areas of life, especially in "business enterprises that work to ensure their market position and competitiveness in a highly volatile business environment" (Verhoef, 2021).

Digital transformation has played a crucial role in commercial aspects, facilitating many operations and clearing many obstacles that were often stumbling blocks.

We also find that digital transformation has caused an unprecedented radical revolution, thanks to new innovations where "the boundaries of labor markets have blurred, and the roles of various parties have changed (the consumer becomes a participant in the production process, and the competitor becomes a collaborator)". Value creation methods have also

changed due to competition. After the list of the top five global companies in the last decade included only one digital company (Microsoft), in 2018 all top five companies were digital (Apple; Alphabet; Microsoft; Amazon; Facebook). This reflects the impact brought about by the broad use of modern technology and what it can enable if utilized optimally, making digital transformation an absolute necessity that business organizations must undertake to compete in the digital business environment and secure their competitive position (Krairi, 2023).

One of the most important points highlighting the importance of digital transformation is that it leads to meeting needs, especially in business institutions, where "digital networks help connect the various users belonging to a business enterprise and respond to their mutual needs. They are also considered among the most important resources in the digital age due to their ability to save time and costs. In addition, a vast capacity for data analysis is essential for institutions seeking to embark on the digital transformation journey" (Krairi, 2023).

Furthermore, technologies related to digital transformation help in "predicting and exploiting available opportunities in the market provided by modern technology. This technology is necessary for institutions seeking to achieve digital transformation, requiring them to be flexible. Digital agility is essential to respond to customer expectations and compete amidst market fluctuations in the digital age" (Krairi, 2023).

In addition to the services it provides in the agricultural and commercial sectors, digital transformation "can effectively contribute to achieving development and economic efficiency, which is a fundamental dimension of the three dimensions of sustainable development. The benefits of digital transformation are not limited only to the technological and technical positives and reducing the costs and time required to address and solve various operational and administrative obstacles. Rather, it contributes to creating a broad space and a large field for innovation and creativity that produces products and provides high-quality services at a low cost compared to relying on traditional classic methods. Digital transformation will grant institutions immense capacity in achieving added value" (Eddine, 2024).

As is also known, digital transformation contributes "effectively to the process of accessing foreign markets with the lowest possible costs, and contributes to the transfer and import of advanced technology from abroad while creating an encouraging investment environment to attract various foreign investments. Countries cannot achieve various sustainable development goals, especially economic efficiency, except through what is known as digital governance, which relies on the use of digital transformation as a main tool to achieve this, as adopting it is a necessity imposed by international changes" (Eddine, 2024, p. 516).

The contribution of digital transformation in improving institutional performance can be highlighted as follows (Houtia, 2023):

- Digital transformation plays an important role in achieving the strategic goals of organizations. It helps in achieving the efficiency of the organization's operations and activities and reducing its costs by improving the services provided to the customer as

a result of the optimal use of information. This allows the provision of services with a multi-alternative character that facilitates the selection process.

- It helps improve the strategic planning process through computer-aided planning and by developing systems to support and analyze the organization's policies.
- Cost reduction, where digital transformation improves business technology, commercial processes, and reliance on digital technology. This results in saving the cost of each transaction and increasing sales, and it also improves and regulates operational efficiency.
- Developing an appropriate strategy for customers. Modern technologies, especially digital transformation, create capabilities that can help institutions acquire, retain, and assist customers while simultaneously reducing marketing expenditure.
- Increasing productivity and reducing labor costs, where modern technologies operate through the use of advanced technological methods.
- Digital transformation contributes to making agriculture a primary driver of economic development and an area of immense opportunity for people in Africa. It allows benefiting from opportunities in expanding agribusiness and innovations, including ICT innovations along the value chain, improving the sector's image, increasing productivity and returns on investments, and creating new job opportunities, thereby attracting more youth.
- Digital technology unlocks massive, untapped potential for farmers, investors, and entrepreneurs to improve the efficiency of food production and consumption in Africa. From precision agriculture to an effective food supply chain, technology can achieve significant economic, social, and environmental benefits.
- Information technology plays a major role in addressing environmental issues, whether through the use of geographic information systems or the use of IT devices and applications that can contribute to rationalizing the use of materials and energy. It attempts to tackle climate change issues and the green economy by digitizing manual processes, reducing the use of materials, or replacing human activities with electronic ones (Ikram, 2022).

5. Hindering Challenges

Despite the efforts made by many countries to rise to the challenge, there are a set of obstacles facing this sector. This leads us to say that the agricultural sector suffers from many constraints and problems that have hindered the development path. In truth, these challenges are many and varied; some take a technical nature, some take an economic nature, some take a social nature, and others are of an environmental nature. Among these challenges:

- Lack of technical skills among individuals working in the organization. This is a general and essential matter that must be taken into account when formulating and preparing a digital strategy.
- Organizational culture, which is a set of beliefs, values, norms, and myths, is considered a problem that hinders the digital transformation process unless it is based

on openness to change. Many values have been lost and replaced by new frameworks and practices.

- Weak coordination process. Meaning, if good communication is not established between the different levels, the digital transformation process fails, so roles and objectives must be defined accurately.
- Weak infrastructure related to equipment and ICT technologies, as well as their obsolescence and limitations. This undoubtedly hinders the mission of digital transformation.
- Fears of digital transformation failure and a lack of conviction in it. Fear is often a means of destruction and loss.
- Lack of competence and experience among organizational cadres in dealing with the basics and requirements of digital transformation. Laws and legislation form an obstacle that frustrates the effectiveness of digital transformation, making it slow and potentially bringing losses to the institution (Ghrissi, 2021).

Among the challenges facing this technology:

- Heavy reliance on this technology can lead to addiction, which negatively affects health.
- The increase in the volume of targeted websites due to the large number of connected devices may lead to technical and informational problems.
- Digital innovation outpacing security measures (Salami & Bouchi, 2019).

Among the challenges that may impede the success of digital transformation:

- High cost of digital transformation from the technical preparation side...
- Rapid technological change, making it difficult to keep up constantly.
- Absence of a culture of innovation, which would otherwise face many obstacles.
- Resistance to change from employees, as we find digital transformation between supporters and opponents.
- In addition to that, the difficulty of integrating new technologies with old ones (KOTP, 2025).

The speaker adds:

- Fear of information security risks as a result of using technology is considered one of the biggest challenges facing the success of digital transformation.
- Weak and fluctuating internet connection in many rural areas (Dabnoun & Al-Jidi, 2023).

In truth, these challenges were not limited to the material and technical aspects but extended to the moral aspect. Perhaps this is what prompted Ali Rahouma in his book *Automated Sociology* to state that "today's human is a few steps away from handing over the banner to a new human, who is an integral part of him but carries the characteristics of technology in his mind, body, behavior, and culture..." (Rahouma, 2008, p. 124).

Today's human has also become a hostage to this technology, "as the lifestyle of modern man, his work, and his relationships with others often pass through the media of technology, and

the problem lies in the consequences of this new slavery and its dangerous impact on man's representation of himself" (Madkour, 2022).

- Exacerbation of developing countries' problems under digital transformation. This is "a result of the weak educational reality [it is an Achilles heel]. Technological companies that grow rapidly in emerging countries like India constitute a significant handicap for countries aspiring to develop new industries.
- The problem of expansion and maintaining competencies. We find that global companies are now seeing difficulty in expanding their business in developing countries. Companies find themselves in a brain war in a position of competition to hunt for talent and face a bigger dilemma, which is how to retain it.
- High rates of unemployment and poverty. Unemployment is high and permanent, and this is because the high-tech services sector in emerging countries grows and develops like an isolated island from a completely different environment dominated by poverty and lack of knowledge. The poor get poorer and the rich get richer. Inequality also appears in jobs in a way that widens the gap between elite jobs and other works" (Petropoulos, 2007). This is what drives the overwhelming majority to look for other jobs instead of working in the agricultural sector.
- Weak agricultural mechanization. In addition to these obstacles, weak agricultural mechanization poses a major hindrance in the sector, as many farmers rely on a small percentage of machines; in fact, there are still those who rely on simple traditional methods.
- In addition to these challenges, we can add other challenges, as "the greatest challenge to the sustainable development process in the agricultural sector at present is the exacerbation of economic crises and their adverse effects on sustainable development goals. The major financial turmoil that began in 2007 turned into a full-blown economic crisis in September 2008 and resulted in increased unemployment rates" (Al-Ajal & Nawal).
- The migration of the workforce from the agricultural sector to other sectors as a result of existing disparities in income levels and the rapid growth they experienced, especially the building and public works sector (Bessaoud, 2017).
- Weak use of agricultural fertilizers and pesticides: Agricultural fertilizers and pesticides are among the most important components of high agricultural yield. This is especially true in lands that suffer from a lack of natural nutrients for the soil and plants, and suffer from insects or harmful weeds.

6. Results and Discussion

Conclusion

Through our humble research journey, we have reached a set of results that can be broken down as follows:

- The study clarified that the concept of digital transformation is linked to the optimal exploitation of the results of the information revolution and the proper use of

technological methods. This is because the good exploitation of these technologies has led to tangible results.

- The shift towards digital transformation is no longer an optional matter but a necessary imperative. We find many things impose digital transformation upon us, especially digital marketing.
- Digital transformation has clear impacts, especially on the scientific and social levels. We find digital transformation has added quality on the scientific level in terms of preparation and assessment, for example, and has also granted society numerous conveniences.
- Digital transformation, as much as it promotes progress, also entrenches the widening of the social gap. This illustrates that the impact of digital transformation is not limited strictly to positive aspects.
- Digital transformation has become a priority in order to keep pace with the requirements of the era. Where we find ourselves in the presence of digitization, we are compelled to coexist with it, as it is a part of our lives.
- Digital transformation has many gaps between what is proposed theoretically and what happens in reality. It is evident that various theories focus on the general benefits of digital transformation without referencing the risks.
- Digital transformation obliges us to embody various requirements, especially scientific ones. This pushes us to improve infrastructures at all levels and provide a more suitable foundation.

Summary

We conclude from this that digital transformation is a tumultuous world with deep abysses, and it has many advantages that would enable us to change conditions and contribute to their improvement. We hope through this research to provide a suitable digital ground where the philosophy of digital transformation shifts from words to actions, benefiting from global scientific and technical results and all available opportunities.

Recommendations

We can provide a set of recommendations regarding this topic:

- The necessity of forming competencies that have the ability to materialize digital transformation.
- Society must be made aware of the advantages that digital transformation contains.
- Striving to consolidate and spread the culture of digital transformation.
- The necessity of providing equipment and preparing infrastructures to embody digital transformation.
- Society must be made aware of the risks involved in digital transformation, especially on cultural identity.
- Specialists and experts must be involved in data management.
- The necessity of marketing websites in various languages, especially the Arabic language.

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