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Digitalization and Food Practices: Socio-technical Transformations of Food Systems in Algeria

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This article examines the transformative role of digitalization in reshaping food systems in Algeria, with a particular focus on consumption practices, health-related behaviors, and agricultural production within the broader context of global food system transformation. Moving beyond a purely technological perspective, the study conceptualizes digitalization as a socio-technical process that reconfigures market structures, knowledge production, and power relations. The paper is based on an interdisciplinary scientific conference organized by the Social Sciences and Health Research Unit (GRAS) at the University of Oran 2 (Algeria). It integrates multiple empirical and conceptual contributions, including sociological analyses, exploratory survey data collected from Algerian consumers and African migrant women, a qualitative study on diabetic patients, and an assessment of digital transformation in the agricultural sector. This approach enables a cross-sectoral and integrative understanding of digitalization across food systems. The findings show that digital technologies—particularly social media platforms, algorithmic systems, artificial intelligence, and precision agriculture—play an increasingly central role in shaping food practices. At the consumption level, digital platforms and influencers significantly influence purchasing decisions and food-related perceptions. At the same time, digital tools in agriculture contribute to improving productivity, optimizing resource use, and fostering innovation. However, the analysis also highlights the emergence of critical challenges related to digital inequalities, information reliability, and governance. In contexts such as Algeria, where digital adoption is expanding but remains uneven, these transformations may reinforce existing socio-economic disparities while creating new forms of dependency and informational vulnerability. Overall, the study underscores the ambivalent nature of digitalization as both a driver of innovation and a source of structural tensions. By situating the Algerian case within broader international debates on digital transformation and food system sustainability, this paper contributes to a deeper understanding of how digitalization shapes food practices and development trajectories in emerging economies. It calls for interdisciplinary and critical approaches to better address the complex interactions between technology, society, and food systems in the digital age.

1. Introduction

On January 26, 2026, the Social Sciences and Health Research Unit "GRAS" at the University of Oran 2 organized a scientific conference (study day) entitled *"Digitalization and Food Practices"* in Oran, Algeria. While rooted in a local academic context, this event should be understood within a broader global dynamic marked by the rapid and multidimensional digital transformation of food systems. Over the past decade, digital technologies have profoundly reshaped the ways in which food is produced, distributed, marketed, and

consumed, leading to structural changes that extend far beyond mere technological adoption. Rather, these transformations reflect deeper reconfigurations of market structures, value chains, and socio-economic relations within contemporary food systems.

In this perspective, digitalization should not be reduced to a set of technical innovations but rather conceptualized as a systemic transformation affecting the entire agri-food chain. It reconfigures value creation processes, reorganizes supply chains, and transforms relationships between actors, while simultaneously altering the balance of power within food systems (Chen et al., 2025; Plakantara & Karakitsiou, 2025). The emergence of platform-based business models, data-driven decision-making processes, and algorithmic governance mechanisms illustrates how digital infrastructures increasingly mediate economic exchanges and social interactions.

At the production and distribution levels, digital technologies such as blockchain, artificial intelligence, and the Internet of Things are often promoted as tools for improving efficiency, transparency, and traceability within food systems (Tripoli & Schmidhuber, 2020; Tyagi et al., 2024). These innovations are expected to enhance food safety, optimize resource use, and facilitate coordination across supply chains. However, recent studies highlight that these technological developments also raise critical issues related to data governance, technological dependency, and unequal access to digital infrastructures (Ahmadi, Amendolagine, & LaSala, 2025). In particular, the increasing concentration of data and digital capabilities in the hands of a limited number of actors may reinforce existing asymmetries between multinational firms and local producers, especially in emerging economies (Sodano, 2024).

At the consumption level, the expansion of digital platforms and social media has profoundly transformed food-related practices and representations. Consumers are increasingly exposed to algorithmically curated content that influences their preferences, perceptions, and purchasing decisions (Boyland et al., 2020; Lafontaine, Hanson, & Wild, 2025; Stehrenberger, Danesi, & Schneider, 2025). In this context, food becomes not only a material necessity but also a digital object, embedded in processes of communication, representation, and commodification. The rise of influencers, online reviews, and targeted advertising contributes to the emergence of new forms of digital intermediation, where consumption choices are shaped by complex interactions between users, platforms, and algorithms (Jabbour Al Maalouf et al., 2025; Kechri et al., 2025). In particular, digital nutrition applications are increasingly used to guide dietary choices and monitor health behaviors, with empirical evidence showing growing levels of user engagement and satisfaction in emerging contexts (Kesa, Koufie, & Tchuenchieu Kamgain, 2025).

Furthermore, the integration of artificial intelligence into food and nutrition practices introduces new opportunities as well as significant challenges. AI-based applications enable personalized dietary recommendations and health monitoring, potentially improving nutritional outcomes (Brankovic & Hendrie, 2025; Panayotova, 2025). However, these developments also raise concerns regarding scientific validity, ethical standards, transparency, and algorithmic bias (Hanna et al., 2025; Radanliev, 2025). As such, the digitalization of food practices must be analyzed not only in terms of technological efficiency but also through a critical lens that considers its social, ethical, and political implications.

At the territorial level, digitalization is frequently presented as a lever for innovation and local development, particularly in the context of agricultural modernization and the valorization of local food systems (Galarraga & Martinez de Albeniz, 2025; Hjalager, 2022; Hobbs, 2020). The development of digital agriculture, including precision farming and smart farming technologies, illustrates the potential of digital tools to enhance productivity and sustainability. However, these opportunities coexist with persistent digital divides, infrastructural limitations, and unequal capacities to adopt and appropriate technological innovations (Raihan et al., 2024). In countries such as Algeria, where digital penetration is progressing rapidly but unevenly, digitalization becomes a site of negotiation between inclusion and exclusion, innovation and marginalization.

More broadly, recent theoretical contributions emphasize that digital transformation in food systems must be understood as a paradigm shift, affecting not only technological practices but also institutional arrangements, governance structures, and societal norms (Veraart & Blok, 2025). Emerging technologies such as digital twins and integrated data platforms further illustrate the increasing complexity and interconnectedness of food systems (Abdurrahman & Ferrari, 2025; Monteiro & Barata, 2025). These

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developments call for interdisciplinary approaches capable of capturing the multiple dimensions of digitalization and its implications for sustainability, equity, and resilience.

In this context of accelerating digital transformation, the scientific conference organized by the GRAS research unit aimed to explore a central research question: *to what extent does digitalization reshape food practices, and what are the socio-economic, cultural, health, and governance implications of this transformation within contemporary food systems*? Rather than merely documenting technological innovations, the conference provided a platform for critical dialogue, bringing together diverse disciplinary perspectives to examine the opportunities and challenges associated with digitalization.

The contributions presented during the conference were structured around four interrelated themes: (1) food representations and the influence of algorithms; (2) the digitalization of markets and supply chains; (3) digital technologies in health and nutrition; and (4) governance and regulatory challenges in platform-based food environments. Taken together, these contributions highlight that digital food systems should not be viewed solely as drivers of innovation, but rather as complex arenas where economic interests, social dynamics, power relations, and policy challenges intersect.

2. Methodological Approach

This paper is based on a scientific study day organized by the Social Sciences and Health Research Unit "GRAS" at the University of Oran 2, which brought together interdisciplinary contributions addressing the theme of digitalization and food practices. The present work adopts a conference report approach, combining descriptive synthesis with analytical interpretation, in order to capture both the diversity of perspectives and the underlying coherence of the discussions.

The empirical material mobilized in this article is derived from multiple sources. These include oral presentations delivered during the conference, empirical findings presented by participants (such as quantitative survey data, qualitative interviews, and case studies), as well as the discussions and exchanges that emerged throughout the sessions. This diversity of materials reflects the interdisciplinary nature of the event, bringing together insights from sociology, management sciences, public health, and agricultural sciences.

Rather than relying on a single standardized research design, the paper follows a qualitative and interpretative analytical strategy, structured around a thematic approach. The different contributions were examined through a process of thematic coding and analytical categorization, allowing for the identification of recurring patterns, convergences, and tensions across the presentations. This approach is consistent with qualitative synthesis methods that aim to generate analytical insights from heterogeneous sources while preserving contextual richness (Braun & Clarke, 2006).

In this perspective, the objective is not to produce statistically generalizable findings, but rather to provide a contextualized and reflexive understanding of the transformations induced by digitalization within food systems. Such an approach is particularly relevant when addressing complex and multidimensional phenomena that require the integration of diverse forms of knowledge and empirical evidence (Denzin & Lincoln, 2018).

At the same time, the paper adopts a critical interpretative stance, linking the empirical insights presented during the conference to broader theoretical debates on digital transformation, platform economies, and food system governance. This analytical positioning allows for moving beyond a purely descriptive account of the event and contributes to situating the findings within ongoing discussions in the literature (Sodano, 2024).

It is important to acknowledge certain limitations inherent to this methodological approach. The reliance on conference-based material implies a degree of heterogeneity in data sources, methods, and levels of empirical depth across contributions. Furthermore, the absence of a unified research protocol may limit the comparability of findings. However, this diversity also constitutes a strength, as it enables a more comprehensive and interdisciplinary understanding of digitalization processes in food systems, particularly in emerging contexts where empirical research remains relatively limited.

Finally, this methodological framework aligns with recent calls for more integrative and interdisciplinary approaches to the study of digital transformation in agri-food systems, which emphasize the need to combine empirical insights with critical analysis in order to better understand the socio-economic and governance implications of digitalization (Ahmadi et al., 2025; Plakantara & Karakitsiou, 2025).

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3. The Social Challenges of Digital Technology

The intervention of Professor Mohamed Mebtoul provided a critical sociological perspective on the social implications of digitalization, emphasizing that digital technologies should not be understood as neutral or purely technical tools. Rather, they constitute complex socio-technical systems embedded in broader economic, political, and cultural structures that actively shape social relations, knowledge production, and individual behaviors.

From this perspective, digital platforms play a central role in structuring access to information and mediating public discourse. Through algorithmic mechanisms, they determine the visibility of content, influence attention dynamics, and contribute to shaping individual perceptions and collective representations. As highlighted in recent studies, such processes are closely linked to the expansion of platform economies and the increasing role of data-driven governance in contemporary societies. In this sense, digitalization can be understood as a reconfiguration of power relations, where control over data and technological infrastructures becomes a key source of influence.

Furthermore, the rise of attention-based economic models has significant implications for the quality and reliability of information circulating within digital environments. As platforms optimize content for engagement and visibility, they may contribute to the dissemination of simplified, sensationalized, or even misleading information. In the context of food practices, this phenomenon is particularly critical, as it affects dietary knowledge, health-related behaviors, and consumer decision-making processes. The coexistence of scientific information, commercial messages, and user-generated content creates a complex informational environment in which individuals must navigate often contradictory signals.

Beyond these informational dynamics, Professor Mebtoul also highlighted the cognitive and normative implications of digitalization. The increasing reliance on digital tools and algorithmic systems may lead to forms of cognitive dependency, where individuals progressively internalize digital norms and delegate decision-making processes to technological systems. This dynamic can be interpreted in light of the work of Hunyadi (2025), where the author describes contemporary societies as structured by subtle forms of normative influence that shape individuals' perceptions, preferences, and behaviors without explicit coercion. In this perspective, digital environments contribute to a form of diffuse and internalized regulation, where individuals tend to conform to algorithmically mediated expectations, often without fully perceiving the underlying mechanisms.

This process reflects what can be understood as a transformation of autonomy itself. Rather than being constrained through direct external control, individuals may become embedded in systems that orient their choices and frame their possibilities of action. In digital contexts, this translates into a progressive normalization of behaviors guided by data-driven logics, where personalization and recommendation systems subtly influence everyday practices, including food-related decisions.

In addition, digitalization reshapes professional practices and social interactions, often imposing new forms of adaptation and flexibility on individuals. These transformations may generate both opportunities and constraints, particularly in contexts characterized by unequal access to digital resources. In emerging economies such as Algeria, where digital infrastructures are expanding but remain unevenly distributed, these dynamics may reinforce existing socio-economic disparities, creating new forms of exclusion alongside opportunities for inclusion.

Finally, the analysis points to a series of fundamental tensions inherent in digital transformation. On the one hand, digital technologies offer unprecedented opportunities for access to information, communication, and innovation. On the other hand, they raise critical challenges related to power concentration, information quality, and social inequality. As such, digitalization should be understood not as a linear process of progress, but as a contested and ambivalent phenomenon that requires continuous critical examination.

In this context, the role of the social sciences becomes essential. By interrogating the underlying assumptions, power structures, and societal implications of digital technologies, they contribute to a more nuanced and reflexive understanding of digital transformation. This perspective is particularly important in the field of food systems, where digitalization intersects with fundamental issues related to health, sustainability, and social justice.

4. Integration of Digital Technology into Food Practices

The contribution of Dr. Aicha Benabed offers a valuable

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qualitative perspective on the integration of digital technologies into everyday food practices, focusing on African migrant women living in precarious conditions in the city of Oran. Based on semi-structured interviews and in-depth discourse analysis, the study explores how digitalization intersects with food-related practices in contexts marked by mobility, vulnerability, and cultural hybridity.

The findings highlight that food practices, and particularly the preparation of traditional dishes, play a central role in maintaining cultural identity and social continuity. In migratory contexts, cooking functions not only as a domestic activity but also as a key mechanism of resilience, enabling individuals to preserve symbolic ties to their countries of origin while adapting to new socio-economic environments. In this sense, food practices emerge as a space where identity, memory, and survival strategies are closely intertwined.

Within this framework, digital technologies are progressively embedded in these practices, contributing to the transformation of the kitchen into a hybrid space that is both intimate and connected. Through mobile applications and social media platforms—particularly Facebook and YouTube—participants access recipes, exchange advice, and share culinary experiences. These digital interactions extend food practices beyond the private sphere, integrating them into broader networks of communication and visibility.

From an analytical perspective, this process reflects a form of situated digital appropriation, in which technological tools are not passively adopted but actively reinterpreted and integrated into existing social and cultural practices. Digitalization, in this context, does not replace traditional knowledge but rather coexists with and reshapes it. Culinary practices become mediated by digital tools, while maintaining their cultural and symbolic significance.

At the same time, the study reveals that these digital practices are shaped by structural constraints related to economic resources, access to technology, and social position. The use of digital platforms is therefore not uniform but differentiated, reflecting broader inequalities in access to digital infrastructures and competencies. This observation is consistent with recent literature highlighting the persistence of digital divides and their impact on the appropriation of technological innovations.

Moreover, digital platforms also open up new possibilities for visibility and economic activity. By sharing culinary content online, some participants engage in informal entrepreneurial practices, transforming food preparation into a potential source of income. This illustrates how digitalization can contribute to new forms of economic participation, even in contexts of vulnerability. However, these opportunities remain embedded in platform logics that structure visibility, recognition, and monetization, raising questions about dependency and sustainability.

The findings also point to a broader transformation of food practices, where the boundaries between private and public spheres become increasingly blurred. Cooking is no longer confined to the domestic space but becomes part of a digitalized environment characterized by sharing, representation, and interaction. In this sense, food practices are not only transformed at the level of techniques and knowledge but also at the level of social meaning and symbolic value.

Overall, this contribution highlights the ambivalent nature of digitalization in food practices. On the one hand, digital technologies support cultural preservation, social connection, and economic opportunities. On the other hand, they reflect and sometimes reinforce existing inequalities, while embedding everyday practices within broader digital ecosystems governed by platform-based logics.

By situating these findings within a broader analytical framework, this study contributes to a more nuanced understanding of how digitalization operates in everyday life, particularly in contexts marked by vulnerability and mobility. It shows that digital transformation is not a uniform or linear process, but rather a complex and negotiated phenomenon shaped by social, economic, and cultural factors.

5. The Influence of Digital Technologies on Food Practices in Algeria

The contribution of Professor Kamel Chikhi provides an empirical and analytical examination of the influence of digital technologies on food practices in Algeria. The analysis is based on an exploratory survey conducted between late 2024 and early 2025 among a sample of 202 consumers, aiming to capture emerging patterns of digital engagement and their implications for food-related behaviors.

The findings indicate a widespread integration of digital technologies into everyday life. Daily Internet

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connectivity appears to be nearly universal among respondents, with smartphones constituting the primary access device. Social media platforms—particularly Facebook, Instagram, YouTube, and WhatsApp—emerge as central spaces for information-seeking, communication, and consumption-related decision-making. Approximately 60% of respondents reported spending between one and two hours per day on these platforms, mainly for informational and recreational purposes. This high level of engagement reflects the growing centrality of digital environments in structuring daily routines and social interactions.

From an analytical perspective, these results confirm that digital platforms function as key intermediaries in contemporary food systems. They not only facilitate access to information but also actively shape consumer preferences and perceptions. Nearly half of the respondents indicated that they had purchased a food product following exposure to content on social media. This finding highlights the increasing role of digital visibility and online social influence in driving purchasing behavior, consistent with recent studies emphasizing the impact of digital marketing and platform-based consumption dynamics.

In this context, culinary influencers emerge as particularly influential actors within digital food environments. Almost 50% of participants reported that they take influencers' recommendations into account when making purchasing decisions. This result underscores the growing importance of influencer marketing as a mechanism of persuasion and trust-building, where perceived authenticity and proximity play a crucial role. More broadly, it reflects a shift in authority from traditional institutional sources toward decentralized and digitally mediated forms of influence.

Furthermore, the findings suggest that digital technologies contribute to the normalization of certain consumption practices. Algorithmically curated content exposes users to repeated patterns of food-related information, potentially reinforcing specific preferences and consumption habits. As highlighted in the literature, such dynamics are characteristic of platform-based environments, where personalization mechanisms simultaneously enhance user experience and guide behavioral outcomes.

Although the adoption of artificial intelligence in food-related decision-making remains at an emerging stage, the data reveal a growing engagement with AI-supported tools among respondents. A notable proportion reported having used such technologies, accompanied by measurable levels of satisfaction. Overall, nearly 70% of respondents declared being satisfied or very satisfied following a purchase influenced by digital technologies. This level of satisfaction suggests that digitalization is not only influencing behaviors but also contributing to the perceived value of consumption experiences.

However, these developments also raise important questions regarding the quality and reliability of information circulating within digital environments. As consumers increasingly rely on online sources for food-related decisions, the distinction between credible information, commercial content, and user-generated material becomes blurred. This may have implications not only for consumption patterns but also for public health, particularly in contexts where digital literacy levels remain uneven.

In addition, the results must be interpreted in light of broader socio-economic and infrastructural conditions. While digital penetration in Algeria has increased significantly, access to technology and digital competencies remains uneven across different social groups. These disparities may influence the extent to which individuals can benefit from digital opportunities, potentially reinforcing existing inequalities. This observation aligns with recent research highlighting the persistence of digital divides and their impact on consumer behavior and market participation.

Overall, the findings demonstrate that digitalization acts as a structuring force in contemporary food practices in Algeria. It reshapes how consumers access information, form preferences, and make purchasing decisions, while simultaneously embedding these practices within broader digital ecosystems characterized by platform logics and algorithmic mediation.

From a strategic perspective, these transformations carry significant implications for multiple stakeholders. For businesses, they highlight the growing importance of digital marketing strategies and influencer engagement. For public authorities, they underscore the need to regulate digital content and ensure the reliability of information. For researchers, they point to the necessity of further investigation into the long-term effects of digitalization on consumption patterns, nutritional behaviors, and public health outcomes.

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6. From Epidemiological Transition to Digital Transition: A Sociological Perspective on the Food Practices of Diabetic Patients in Algeria

The contribution of Dr. Salemi provides a sociological analysis of the evolving food practices of diabetic patients in Algeria, situating these transformations within the broader framework of an ongoing epidemiological transition characterized by the increasing prevalence of chronic non-communicable diseases, particularly diabetes. This transition reflects profound shifts in lifestyles, dietary patterns, and socio-economic conditions, which collectively reshape individuals' relationships with food and health.

Drawing on an empirical survey conducted among diabetic women, the study examines how individuals interpret, negotiate, and sometimes circumvent nutritional recommendations issued by the biomedical field. The findings reveal that food practices are not solely determined by medical prescriptions but are embedded in complex social, cultural, and economic contexts. Patients are often confronted with tensions between dietary guidelines, cultural food traditions, and everyday constraints, leading to adaptive strategies that reflect both compliance and resistance.

From this perspective, food practices emerge as socially situated behaviors, shaped by a plurality of factors including economic resources, family structures, cultural norms, and access to healthcare information. The management of diabetes, therefore, cannot be understood solely in biomedical terms but must be analyzed as a social process involving negotiation, interpretation, and compromise. This aligns with sociological approaches that emphasize the importance of lived experience in shaping health-related behaviors.

Within this context, digital technologies introduce a new layer of complexity, marking a transition from an epidemiological framework to what can be described as a *digital transition in health practices*. Digital tools—such as mobile applications, online forums, and social media platforms—provide patients with access to a wide range of information, advice, and peer experiences. These tools may enhance patients' autonomy by enabling them to seek information, monitor their condition, and engage with support networks beyond traditional healthcare settings.

However, the study highlights the ambivalent nature of this digitalization process. While digital technologies can facilitate access to information and support informed decision-making, they may also contribute to the circulation of inconsistent, contradictory, or non-validated dietary advice. In such contexts, patients may struggle to distinguish between scientifically grounded recommendations and informal or misleading content, potentially leading to inappropriate or risky dietary practices.

Moreover, the use of digital tools is not uniform across all patients and reflects broader social inequalities. Differences in digital literacy, educational level, and access to technology influence how individuals engage with digital health resources. As a result, digitalization may simultaneously function as a vector of empowerment for some patients and a source of confusion or exclusion for others. This observation is consistent with broader research highlighting the role of digital divides in shaping access to health information and services.

The findings also point to a transformation in the relationship between patients and medical authority. As individuals increasingly access information through digital channels, the traditional hierarchy between healthcare professionals and patients may be reconfigured. Patients are no longer passive recipients of medical advice but become active agents in the construction of their own knowledge. While this can enhance patient engagement, it may also lead to tensions when digital information contradicts professional recommendations.

From a broader analytical perspective, this contribution illustrates how the digital transition intersects with the epidemiological transition, producing new forms of health-related practices and challenges. It highlights the need to consider digitalization not only as a technological development but as a social process that reshapes knowledge production, authority, and decision-making in health contexts.

These findings have important implications for public health policies. They suggest that improving health outcomes requires not only the dissemination of medical knowledge but also the development of digital literacy and the regulation of online health information. In this regard, integrating digital tools into health strategies must be accompanied by efforts to ensure the reliability, accessibility, and inclusiveness of digital health ecosystems.

Overall, this contribution underscores the importance of adopting a sociological perspective when analyzing the interaction between digital technologies and health

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practices. It demonstrates that food behaviors among diabetic patients are shaped by a complex interplay of medical, social, and digital factors, calling for interdisciplinary approaches to better understand and address the challenges associated with the digitalization of health and food systems.

7. Digitalization: A Key Factor for the Development of the Agricultural Sector

The contribution of Dr. Bendi Djelloul Mounsif Charafeddine provides a comprehensive analysis of the role of digitalization as a strategic lever for the development and modernization of the agricultural sector. This reflection is situated within a global context marked by increasing pressure on natural resources, the need to enhance agricultural productivity, and the growing demand for more sustainable and efficient production systems.

In this context, digitalization emerges as a key driver of transformation, enabling the optimization of agricultural practices through the integration of advanced technologies. The development of digital agriculture—often referred to as agritech—relies on a combination of tools such as sensors, drones, GPS systems, artificial intelligence, robotics, and the Internet of Things (IoT). These technologies support the implementation of precision agriculture and smart farming practices, which aim to improve productivity while reducing costs and minimizing environmental impact.

The empirical data presented in the study illustrate the rapid expansion of digital agriculture at the global level. The precision agriculture market was estimated at USD 3.4 billion in 2017, with a projected annual growth rate of 12.8%, reaching USD 5.5 billion by 2021. In the same period, investments in agricultural digitalization amounted to USD 4.2 billion in 2017 alone. Regionally, Europe, the Middle East, and Africa accounted for 41% of this market, followed by the Asia-Pacific region (32%) and the Americas (27%). These figures reflect not only the economic significance of digital agriculture but also its increasing integration into global agri-food systems.

The analysis also highlights the diversity of actors involved in this transformation. Three main categories can be identified: start-ups specializing in technological innovation, agricultural machinery manufacturers, and large agrochemical and seed companies. The United States, in particular, plays a leading role in this ecosystem, representing 48% of start-up investments in 2016, with a total of USD 1.6 billion. This concentration of investment raises important questions regarding the distribution of technological capabilities and the potential dependence of other regions on external actors.

Within the Algerian context, digitalization is increasingly perceived as an opportunity to modernize the agricultural sector and enhance its competitiveness. The transition toward smart agriculture combines technological innovation with the valorization of local resources, particularly in Saharan regions, where agricultural development is gaining strategic importance. The emergence of specialized start-ups, such as Qareeb, which focuses on intelligent irrigation and yield optimization through the use of drones and artificial intelligence, illustrates the gradual structuring of a national agritech ecosystem.

However, the study emphasizes that the successful integration of digital technologies into agriculture is contingent upon several structural conditions. These include the need for adequate training of farmers, the development of digital and logistical infrastructures, and the establishment of reliable systems for data management and governance. Without these conditions, the potential benefits of digitalization may remain unevenly distributed, potentially reinforcing existing disparities between regions and categories of producers.

From a broader analytical perspective, digitalization in agriculture can be understood as part of a larger transformation of food systems, where production processes become increasingly interconnected with digital infrastructures and global value chains (Vahdanjoo, Sørensen, & Nørremark, 2025). While these developments offer significant opportunities in terms of efficiency, sustainability, and innovation, they also raise critical issues related to data ownership, technological dependency, and environmental impact.

In particular, the increasing reliance on data-driven systems in agriculture raises questions about who controls agricultural data and how it is used. As digital platforms and technologies become central to agricultural decision-making, farmers may become dependent on external service providers, potentially limiting their autonomy. This issue is especially relevant in emerging economies, where local capacities for technological development may be more limited (Ahmadi et al., 2025). Overall, this contribution highlights the dual nature of digitalization in the agricultural sector. On the one hand, it represents a powerful tool for modernization, productivity

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enhancement, and sustainable resource management. On the other hand, it introduces new challenges related to governance, inequality, and dependency. Addressing these challenges requires a strategic and coordinated approach that integrates technological innovation with policies aimed at ensuring inclusiveness, resilience, and long-term sustainability.

8. Conclusion

The scientific meeting organized by the Social Sciences and Health Research Unit "GRAS" at the University of Oran 2 provided a comprehensive and interdisciplinary exploration of the ongoing transformations induced by digitalization across food systems in Algeria. By bringing together perspectives from sociology, public health, agricultural sciences, and consumer behavior, the event highlighted the multidimensional nature of digital transformation and its far-reaching implications for production, consumption, and governance structures.

Across the different contributions, a central finding emerges: digitalization cannot be reduced to a purely technological process. Rather, it must be understood as a *systemic socio-technical transformation* that reshapes knowledge production, market organization, and social relations. This perspective aligns with recent literature emphasizing the restructuring power of digital platforms and data-driven systems within contemporary food regimes (Sodano, 2024; Stehrenberger et al., 2025). In this sense, digitalization operates as a structuring force that redefines both material practices and symbolic representations within food systems.

From the consumer perspective, the findings presented in this study show that digital technologies significantly influence food-related behaviors, particularly through social media platforms, influencers, and algorithmic recommendation systems. These mechanisms contribute to the reconfiguration of decision-making processes, where traditional sources of authority are increasingly complemented—or sometimes replaced—by digital intermediaries. This transformation is consistent with broader studies on digital food environments, which highlight the growing impact of platform economies on consumption patterns and public health (Boyland et al., 2020; Lafontaine et al., 2025).

At the social and cultural level, the contributions also reveal that digitalization is not a homogeneous process. It generates differentiated effects depending on socio-economic status, digital literacy, and access to technological infrastructures. While some groups benefit from increased access to information, social visibility, and economic opportunities, others remain constrained by structural inequalities and digital divides. This ambivalence reflects findings in recent research on digital inequality and inclusion in emerging economies (Raihan et al., 2024).

In addition, the conference highlighted the increasing role of digital technologies in health-related food practices, particularly among chronic disease patients. While digital tools can enhance access to information and support patient autonomy, they may also generate uncertainty due to the proliferation of non-validated content and algorithmically mediated information. This duality reinforces the need for critical digital literacy and stronger regulatory frameworks in the field of digital health.

From an agricultural perspective, digitalization appears as a major driver of transformation, enabling precision agriculture, resource optimization, and improved productivity. However, as illustrated by recent developments in agritech systems, these advances are accompanied by new forms of dependency related to data ownership, technological infrastructures, and global value chains. Such dynamics echo broader debates on the governance of digital agriculture and the concentration of technological power within global food systems (Tripoli & Schmidhuber, 2020; Tyagi et al., 2024).

Theoretically, these findings reinforce the idea that digital transformation in food systems should be understood as a *contested and ambivalent process*, characterized by both opportunities and structural tensions. In this regard, the notion of "soft domination" and cognitive influence discussed by Hunyadi (2025) provides a useful analytical lens to understand how digital environments shape perceptions, behaviors, and decision-making processes without direct coercion.

Overall, this study demonstrates that digitalization operates simultaneously as a driver of innovation, a mechanism of social reconfiguration, and a source of inequality. It affects all dimensions of food systems—production, consumption, health, and governance—while raising critical questions regarding equity, sustainability, and regulatory capacity.

From a policy and research perspective, several implications emerge. First, there is a need to strengthen interdisciplinary approaches that integrate technological, social, and economic dimensions of food systems. Second,

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ensuring equitable access to digital infrastructures and improving digital literacy are essential to mitigate emerging inequalities. Third, regulatory frameworks must evolve to address issues related to data governance, algorithmic transparency, and information reliability. Finally, future research should adopt longitudinal and comparative approaches in order to better understand the long-term effects of digital transformation on food systems, particularly in emerging economies.

In conclusion, the discussions initiated during the GRAS scientific meeting confirm that digitalization is not merely a technological shift but a profound transformation of food systems as socio-technical and political structures. As such, it calls for renewed analytical frameworks capable of capturing its complexity and ambivalence. By situating the Algerian case within broader global dynamics, this study contributes to ongoing debates on the future of food systems in the digital age, highlighting the need for more inclusive, equitable, and critically informed approaches to digital transformation.

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