Journal of Agriculture, Food Systems, and Community Development
ISSN: 2152-0801 online
https://foodsystemsjournal.org

Digitalization of food provisioning: A scoping review of social implications and pathways to equitable futures

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Submitted February 19, 2024 / Revised November 22, 2024, and January 29, February 25 and 26, 2025 / Accepted February 28, 2025 / Published online June 13, 2025

Citation: Farhangi, M., Rohracher, H., Cohen, N., Ilieva, R., Brückner, M., Brettin, S., & Veen, E. (2025). Digitalization of food provisioning: A scoping review of social implications and pathways to equitable futures. *Journal of Agriculture, Food Systems, and Community Development*, *14*(3), 233–250. https://doi.org/10.5304/jafscd.2025.143.017

Abstract

This review examines the social consequences of digital food provisioning (DFP), the application of digital technologies to food acquisition and home delivery, and its potential for shaping equitable food futures and promoting food justice. The paper specifically investigates how DFP influences consumer behavior, labor conditions, and social relations, drawing insights from current studies and empirical evidence. By synthesizing a wide range of scholarly work, this review aims to uncover how digital transformations in food provisioning can either reinforce or mitigate social inequalities and discusses strategies to leverage DFP towards achieving a more equitable and just food system.

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Keywords
digitalization, digital food provisioning, equity, social impacts, food system

Introduction

Digitalization, including mobile apps, cloud technologies, GPS tracking, and artificial intelligence has changed consumers' food provisioning, defined as the practices of selecting, buying, obtaining, sharing, and preparing food. Food provisioning has changed in terms of the services offered and provided, the way food is delivered (including the organization of delivery work), and the practices of food consumption. New forms of online grocery shopping, digital platform-based meal delivery services, digital choice emergency food pantries, and peer-to-peer food sharing apps have reconfigured the previously established food provisioning system. Digital platforms offer convenience, speed, and flexibility, allowing consumers to order meals and groceries on their computers or mobile devices (Chakraborty et al., 2022; Ray et al., 2019). However, digital food provisioning (DFP) also transforms the social and economic relations among food producers, consumers, and other actors in the food system as much as it facilitates food provisioning for new types of actors and their interests (Li et al., 2020; Wang et al., 2022). Consequently, the increase in DFP has also raised serious concerns among urban authorities about how it may exacerbate social problems in the areas of social equity, health, worker rights, and the environment. For example, online supermarkets, which are often spurred by investment capital funding, can disturb food buying and distribution through the reconfiguration of shopping patterns, expansion of gendered workloads, and empowerment of corporations (e.g., Amazon) with significant financial capital. This has led to increased concerns about the effects of these change on people (e.g., disparities in food access) and on urban environments (e.g., traffic, packaging waste) (Cohen et al., 2020; Semblante et al., 2023).

This paper examines scientific research that has been conducted on the last-mile delivery of food, focusing on the food provisioning process as mediated by digital platforms. This includes how food is selected, purchased by, and delivered to consumers, emphasizing the role of digital platforms in shaping these practices. By concentrating on these digitally mediated processes, the paper explores their social implications within the broader context of digital food systems. The paper takes stock of recent research on the social consequences of the digitalization of food provisioning. Its goal is threefold. The first and central objective is to give a structured overview of how DFP impacts various aspects of society, addressing emerging issues that result from shifts in food consumption practices due to digitalization. A second objective is to identify existing knowledge gaps to inform future studies by synthesizing the current body of research. The third and final objective is to explore the intricate interplay among digital food platforms, social consequences, and policy responses, suggesting means by which to create a more socially just food system. We describe strategies that have been taken to foster such a system previously in order to offer insights that could guide researchers and policymakers. These considerations are vital for addressing the multifaceted challenges and opportunities

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Disclosures
The authors declare no conflict of interest.

Funding Disclosure
This research was funded by Formas under the project "Navigating Digital Food Landscapes: Exploring Effective Governance Approaches to Address Spatial Inequalities" (Funding number: AC-2023/0032). The funding supported the contributions of the authors affiliated with IVL Swedish Environmental Research Institute and Linköping University.

presented by the digitalization of food provisioning, ultimately steering us towards a future where technology enhances social justice in food systems.

Methodology

This paper employs a scoping review methodology, which is particularly suited for synthesizing a broad and diverse body of literature in the emerging and interdisciplinary field of digital food provisioning (DFP). This enables the coverage of a broad range of literature without the strict inclusion and exclusion criteria of a systematic review (Arksey & O'Malley, 2005; Munn et al., 2018). The review followed the framework proposed by Arksey and O'Malley (2005), in which studies with varied designs and methods are included to comprehensively map the field and identify research gaps (Arksey & O'Malley, 2005; Munn et al., 2018). The scope of this review is deliberately focused on the last-mile delivery of food, encompassing the processes of selecting, purchasing, and delivering food with the intermediation of digital food platforms. This includes platforms that facilitate grocery shopping, food pantry services, meal delivery, and related activities. By narrowing the focus to these elements of food provisioning, the review aims to capture the social dimensions and inequities arising from these digitally mediated practices while excluding broader supply chain logistics.

Review Process

The review process was structured according to the five-stage framework outlined by Arksey and O'Malley (2005), which includes: (1) identifying the research questions, (2) identifying relevant studies, (3) selecting relevant studies, (4) charting the data, and (5) collating, summarizing, and reporting the results. The search strategy included systematic queries in databases using relevant keywords and a snowballing technique to capture additional references. Table 1 illustrates the inclusion and exclusion criteria used and Table A1 (in the appendix) gives an overview of the studies analyzed including the dimensions of impact and key themes, in order to ensure transparency in categorization and analysis. We identified broad research questions to include the diverse social dimensions of DFP, such as how digitalization affects food provisioning practices—for example, how gig-based delivery work reshapes labor conditions, how digital platforms influence consumer food choices, or how public space is reconfigured through platform logistics. Our review was initiated by assembling a preliminary list of studies on DFP with which we were familiar. The list was extended using the Scopus database using the keywords: "digital food platforms," "online grocery shopping," and "food delivery apps." This search retrieved 672 articles. We focused on studies written in English, were published between 2013 and 2024, and were not solely about the technical aspects of apps used in food provisioning. We prioritized studies that address the social dimensions of DFP, such as the impact of digital food platforms on urban residents, urban life, and on urban structures that could subsequently affect

Table 1. Criteria for Inclusion and Exclusion of Studies

Criterion	Inclusion	Exclusion
Time period	Articles published between 2013 and 2024 (including 2024 studies added during the peer-review process)	Studies outside these dates
Language	English	Non-English
Type of article	Original research and reviews published in peer-reviewed journals	Articles that were not peer-reviewed
Study focus	Studies addressing the social dimensions of DFP, such as the impact on urban citizens, urban life, and urban structures	Highly technical articles focusing solely on the technical aspects of apps used in food provisioning
Literature focus	Articles exploring the broader social implications of digital food platforms, including effects on consumption practices, health, equity, and well-being	Articles not connected to the social implications of DFP, such as those focused purely on technical details without broader considerations

urban life. After this screening, 50 articles remained for further review.

To ensure comprehensiveness, we employed a snowballing technique, examining the references of included papers to identify additional relevant studies. Furthermore, during the peer review process we added studies published in 2024 and performed an additional systematic search using Google Scholar, leading to 14 additional papers. After an initial screening of abstract and keywords, 10 articles were excluded as irrelevant, leaving four studies from 2024 for full review, for a total of 54 studies.

In our analysis, we sought to understand the social dimensions of DFP as discussed in the literature. Rather than starting with a predetermined list of questions, we let the issues raised in the papers guide our categorization. We analyzed the studies selected to identify recurring themes related to the social aspects of DFP. These themes were categorized into broader groups reflecting the primary social impacts of DFP, with particular focus given to consumption practices, labor conditions, and social relations. This approach ensured that the review captured a broad spectrum of social issues related to DFP. A table summarizing the themes and representative studies is included in the Appendix (Table A1) to provide an overview of the findings and basis for analysis.

Results

This section synthesizes findings from the reviewed literature on the social implications of digital food provisioning (DFP). Drawing from diverse empirical studies, it highlights how digitalization is transforming food access, labor, and social relations across different contexts. The results are organized into three key dimensions of impact: consumption practices, labor conditions, and social relations.

The Transformation of Food Provisioning

Research has shown that digital technologies have altered the food system, with significant social impacts (George & Tomer, 2022b). Studies revealed that digital food provisioning, such as shopping for and receiving food online, is an important lever to transform systems and practices within the food sector (Fernandez & Raine, 2021). For example, DFPs have altered how consumers plan meals, shop, and access food, while prompting retailers to adopt new logistics, delivery models, and digital interfaces. While DFP started gaining popularity during the last 15 years (Oncini et al., 2020), its growth accelerated in response to the COVID-19 pandemic as cities curtailed in-person shopping and restaurants, consumers avoided retail shops, and people consumed more meals at home (Gruntkowski & Martinez, 2022). Scientific findings suggest that pandemic-related spikes in food insecurity have also prompted some emergency food providers to adopt online distribution (Cohen et al., 2020). In the US, 79% of consumers buy some of their groceries online, and adoption is predicted to grow rapidly in the EU (Gruntkowski & Martinez, 2022). According to Kühn et al. (2020) online grocers are expected to represent 20% of the EU grocery market by 2030. While in-person shopping has resumed since pandemic restrictions abated, digitalization has permanently affected the structure and business models of food retailers and the operation of nonprofit food distribution systems. New actors have reshaped DFP, shifting power relations and prompting concerns about social equity, health, gender relations, and worker rights (Ghirlanda, 2025). Critical voices point to the production of injustices, exclusion, and exploitation within DFP systems, though most analyses focus on the observation of functionalities and structures (Morrow, 2019). As the digitalization of food provisioning, and the "food-delivery revolution" (Meemken et al., 2022), continue to progress and become ubiquitous in cities throughout the world (Goods et al., 2019), concerns about the effects on urban environments of food delivery (e.g., traffic, packaging waste, land use) have been raised (Hagberg et al., 2017).

Three dimensions of social impact are highlighted in the reviewed literature: (1) consumption practices, (2) labor conditions within the food retail sector, and (3) social relations, encompassing access, inclusion and exclusion, and power dynamics (Table 2). These three dimensions underscore the complex interplay between DFP and various aspects of social life. The findings reflect an emerging landscape where digital technologies in food

provisioning present both opportunities for positive change and challenges that need to be carefully navigated to ensure equitable and just outcomes in the food system. The following sections discuss the findings around these three social aspects of DFP.

Consumption Practices

The literature indicates a profound transformation in consumer behavior and dietary patterns due to DFP altering convenience, traditional routines, and the ability to integrate sustainability into food practices (Heidenstrøm & Hebrok, 2022). Granheim et al. (2022), for instance, conclude from their systematic scoping review that digitalization enables new forms of buying and selling, primarily through online grocery shopping and emerging food delivery services. Scholars like Dal Gobbo et al. (2022) and Fuentes et al. (2022) also highlight how digital platforms are reshaping shopping routines and influencing consumption choices. With that being said, the actual effects of these developments remain unclear (Granheim et al., 2022). While changes related to DFP have the potential to improve food systems in terms of health, sustainability, or accessibility, there are also concerns that DFP may perpetuate unhealthy consumption habits and potentially exacerbate issues related to food access and nutritional inequality. For example, DFP may perpetuate unhealthy consumption by encouraging frequent ordering of calorie-dense, shelf-stable, nutrient-poor meals, which contribute to overconsumption. Additionally, platform design often promotes impulsive food choices through targeted advertisements and discounts, potentially leading to poor dietary decisions (Bissell, 2020). Despite the lack of studies on the actual effects of DFP, we were able to identify three themes around the effects of DFP on consumer practices: (1) health or diet quality, (2) well-being, and (3) social equity.

Health or Diet Quality

The number of studies assessing how DFP interrelates with health or diet quality is limited (Trude et al., 2022). However, DFP does seem to have the potential for positive influence in relation to consumption and health (Dal Gobbo et al., 2022). For instance, if desired by the operator to do so, digitalization enables nudging towards healthier foods during the shopping experience. van der Laan and Orcholska (2022) studied the extent to which consumer behavior can be influenced if handheld scanners, such as those used in supermarkets, suggest healthier product options when consumers scan an unhealthy product. They found that such a nudge would stimulate more healthy shopping behavior, though unexpectedly also found that adding a descriptive or evaluative nutrition label lowers those effects. Websites and apps also have the potential to convey nutritional information, even though online grocers currently provide this information inconsistently (Chintala et

Table 2. Categorization of Studies by Dimension of Impact

Dimension of Impact	Studies
Consumption Practices	Chakraborty et al. (2022), Chintala et al. (2024), Cohen (2022), Cohen et al. (2020), Dal Gobbo et al. (2022), Fernandez & Raine (2021), Fuentes & Fuentes (2017), Fuentes et al. (2021, 2022), Granheim et al. (2022), Gruntkowski & Martinez (2022), Heidenstrøm & Hebrok (2022), Kühn et al. (2020), Milkman et al. (2010), Ray et al. (2019), Samsioe & Fuentes (2022), Scheider & Eli (2023), Timur et al. (2023), van der Laan & Orcholska (2022), Vărzaru (2024), Wang et al. (2022), Zatz et al. (2021)
Labor Conditions	Centeno et al. (2022), Cohen (2022), Friedman (2014), Ghirlanda (2025), Goods et al. (2019), Heiland (2021), Ilieva et al. (2023), Lee (2018), Meemken et al. (2022), Riordan et al. (2023), Schneider & Eli (2023), Semblante et al. (2023), Uchiyama et al. (2022), Vandaele (2022), Vignola et al. (2023), Zanetta et al. (2021)
Social Relations	Bissell (2020), Brettin et al. (2024), Brückner et al. (2021), Buettner et al. (2023), Cairns et al. (2014), Čajić et al. (2022), Compostella et al. (2022), Fernandez & Raine (2021), George & Tomer (2022a, 2022b), Hagberg et al. (2017), Hebinck et al. (2018), Keeble et al. (2021), Li et al. (2020), Morrow (2019), Oncini et al. (2020), Pesci et al. (2023), Stehrenberger & Schneider (2023), Trude et al. (2022)

al., 2024). Online interfaces may effect shopping practices through price promotions and targeted messaging, including nutrition advice (Fuentes et al., 2021). For instance, personalized online food retail that is based on dietary needs of individuals or considers health aspects of ordered food has the potential to lower the calorie content in food orders (Chintala et al., 2024; Fuentes & Fuentes, 2017). Importantly however, user interfaces do not only have the potential to stimulate healthier eating, they also have the potential to reinforce unhealthy shopping patterns through pre-filled shopping carts and recommendations based on previous purchases (Fuentes et al., 2021). Looking beyond such nudging techniques, some studies found that healthy food consumption can be associated with online grocery use in other ways. For instance, empirical evidence suggests that the temporal disconnection between shopping and receiving food bought online may reduce unhealthy impulse buying (George & Tomer, 2022b; Milkman et al., 2010; Zatz et al., 2021). Research by Heidenstrøm and Hebrok (2022), conducted in Norway, demonstrates that online grocery shopping and meal box schemes encourage more planned and conscious food purchasing, potentially reducing food waste and enabling healthier choices. Digitalization may also increase access to, and therefore consumption of, healthy food (Cohen, 2022; Fernandez & Raine, 2021), especially for mobility-restricted consumers. By changing transportation options, as well as factors such as the physical distance and time needed for shopping, a wider range of foods may become available to consumers (Granheim et al., 2022).

To summarize this overview of the potential health and diet quality effects of digitalization, the impacts are mixed and context dependent. While DFPs have the potential to influence health outcomes positively or negatively, these effects depend on how such platforms are designed and implemented. What remains unclear is which types of DFP services and applications will dominate in the future and how their impacts will vary across different user groups. These outcomes will be shaped by factors such as regulatory frameworks, platform design choices, and broader socio-economic dynamics.

Well-being

Digitalization and the resulting changing consumption practices may also impact well-being. Given the limited availability of literature on the topic, we again opted to use a broad interpretation of the concept of well-being to present research results. Consumers may be better able to compare digital shops than brick and mortar stores (Keeble et al., 2021). This ability to compare prices and products more easily across digital shops may enhance a sense of control and convenience in food purchasing, which can positively contribute to consumer well-being. Yet, depending on the type of food (e.g., fresh versus canned vegetables), a digital interface may make the assessment of value or quality more difficult than when viewing items on a supermarket shelf. Online retailers provide more channels for groceries and thus increase competition among food retailers in the short run. On the other hand, competition from online retailers, especially global companies like Amazon, may disadvantage independent businesses (Fernandez & Raine, 2021). Also, while online shopping can reduce the burden of food provisioning for mobility-restricted consumers, for some populations, such as older adults, this shift may have negative physical and psychosocial impacts as in-person grocery shopping is a source of social connection and physical activity. Finally, in her work on the impact of the European Digital Economy and Society Index, Vărzaru (2024) argues that digital transformation "presents substantial opportunities for bolstering food security and advancing SDGs [Sustainable Development Goals]" (p. 17). However, she also reports that while digitalization" significantly and positively influences" three food-related sustainable development goals (no poverty, good health and well-being, reduced inequality), there were no significant influences on SDG2, which aims to combat hunger.

Social Equity

Despite its importance for many dimensions of food systems, here we only discuss the impacts on social equity related to consumer relations. Studies highlight that the effects of digitalization on social equity in consumer practices can be positive or negative, depending on the specific circumstances

at play. Social conditions along characteristics like gender, race, income, and education shape both consumption and production practices. Future studies of online food shopping should consider both social and economic factors across different demographic groups. Furthermore, in contrast with in-person buying, consideration of the online interfaces is also necessary as digital retail facilitates behavioral interventions at the point of purchase. This can result in nudging through price promotions and targeted messaging, including nutrition advice, that can be personalized throughout the shopping experience. These nudges can be more targeted and personalized online than in the more general marketing and promotion that occurs in a store. Identifying challenges and opportunities in digital food shopping is thus necessary to develop appropriate regulations and support systems.

More specifically, Stehrenberger and Schneider (2023) investigated the digital technologies used in Community Supported Agriculture (CSA) for reshaping member engagement and solidarity practices in food provision. They illustrate that CSAs mediated by digital platforms transition members from passive subscribers to active "prosumers"—consumers who also produce, contribute to, or shape the food provisioning process through participation and feedback—enhancing their role in sustainable food practices. The shift of CSA management to digital platforms fosters deeper food citizenship, reflecting a more engaged and responsible approach to food consumption. However, these changes also bring challenges in maintaining social inclusiveness within CSAs, as varying levels of digital engagement can impact collective solidarity and responsibility in food systems. Samsioe and Fuentes (2022) found that DFP can provide access to culturally relevant food that serves consumer needs and preferences. Similarly, digitalization can promote access to sustainable consumption and production (Dal Gobbo et al., 2022), as well as to more just food consumption practices (Trude et al., 2022) by creating new consumer-producer interfaces and markets for local, sustainable food producers (Milkman et al., 2010).

The reviewed literature reveals critical gaps in understanding how DFP interacts with existing socio-demographic inequalities. For example, individuals' access to digital food platforms is often shaped by overlapping factors such as gender, income, and geographic location, which together can create significant barriers to equitable access. Addressing these disparities should be a priority for researchers and policymakers. Moreover, platform design plays a pivotal role in shaping consumer behavior and labor conditions. Future research should investigate how design elements, such as user interfaces and algorithmic management, can be optimized to promote equity and reduce precarious working conditions in the gig economy.

Labor Conditions

The studies reviewed to synthesize knowledge on labor conditions in the context of the digitalization of food provisioning encompass 12 research papers that examine the conditions of workers in the gig economy, food delivery sectors, and platform-based jobs. Several studies, such as those by Centeno Maya, et al. (2022) and Vignola et al. (2023), incorporate a gender and health lens, while others, like the one by Cohen (2022), consider the role of social relations and urban policy. The research spans different geographical locations including Mexico City, Australia, New York City, and Japan, and highlights the challenges and precarious nature of labor in these digital and delivery sectors.

Overall, the evidence reviewed indicates that the rise of digital platforms has significantly altered labor dynamics within the food retail sector by increasing the number of jobs in shopping and delivery, where workers are frequently treated as independent contractors, not employees. For instance, Friedman (2014) illustrates a shift towards more precarious labor conditions in the gig economy in which workers often lack basic protections while facing increased mental and physical health risks. This shift towards contract-based work raises critical questions about the sustainability and ethics of DFP labor practices, especially in the areas of working conditions and well-being of platform-employed food workers. Indeed, several studies (Centeno Maya et al., 2022; Goods et al., 2019; Heiland, 2021; Riordan et al., 2023; Vignola et al., 2023) suggest that the effects of DFP on labor conditions and the well-being of workers can be negative.

Food delivery may increase precarious labor conditions, as there is significant variability and lack of predictability in the schedule and pay for assignments. Workers selecting, packing, and delivering groceries ordered online are typically treated as independent contractors by the companies that employ them, thus lacking basic worker protections like sick leave, workers compensation, and occupational safety and health regulations. Moreover, the literature suggests that the apps that control the nature and pace of their tasks can cause stress and sleep disorders, perceptions of unfairness, low job and life satisfaction, and risky work practices (Uchiyama et al., 2022). Faster work for food delivery cyclists and drivers poses risks to workers' physical and mental health, related to the desire to meet delivery demands and receive good ratings and tips from customers (Lee, 2018; Vignola et al., 2023). Hence, while digitally enabled and managed work related to app-based systems of food ordering offers flexible schedules and access to employment for many, algorithm-based management can add stress for workers. It may also exacerbate gender inequalities and have negative impacts on women who work in food delivery, especially mothers and other caregivers (Centeno Maya et al., 2022). The existing literature highlights the complexity and multifaceted nature of labor conditions in the DFP sector (Schneider & Eli, 2023). Researchers stress that apparent benefits of flexibility and access to employment are often counterbalanced by issues of dependence on gig work, precarity of work, inadequate health and safety protections, and job created health risks (Timur et al., 2023; Zanetta et al., 2021). The emergence of collective actions among workers, as noted in several studies, underscores the growing awareness and mobilization against these challenges (Uchiyama et al., 2022; Vandaele, 2022).

These insights reveal the urgent need for policy interventions and regulatory frameworks to address the evolving landscape of labor conditions in the DFP sector. Further empirical research is warranted to gauge the true social costs of this transition (Vignola et al., 2023) and to inform policies that can prevent and limit the incidence of worker fatigue, illness, and fatal accidents. Some cities have already put forward safeguards and new regulations to protect platform-based food workers (Cohen, 2022; Ilieva et al., 2023) but research is needed to evaluate and understand the effects of these policy efforts.

Social Relations

Since food provisioning can be understood as part of social practices that are unfolding in and thus are always embedded in specific social relations, it is to be expected that the digitalization of food provisioning will have multifaceted impacts on social relations. Within this section we specifically describe 29 articles that focus on this topic. Many of these articles discuss the changes brought about by the global COVID-19 pandemic.

While DFP offers convenience and efficiency, it also has complex implications particularly regarding gender dynamics. As seen in Čajić et al. (2022), digital platforms can both alleviate and amplify traditional gender orders and responsibilities in food-related activities. Studies by Brettin et al. (2024), Brückneret al. (2021), Čajićet al. (2022), and Heidenstrøm and Hebrok (2022)emphasize how digital food platforms might inadvertently increase the workload for women —such as navigating complex sustainability choices—on top of existing food-related care work within households. Digitalization of food provisioning has the potential to reshape gender relations and dynamics, particularly as they relate to access, labor, and decision-making (Cairns et al., 2014; Hebinck et al., 2018). Additionally, the research underscores the need for an intersectional approach in understanding how digital platforms influence social hierarchies, not only in gender but also in race, income, and education (Čajić et al., 2022; Keeble et al., 2021). Broader issues of social equity concern digital divides and the potential for digital platforms to reinforce existing inequalities and exclusionary practices.

For example, a study by Compostella et al. (2022) in California examined changes in offline and online shopping behavior in the wake of the COVID-19 pandemic and found that individuals with higher incomes and education levels were more likely to shop digitally, while those with lower incomes and limited digital access faced greater barriers. The study also found that race was correlated with differences in online shopping uptake,

with Black and Hispanic/Latinx individuals more likely to increase online shopping during the pandemic, partly due to disparities in access to brick-and-mortar stores and greater reliance on delivery services. Race was also found to have a behavioral correlation in a study by Buettner et al. (2023) on young adults' use of food delivery apps. Here, participants who identified as white used these digital services less on average than those who identified as non-Hispanic Black and Hispanic/Latinx. This disparity may be partially explained by differences in food access and affordability, as neighborhoods with higher proportions of Black and Hispanic/Latinx residents often have greater availability of fast-food options, which are heavily featured on delivery platforms (Buettner et al., 2023). Additionally, food delivery apps might offer a more convenient way to access food in areas with fewer traditional grocery stores or healthier options, highlighting a complex interplay of socioeconomic and geographic factors. Another finding of this study is that food insecurity and time constraints were significantly associated with more frequent use of food delivery apps among young adults, suggesting that these factors drive greater reliance on app-based food provisioning. Zhu (2022) suggested in her research on food store accessibility in the United States that online grocery shopping may warrant further evaluation as a potential strategy to improve access and reduce inequalities. The author's assessment is based on a study of sociodemographic characteristics showing that access to quality food is particularly limited in low-income, predominantly Black neighborhoods. However, this suggestion as well as the general impact of DFP on inequalities and exclusions due to racist social relations within the food system requires further in-depth analysis.

Social inequalities and exclusionary practices can further be re-produced through the techno-material layout of DFP. In Morrow's (2019) work on food sharing, for example, she shows how particular knowledge and technical know-how is needed to participate, which limits access to those with such skills and competencies. Moreover, disparate access to high-speed internet and computers may make digital food provisioning more difficult for lower income households. Further, access to both brick and mortar and online grocers varies by geography and the socioeconomic status of the customer base, particularly between urban and rural areas. Rural areas have fewer online grocers and home delivery may be more costly (George & Tomer, 2022a, 2022b; Keeble et al., 2021; Trude et al., 2022).

Another aspect mentioned when analyzing changes in social relations through DFP is the actor relationships between production and consumption, especially in the context of alternative food networks and short value chains. The few existing studies suggest that digitalization can facilitate access to such alternative forms of food provisioning (Dal Gobbo et al., 2022) as well as promote encounters between producers and consumers, and thus expand the knowledge of their respective needs and realities (Čajić et al., 2022). However, Pesci et al. (2023), in their study of farmers using online sales for direct marketing in the early stages of the COVID-19 pandemic, point to barriers accessing technologies in terms of infrastructure and skills. Thus, more in-depth research is needed to (a) understand hurdles and barriers on the production and consumption side in relation to DFP and (b) understand its impact on the relationship between consumption and production. So far, analyses mostly remain limited to the observation of functionalities and structures, as well as to quantitative studies on access and use of DFP. However, especially when considering the influence of DFP on social relations, more qualitative studies are needed to shed light on people's everyday practices and their social embeddedness in relation to online ordering. In addition, there is a need for studies that investigate the permanence of the changes toward a more digitalized system of food provisioning, changes that, among others, have been intensified by the COVID-19 pandemic.

Knowledge Gaps and Future Research Directions

The exploration of digital food provisioning in this literature review has revealed several knowledge gaps and areas for future research that are critical in defining strategies for a socially just food system. While the advent of online food ordering and doorstep delivery, especially during crises like the

COVID-19 pandemic, can in some circumstances and for some people expand access and convenience, the reality is more complex and varied. In some cases, access to healthy food has become more difficult, and digitalization has reproduced precarious labor conditions and gender stereotypes. If anything, our scoping review has shown that we face a significant gap in understanding the extent to which DFP contributes to or alleviates social and economic inequalities (Fuentes et al., 2021; Keeble et al., 2021).

Recommendations highlighted across the literature reveal key areas of focus and future directions for understanding DFPs. Several articles emphasize the need for context-specific research on consumer integration and adaptation to DFPs, as consumer routines and practices deeply shape their sustainability potential. For instance, Heidenstrøm and Hebrok (2022) suggest co-designing DFPs with consumers to ensure alignment with their everyday food handling practices. Similarly, Fuentes et al. (2021) stress that the failure of apps like Karma (a food rescue app) to encourage sustainable consumption is often due to their incompatibility with entrenched habits and routines. Another common recommendation is the exploration of inequalities in access to DFPs. Cohen et al. (2020) identify barriers like higher costs, limited availability in rural areas, and logistical challenges for SNAP users, pointing to the need for policy interventions to enhance accessibility for marginalized groups. Brückner et al. (2021) add that gendered dynamics in food-related care work should be studied to understand how DFPs can alleviate or exacerbate inequities.

The literature also calls for research into environmental impacts of DFPs, particularly regarding their potential to reduce food waste and emissions. Dal Gobbo et al. (2022) argue that alternative food networks facilitated by digital platforms could promote more sustainable practices, but this depends on their ability to fit into complex urban lifestyles.

The diverging research results that we presented in this paper suggest that future studies should investigate how DFP affects various socioeconomic groups, particularly the least wealthy and most food insecure. To effectively foster a socially just food system, researchers and policymakers must understand and address the challenges presented by digital power concentration, digital inequality, and cybersecurity risks, which can exacerbate social inequalities. This understanding is crucial for developing comprehensive policies and regulations that not only promote the benefits of DFP but also protect against its potential drawbacks.

Specifically, a future research and policy agendas should consider:

Digitalization's role in reshaping social relations: There is a need to explore how DFP affects social relations, particularly intersectional categories such as gender, race, or income. Research should focus on how digital platforms might reinforce or challenge forms of inequality or social exclusion or even create new ones. More qualitative studies are needed to evaluate the impacts on different social groups in different contexts.

Design of digital food provisioning services: The uncertainties of the social impacts of DFP described in the literature also depend on the close interrelations of how these services are designed and their consequences on consumption practices or labor conditions. More research is thus needed to better understand how DFP systems can be designed to achieve more just, healthy, and sustainable outcomes.

Policy frameworks for digital food equity: A critical area for future research is the development and evaluation of policy frameworks that address digital food equity. This should focus on ensuring fair access to digital food services for all socioeconomic groups, particularly those who are marginalized. Policy interventions should focus on reducing digital divides by expanding broadband access and subsidizing digital food platforms in underserved areas. This would address geographic and economic barriers to participation in DFP. Additionally, labor regulations must prioritize fair treatment of workers involved in food delivery, ensuring access to protections like sick leave, minimum wages, and workplace safety standards. Policymakers should also incentivize platform designs that align with public health and sustainability goals, such as

reducing packaging waste and encouraging the consumption of healthier food options.

Conclusion

This literature review has examined the impact of digital food provisioning on society with the goal of identifying strategies to create a more socially just food system. The scoping review is based on a broad range of scholarly articles and uncovers significant societal implications as DFP is shaping the food landscape.

Three types of social impacts of DFP were identified: Consumption practices, labor conditions, and social relations. Looking at consumption practices, DFP offers opportunities for sustainable consumption and increased access to healthy food, particularly for mobility-restricted individuals. However, it also presents challenges, such as the potential reinforcement of unhealthy consumption habits and an exacerbation of nutritional inequalities. The digitalization of food provisioning has also altered labor structures within the food retail sector, leading to precarious work environments and a lack of worker protection. The gig economy, which is a significant component of DFP, exemplifies these changing labor conditions, raising questions about ethics in labor practices. In terms of social relations, while DFP can empower some groups, it can also lead to the exclusion of others, particularly those lacking the necessary digital skills or resources, or living in areas with limited digital infrastructure. In sum, the emergence of DFP as a dominant force in food provisioning presents a complex landscape of opportunities and challenges.

The review reveals that the discourse surrounding DFP includes critical voices pointing to the reproduction of injustices and exploitation. Careful assessments and proactive policymaking are required to ensure that DFPs are designed in a way that contributes positively to social equity and justice. Future research should continue to explore these dynamics, focusing on how digitalization can be leveraged to create a food system that is not only efficient and convenient but also fair, health promoting, sustainable, and inclusive.

While digital food provisioning presents both opportunities and challenges, ensuring that opportunities are realized requires targeted action from key stakeholders. Local governments can play a crucial role by ensuring fair working conditions for delivery workers, setting policies that guarantee fair wages and benefits, and promoting responsible platform practices. Nonprofits and community organizations should explore ways to use digital tools to expand food assistance, such as app-based food pantries or e-voucher systems that make it easier for vulnerable populations to access nutritious food. Local food businesses and cooperatives can build community-driven digital marketplaces that connect small farmers directly with consumers, ensuring fair pricing and reduced reliance on major food platforms that often prioritize profit over social good. Food recovery initiatives can use digital platforms to match surplus food from restaurants and grocery stores with food banks and community kitchens, thereby reducing waste while addressing food insecurity. Those designing food delivery and online grocery services should prioritize sustainability by encouraging lower-carbon delivery methods, reducing packaging waste, and the use of digital nudges to promote healthier food choices. Tools for DFP must be designed to be as accessible to deliver on their promises and not perpetuate existing inequalities and vulnerabilities. In this sense, researchers should monitor and assess the social, economic, and environmental impacts of digitalization in food systems so that policymakers, NGOs, and businesses can make informed, evidence-based decisions on how to deploy and regulate these technologies effectively. By taking these steps, digital food systems can work for communities, not just corporations, making food access fairer, jobs more secure, and food systems more sustainable.

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Appendix

Table A1. Overview of the 54 Included Studies

Study	Dimension(s) of Impact	Key Findings
Bissell (2020)	Social Relations	Explores how digital food platforms reshape everyday urban rhythms, affecting social routines and the organization of urban life through platform-mediated logistics.
Brettin et al. (2024)	Social Relations	Investigates how digital food platforms intersect with care practices and gender dynamics, highlighting how sustainability and innovation reshape food-related responsibilities and relational routines in everyday life.
Brückner et al. (2021)	Social Relations	Impact of COVID-19 on food-related care politics and gendered responsibilities.
Buettner et al. (2023)	Consumption Practices	Food delivery app use among young adults correlates with food insecurity, race, and student status, highlighting concerns over nutritional quality and accessibility.
Cairns et al. (2014)	Social Relations	Exploring how digital food platforms can challenge or reinforce traditional gender norms.
Čajić et al. (2022)	Social Relations	Digital and analog elements in food provisioning from a gender perspective in Berlin.
Centeno et al. (2022)	Labor Conditions,	Gender perspective on gig economy labor conditions in food delivery in Mexico City.
Chakraborty et al. (2022)	Consumption Practices	Consumer behavior and motivations for using food delivery apps.
Chintala et al. (2024)	Consumption Practices	Impact of online grocery shopping on consumer behavior and food choices.
Cohen (2022)	Labor Conditions, Social Relations	The role of cities in creating healthful food systems through DFP.
Cohen et al. (2020)	Social Relations	Online grocery shopping and its impact on NYC public housing residents using SNAP benefits.
Compostella et al. (2022)	Consumption Practices	Investigates online shopping behavior post-COVID; race and income influence engagement with digital food provisioning and shape access patterns.
Dal Gobbo et al. (2022)	Consumption Practices, Social Relations	Reconfiguration of alternative food provisioning in the online world.
Fernandez & Raine (2021)	Consumption Practices, Social Relations	Public health opportunities in digital food retail.
Friedman (2014)	Labor Conditions	Examination of precarious labor conditions in the gig economy.
Fuentes et al. (2021)	Consumption Practices	Digital failures and their impact on sustainable food shopping.
Fuentes & Fuentes (2017)	Consumption Practices	Marketing devices in digital food retail influencing consumer behavior.
Fuentes et al. (2022)	Consumption Practices, Social Relations	Digital coping strategies in online food shopping during crises.
George & Tomer (2022a)	Social Relations	Geography of digital access to food in the U.S.
George & Tomer (2022b)	Social Relations	Potential and pitfalls of digitalization in the U.S. food system.

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Study	Dimension(s) of Impact	Key Findings
Ghirlanda (2025)	Social Relations	Analyzes how DFPs create governance challenges by externalizing spatial and infrastructural impacts onto public institutions, straining local regulatory capacity.
Goods et al. (2019)	Labor Conditions	Analysis of job quality in the platform-based food delivery sector in Australia.
Granheim et al. (2022)	Consumption Practices	Digitalization is reshaping food retail by enabling new forms of buying and selling.
Gruntkowski & Martinez (2022)	Consumption Practices	Impact of COVID-19 on online grocery shopping trends in Germany.
Hagberg et al. (2017)	Social Relations	Retail digitalization and its implications for physical stores.
Hebinck et al. (2018)	Social Relations	Participatory foresight for transformative food systems changes.
Heidenstrøm & Hebrok (2022)	Consumption Practices, Social Relations	Sustainability potential within digital food provisioning platforms.
Heiland (2021)	Labor Conditions	Contested space in food delivery gig work.
Ilieva et al. (2023)	Labor Conditions, Social Relations	Food policymaking innovations during COVID-19 in New York City.
Keeble et al. (2021)	Social Relations	Socioeconomic inequalities in access to online food delivery services in England.
Kühn et al. (2020)	Consumption Practices	The role of tactile needs in online grocery retailing.
Lee (2018)	Labor Conditions	Examines gendered dynamics in platform labor; women experience heightened precarity and unpaid reproductive labor in digital food provisioning roles.
Li et al. (2020)	Social Relations	Review of online food delivery platforms and their sustainability impacts.
Meemken et al. (2022)	Labor Conditions, Social Relations	Research and policy recommendations for the food delivery revolution.
Milkman et al. (2010)	Consumption Practices	The effect of order lead time on online grocery shopping behavior.
Morrow (2019)	Social Relations	Food sharing and risk management in Berlin's urban food commons.
Oncini et al. (2020)	Social Relations	Analysis of online food provisioning services in Italy.
Pesci et al. (2023)	Social Relations	Digital divide in farmers' online sales and marketing during the COVID-19 pandemic.
Ray et al. (2019)	Consumption Practices	Motivations for using food delivery apps from a uses and gratification theory perspective.
Riordan et al. (2023)	Labor Conditions, Social Relations	Migrant workers' experiences in the platform economy.
Samsioe & Fuentes (2022)	Consumption Practices, Social Relations	Digital reorganization of household food shopping for sustainability.
Schneider & Eli (2023)	Labor Conditions, Consumption Practices	Digital labor and ethical food consumption in everyday life.
Semblante et al. (2023)	Labor Conditions	Investigates working conditions for food couriers in Southeast Asia; identifies algorithmic control, safety risks, and precarious earnings in gig-based delivery work.

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Table A1, con't.

Study	Dimension(s) of Impact	Key Findings
Stehrenberger & Schneider (2023)	Consumption Practices, Social Relations	Impact of digital technologies on food citizens' solidarity practices in community-supported agriculture.
Timur et al. (2023)	Consumption Practices	Consumer behavior in mobile food ordering during COVID-19.
Trude et al. (2022)	Consumption Practices, Social Relations	Systematic review of online grocery shopping among low-income populations.
Uchiyama et al. (2022)	Labor Conditions	Challenges for improving gig work conditions in food delivery, with lessons from Japan.
Vandaele (2022)	Labor Conditions, Social Relations	Protesting couriers' search for algorithmic justice in the gig economy.
van der Laan & Orcholska (2022)	Consumption Practices	Offering a healthier alternative can nudge healthier choices, but emphasizing its benefits may negate the effect.
Vărzaru (2024)	Consumption Practices	Digital transformation influences food security and SDGs in the EU, linked to the Digital Economy and Society Index.
Vignola et al. (2023)	Labor Conditions	Workers' health under algorithmic management in digital food provisioning platforms.
Wang et al. (2022)	Consumption Practices	Demonstrates how age, income, and tech literacy influence online grocery use; unequal adoption contributes to dietary disparities across socioeconomic groups.
Zanetta et al. (2021)	Labor Conditions	Explores how delivery platforms reconfigure labor visibility and mobility in Latin America, often exacerbating precarity in urban gig work.
Zatz et al. (2021)	Consumption Practices	Highlights racial and structural barriers to healthy food access via DFPs, especially among SNAP users, stressing limitations in digital inclusion and equity.