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RESEARCH ARTICLE

The Role of Platforms in Agricultural Data Value Creation

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ABSTRACT

This study explores the transformative role of digital platforms in the agricultural sector, focusing on how these platforms create value from data. The aim is to identify and analyze the key mechanisms,transparency and access, discovery and experimentation, prediction and optimization, customization and targeting, learning and crowdsourcing, and monitoring and adaptation, through which digital platforms convert agricultural data into actionable insights. Utilizing a qualitative approach, the study employs a structured literature review, mapping these mechanisms to relevant research in farming operations. The findings emphasize the critical importance of digital platforms in enhancing efficiency, sustainability, and profitability in agriculture. This research contributes to the broader discourse on technology-driven transformation in agriculture, offering insights into how digital platforms can help to capture value from agricultural data for all stakeholders.

Keywords: Digital platforms, Agricultural data, Value creation, Data analytics, Precision agriculture

1. Introduction

In recent years, the agricultural sector has experienced a profound transformation, driven by the rise of digital technology. This change hinges on the availability of digital data from sources such as the environment, farms, machinery, and processes, ensuring the seamless operation of software-driven products and services (Falcão et al., 2023). The shift towards digitalization has led to the emergence of various digital platforms, poised to revolutionize traditional farming practices. (Bustamante, 2023; Carolan, 2022; Kenney et al., 2020; Kieti et al., 2021; Wysel et al., 2021). These platforms leverage big data analytics, the Internet of Things (IoT), and artificial intelligence to provide farmers with unprecedented access to information and resources. The strategic use of these technologies not only enhances operational efficiency but also supports sustainable farming practices, crucial in an era of increasing environmental concerns and food demand (Borrero & Mariscal, 2022). These platforms, often operated by large players beyond traditional industry boundaries, are reshaping agricultural value chains (Klingenberg et al., 2022).

The concept of value in agricultural data refers to the benefits and advantages that can be derived from effectively collecting, analyzing, and utilizing data within the farming sector. As data are gathered from various sources, they become a crucial asset that can enhance decision-making, improve efficiency, and optimize operations. The value of agricultural data lies in their ability to inform better practices, reduce waste, increase productivity, and ultimately contribute to the sustainability and profitability of farming operations (Hackfort et al., 2024; Falcão et al., 2023). Moreover, the strategic use of data can provide a competitive edge, enabling farmers and agribusinesses to anticipate market demands, manage resources more effectively, and respond proactively to environmental challenges. As digital platforms continue to evolve, the challenge will be not only to manage the increasing volume of data but also to translate this data into meaningful insights that can drive long-term success in the agricultural sector (Basel et al., 2023). Understanding and maximizing the value of agricultural data are therefore essential for the continued advancement of digital agriculture.

The mechanisms through which digital platforms create value in agriculture is important to examine for realizing the full potential of digital technologies in agriculture. These platforms enable stakeholders to unlock the potential of data, transforming it into actionable insights that drive growth and innovation (Wysel et al., 2021). By identifying and analyzing these mechanisms, stakeholders can better strategize the development, deployment, and utilization of digital solutions, maximizing their impact on the agricultural sector. Despite the rapid adoption of digital technologies in agriculture, the

processes by which these platforms drive value creation remain underexplored (Borrero & Mariscal, 2022; Bustamante, 2023). Borrero and Mariscal (2022) argue that literature has not sufficiently covered the value generated by these platforms or the factors influencing value capture. They also highlight the need to understand the processes through which value is examined, developed, sustained, and made apparent. This study aims to address this gap by systematically analyzing the value creation mechanisms inherent in digital platforms, which are essential for maximizing both the economic and environmental benefits for stakeholders across the agricultural sector.

The objective of this study is to dissect the complex ways in which digital platforms act as catalysts for value creation in agriculture. Specifically, it seeks to identify and describe the primary mechanisms through which these platforms generate value in agricultural practices. This research is intended to establish a foundation for an ongoing study that delves into data value creation in agriculture, by presenting initial findings of the current state-of-the-art.

2. METHOD

This study employs a research framework based on the Value Creation Mechanisms component of the value creation framework, as adapted from Grover et al. (2018) (see Figure 1). This framework is particularly suited to the agricultural sector, focusing on key mechanisms such as transparency and access, discovery and experimentation, prediction and optimization, customization and targeting, learning and crowdsourcing, and monitoring and adaptation. These mechanisms are integral to creating value from agricultural data, as they support essential operations like data access, predictive optimization, and adaptive decision-making, helping to improve the efficiency and responsiveness of farming operations.

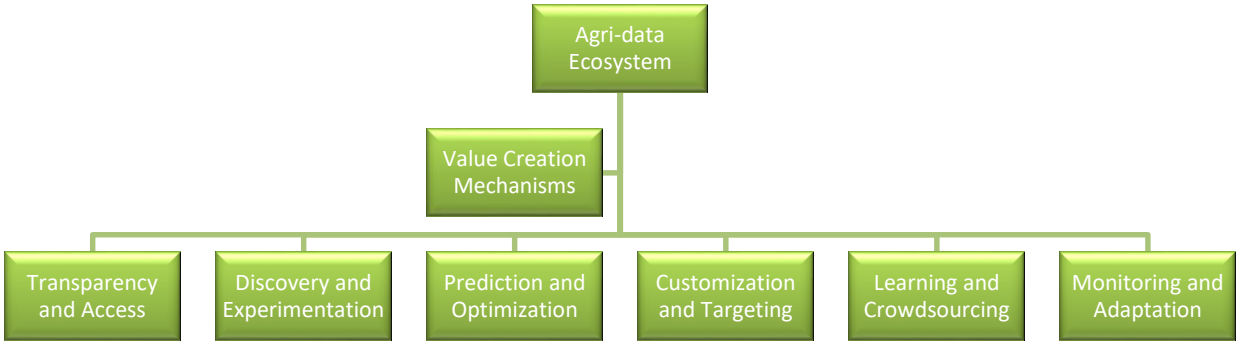

Figure 1. Value Creation Mechanisms from Agricultural Data (Adapted from Grover et al., 2018)

The research design follows a qualitative approach, centered around a literature review to explore the role of digital platforms in data value creation within agriculture. This study involves a mapping of the value creation mechanisms to relevant research in agriculture, thereby providing a structured approach to evaluating the impact of digital platforms.
To gather relevant academic literature, a systematic review was conducted. The data collection process involved a database search performed on June 30, 2024, using the Scopus advanced search function. The search query was specifically designed to capture studies related to data value creation in agriculture, with a particular focus on digital platforms.

Table 1. Search Query for Scopus Database

Search Engine	Query
Scopus (www.scopus.com)	*TITLE-ABS-KEY ("data valu*" OR "value of data" OR "value creation" OR "value capture" OR "data asseti?ation" OR "data moneti?ation" OR "data asset" OR "valuation") AND TITLE-ABS-KEY ("farm*" OR "agri*") AND TITLE-ABS-KEY ("*data*") AND TITLE-ABS-KEY ("platform*") AND PUBYEAR > 2013 AND PUBYEAR < 2025 AND (LIMIT-TO (PUBSTAGE , "final")) AND (LIMIT-TO (LANGUAGE , "English"))*

The initial search yielded 38 documents. These documents were then subjected to a screening process, wherein their titles, abstracts, and keywords were evaluated for relevance to the study's objectives. After the screening, a full-text assessment was conducted and a final selection of 11 articles was made, each chosen for its direct relevance to the study's focus on digital platforms and their role in agricultural data value creation. The analysis focused on understanding how each mechanism manifests in the context of agricultural digital platforms.

3. RESULTS AND DISCUSSION

3.1 Transparency and Access

One of the most transformative impacts of digital platforms in agriculture is their capacity to enhance transparency and access to critical data, which can significantly alter the dynamics of agricultural ecosystems. Transparency in data platforms facilitates timely decision-making, scalability, and better change management, underscoring the broader organizational benefits that can be realized through enhanced access to agricultural data (Saggi & Jain, 2018). Moreover, the importance of transparency in digital agricultural platforms is highlighted by Wysel et al. (2021), who argue that transparency is vital for embryonic digital markets where stakeholders collaborate around data-products. This transparency fosters trust and engagement among participants, ensuring that the value created by these platforms is equitably shared and contributes to the overall efficiency of the agricultural ecosystem. Gaining a holistic understanding of farm-level activities is essential not only for enhancing farmer competitiveness but also for optimizing the roles of other stakeholders, such as advisors (Bustamante, 2023). To fully realize the benefits of digital platforms, it is crucial to ensure inclusivity across the entire agricultural value chain, integrating both digital and physical infrastructures like administrative offices and farmer centers (Kieti et al., 2021). This approach ensures that even those with limited digital literacy or access to technology can participate and benefit from the insights these platforms provide. Moreover, ensuring information symmetry—where all stakeholders have access to up-to-date, accurate data—enhances the overall efficiency and effectiveness of these platforms. Additionally, van Dyck et al. (2021) highlight the importance of openness in these platforms, noting that reducing access restrictions can spur wider adoption and create new value propositions, though they caution that technical restrictions imposed by firms could limit these benefits.

The development of open-source frameworks has been instrumental in democratizing access to agricultural information (Basel et al., 2023). This democratization allows a broader range of stakeholders, including smallholder farmers, to utilize real-time geospatial data and other vital insights, breaking the monopoly of knowledge traditionally held by large agribusinesses. By leveling the informational playing field, these platforms contribute to a more equitable agricultural ecosystem where data are not just a resource for the privileged few, but a tool available to all who seek to optimize their practices. Additionally, the use of GPS-enabled tools, such as mobile applications, in these platforms enhances access to data at the farm level (Ciasullo et al., 2024).

Klingenberg et al. (2022) state that the digitalization of agricultural systems is more evolutionary than revolutionary, suggesting that as these systems mature, they have the potential to bring greater transparency and predictability to production processes. This gradual evolution implies that over time, platforms may develop more robust mechanisms for transparency and access, thereby helping to mitigate current challenges related to data ownership and platform dependency. Moreover, platforms that emphasize openness—such as those incorporating blockchain technology—could play a crucial role in this evolution. By distributing data management across a network of participants, these platforms increase transparency and reduce the risk of data manipulation, ensuring that information remains decentralized and accessible to all stakeholders (Gebresenbet et al., 2023). Such innovations hold promise in addressing dependency issues, fostering a more equitable and inclusive agricultural data ecosystem.

However, the promise of transparency and access is not without its complications. While these platforms have the potential to democratize data, they also introduce new forms of dependency that can undermine these very benefits. Hackfort et al. (2024) highlight the growing concern over the dependency on proprietary platforms controlled by major agribusinesses. These companies often create ecosystems where stakeholders, including farmers, are locked into specific technologies and services, limiting their autonomy and potentially leading to exploitative practices. For example, John Deere's license agreements restrict farmers from repairing their tractors or accessing the data generated by their machinery, effectively transforming these tools from owned assets into leased services controlled by the manufacturer (Hackfort et al., 2024). Moreover, the concentration of data ownership among a few powerful firms can further erode the benefits of transparency. Aggregated datasets, which are often essential for informed decision-making, remain inaccessible to the very farmers who generate them, as these datasets are typically owned and controlled by the firms that manage the platforms (Hackfort et al., 2024). This lack of access can restrict farmers' ability to make data-driven decisions unless they are willing or able to purchase access through proprietary channels, thus perpetuating inequalities within the agricultural sector. When data is made accessible and transparent, it empowers all participants—from smallholder farmers to large agribusinesses—to extract actionable insights, drive innovation, and improve decision-making processes. By fostering truly open and accessible platforms, the agricultural sector can unlock the full potential of its data, ensuring that value creation is shared equitably across the ecosystem.

3.2 Discovery and Experimentation

The evolution of modern agriculture is increasingly driven by the ability to discover new insights and experiment with innovative approaches, largely facilitated by digital platforms that aggregate and analyze vast amounts of data. By providing access to diverse datasets and enabling integrated data exploration, these platforms empower stakeholders to uncover novel approaches, thereby enhancing the agricultural sector's ability to adapt and thrive in a rapidly changing environment (Wysel et al., 2021). Using dashboards that combine optimization methods, statistics, data mining, machine learning, and various

visualization techniques, these platforms allow for integrated data exploration. This coherent toolkit not only facilitates data discovery but also enables users to export and share data in multiple formats, enhancing the potential for collaborative experimentation across the agricultural value chain (Casado & Younas, 2015; Basel et al., 2023).

Agricultural companies are utilizing the data for innovation to drive product development and refine decision-making processes, with predictive maintenance tools serving as a prime example. For instance, John Deere's precision farming platforms use real-time data to monitor equipment, predict failures before they occur, and optimize machinery performance, thus reducing downtime and enhancing efficiency (Hackfort et al., 2024). Furthermore, the application of GPS technology in agriculture exemplifies how discovery is intertwined with precise resource management. By coupling real-time geospatial data with predictive analytics, GPS systems can accurately inform water dispersion strategies and identify dry fields, thereby optimizing irrigation practices and contributing to sustainability (Ciasullo et al., 2024).

Continuous data flows from earth observation systems, for instance, are essential in developing responsive models that can adapt to changing weather conditions, supporting the creation of new farming techniques and technologies (Gebresenbet et al., 2023). Moreover, balancing the need for timely data delivery with the deep interrogation of activity data is crucial for maximizing the value of these platforms and ensuring they serve as catalysts for innovation (Wysel et al., 2021). This trend highlights the importance of maintaining diversity in farming approaches, ensuring that the benefits of innovation are broadly distributed (Bustamante, 2023). The openness of platforms to various actors, including food companies, universities, startups, and traditional suppliers, fosters an inclusive innovation ecosystem that counters this risk. By enabling diverse stakeholders to access and utilize agricultural data, these platforms support a continuous learning process and the development of a wide range of innovative solutions (Bustamante et al., 2023; Klingenberg et al., 2022).

3.3 Prediction and Optimization

The fusion of prediction and optimization technologies with big data platforms is creating new avenues for value creation. By integrating advanced analytics, machine learning algorithms, and real-time data, these platforms can forecast weather patterns, predict crop yields, and optimize input applications, leading to more efficient and sustainable farming practices. Platforms enable data-driven decision-making by providing real-time insights that guide farmers in their input and resource management strategies, ultimately leading to better economic outcomes (van Dyck et al., 2021; Wysel et al., 2021). Platforms also can combine open datasets with on-farm generated data to support decision-making, data analysis, and process optimization (Gebresenbet et al., 2023). However, while these platforms increase the accessibility of data, they do not automatically translate into value unless users are equipped with the tools to effectively analyze and apply the information (Basel et al., 2023). This underscores the need for user-friendly interfaces and co-development of tools that align with the needs of farmers.

Bayer's Climate FieldView and John Deere's See & Spray technology exemplify the integration of predictive tools into agricultural systems. Climate FieldView utilizes data analytics to tailor input recommendations according to specific field conditions, which enhances resource efficiency and increases crop productivity (Bustamante, 2023). John Deere's See & Spray technology, on the other hand, employs machine learning algorithms to distinguish between crops and weeds, enabling site-specific herbicide application. This targeted approach not only reduces chemical use but also minimizes environmental impact, demonstrating the potential of predictive tools to optimize agricultural practices (Hackfort et al., 2024). Predictive models extend beyond crop management to equipment maintenance, significantly improving operational efficiency. Companies like John Deere use predictive maintenance tools to monitor the performance of machinery, offering timely maintenance that prevents unexpected breakdowns and extends equipment lifespan. This capability enhances operational efficiency and reinforces customer trust by ensuring the reliability of farming equipment (Hackfort et al., 2024; Klingenberg et al., 2022).

Despite the clear benefits, the increasing reliance on predictive models is not without risks. Over-reliance on algorithmic recommendations may cause farmers to disregard broader ecological or socio-economic contexts, potentially leading to issues like over-application of inputs or the neglect of traditional farming practices that contribute to long-term agricultural resilience (Ciasullo et al., 2024). Furthermore, the vast amounts of data generated by these platforms can lead to "data paralysis," where the overwhelming volume of information impedes effective decision-making (Basel et al., 2023). To mitigate these challenges, modern agricultural platforms are designed with modularity and customization in mind. This flexibility allows platforms to integrate various digital tools, such as climate sensors, drones, and IoT devices, into a cohesive system that supports predictive maintenance, simulation, and real-time monitoring (Ciasullo et al., 2024; Gebresenbet et al., 2023). The modular design enables the reconfiguration of assets, enhancing the scalability and adaptability of agricultural operations, and thus improving their overall efficiency (Ciasullo et al., 2024). Moreover, platforms leverage their existing user bases to expand from farm management and machine services to adjacent areas such as crop protection, demonstrating the potential for agricultural data platforms to diversify their offerings through the strategic use of prediction and optimization (van Dyck et al., 2021). Additionally, these platforms facilitate the optimization of decision-making processes by providing real-time data and enabling effective application of predictive models (Wysel et al., 2021).

3.4 Customization and Targeting

The digitalization of the agricultural value chain has thus placed customization at the core of new value propositions, where personalized products and services can spur productivity by addressing the specific needs of individual farms (Klingenberg et al., 2022). Big data services are crucial for customizing solutions to meet the individual requirements of customers, allowing for tailored recommendations that optimize both resource use and productivity (Saggi and Jain, 2018). By leveraging detailed farm-level data, the platforms enable the personalization of farming solutions, ensuring that products and services are closely aligned with the unique needs of individual farms. For instance, Bayer's Climate FieldView exemplifies this approach by utilizing specific farm data to drive targeted marketing and product recommendations, often directing farmers towards proprietary products that best suit their circumstances (Bustamante, 2023; Hackfort et al., 2024). This ability to provide precise, relevant recommendations based on detailed data on farming operations represents a significant evolution in how agricultural products are marketed and utilized (Hackfort et al., 2024). Digital platforms increasingly act as data aggregators, they enable data-driven value creation through mechanisms like targeted advertising (Kieti et al., 2021). The modular design of the platforms allows for high levels of customization and operational adaptability (Ciasullo et al., 2024). These capabilities allow for the customization of solutions that are not only tailored to the individual farmer but also optimized for broader market conditions. For example, platforms can adjust their recommendations based on fluctuating commodity prices or changing environmental conditions, thus providing farmers with up-to-date, context-specific advice (Wysel et al., 2021). This dynamic targeting is essential for maximizing productivity and profitability in an increasingly volatile agricultural environment.

Yet, the integration of these advanced technologies also introduces concerns regarding dependency and data security. As platforms become more integral to farm management, there is a growing fear of dependency among customers, particularly in industrial markets where the risk of being locked into a single provider is high (van Dyck et al., 2021). This dependency is often mitigated by strategies like subsidizing premium services, which can attract and lock in customers but also raise concerns about market power and fairness (van Dyck et al., 2021).

3.5 Learning and Crowdsourcing

By aggregating and analyzing data from diverse sources, digital platforms significantly contribute to the sector's collective knowledge, enhancing decision-making and operational efficiency (Klingenberg et al., 2022). Hackfort et al. (2024) state how data collected from farm operations is essential for improving machine learning algorithms, which, in turn, enhance the accuracy and effectiveness of digital decision support tools. For example, the use of telematics software in John Deere's equipment, which captures real-time metrics such as location, usage hours, and fuel consumption, enables continuous performance improvements through advanced data analysis (Hackfort et al., 2024). Similarly, digital solutions implemented at the firm level, such as those in wineries, allow for real-time data collection throughout all processes. These data are then analyzed using machine learning systems, with the insights shared via mobile apps as actionable information (Ciasullo et al., 2024). This continuous learning process is reflected in how farmers interact with algorithms, as described by Carolan (2022). By feeding algorithms with extensive field data, the learning process becomes iterative, with each cycle improving the algorithms' ability to predict and recommend optimal farming practices. As van Dyck et al. (2021) note, the availability of aggregated data makes these platforms attractive to third-party developers, who can offer complementary services that spur further innovation. This ecosystem of innovation is vital for maintaining the sector's competitiveness and ensuring the continuous improvement of agricultural technologies. Wysel et al. (2021) further argue that these platforms serve as intermediaries, matching stakeholders with congruent goals and facilitating collaboration, which is critical for effective learning and crowdsourcing. Crowdsourcing, facilitated by these platforms, allows farmers to share critical real-time data, such as pest outbreaks or weather conditions, thereby enabling a coordinated response to agricultural challenges. This approach enhances the resilience of the agricultural community and fosters a stronger sense of collaboration among farmers (Gebresenbet et al., 2023). The use of data fusion techniques, which combine data from multiple sensors and related databases, further improves the accuracy and specificity of insights, leading to more effective decision-making in the field (Gebresenbet et al., 2023).

3.6 Monitoring and Adaptation

Monitoring and adaptation are critical functions enabled by digital platforms in agriculture, allowing for real-time tracking and the flexibility to adjust practices based on emerging data. The platforms utilize advanced technologies to monitor environmental conditions such as soil moisture, temperature, and crop health. This data, collected through IoT devices, supports farmers by providing insights that enable them to optimize their practices, thereby enhancing productivity and sustainability (Ciasullo et al., 2024). The integration of various data sources into these platforms, such as sensor data, satellite imagery, and weather data, enables a comprehensive approach to agricultural monitoring. For example, real-time, high-frequency data streams provide valuable insights into complex agroecological systems, supporting the monitoring of interventions related to climate change and biodiversity conservation (Basel et al., 2023). This ability to harness diverse data streams in real-time is crucial for addressing global challenges like food security and climate resilience. Moreover, remote image capture and processing through IoT systems help detect insects and vine diseases, while tracking pesticide, herbicide, and fertilizer use allows for continuous improvement in their application. In addition to monitoring growing conditions, smart farming platforms are also extending their capabilities to the harvest stage.

Diagnostic tools, such as yield monitors, keep detailed records of within-field yield variability, allowing farmers to analyze both crop quantity and quality (Carolan, 2022). These continuous monitoring processes ensure that farming practices can be adapted at any stage of the production cycle, resulting in more efficient and productive operations. The importance of robust data management systems cannot be overstated in this context. Data management systems provide the infrastructure necessary for executing complex data analytics and managing vast amounts of agricultural data (Saggi & Jain, 2018) These systems support the accurate processing and reporting of data, which is essential for making informed decisions based on the information collected by digital platforms. The role of digital monitoring has been further expanded by integrating these tools directly into their carbon farming programs. The initiatives ensure that data collected from environmental monitoring flows seamlessly into corporate platforms, where it can be analyzed to provide farmers with actionable feedback. This feedback is essential for improving carbon sequestration efforts and fine-tuning agricultural practices to achieve better environmental outcomes (Hackfort et al., 2024). Such platforms contribute to more efficient farm management and align with broader sustainability goals by aiding farmers in reducing their carbon footprints.

However, the effectiveness of monitoring and adaptation through these platforms is not without challenges. The quality and accuracy of the data collected are critical factors; incomplete or non-representative data can lead to suboptimal recommendations and practices. Additionally, the adaptation strategies promoted by these platforms must be tailored to local contexts, which is particularly challenging in regions with limited digital infrastructure (Wysel et al., 2021). Continuous monitoring of stakeholder interactions and the evolving needs of users is necessary to ensure that these platforms consistently create and maintain value.

4. CONCLUSIONS

Digital platforms have become indispensable in the creation and capture of value from agricultural data, fundamentally transforming how the agricultural sector operates. These platforms serve as the central hubs through which vast amounts of data generated from various sources—ranging from environmental sensors and farm machinery to market data and consumer trends—are aggregated, analyzed, and converted into actionable insights. By leveraging advanced technologies such as big data analytics, the IoT, and artificial intelligence, these platforms enable a more precise and efficient approach to farming, enhancing productivity, sustainability, and profitability across the agricultural value chain (Klingenberg et al., 2022). The use of platforms is particularly significant in ensuring that data-driven insights are accessible and actionable (Wysel et al., 2021).

The value creation mechanisms of digital platforms—such as transparency and access, discovery and experimentation, prediction and optimization, customization and targeting, learning and crowdsourcing, and monitoring and adaptation—are pivotal in transforming data into a strategic asset. Platforms provide the infrastructure necessary to aggregate diverse data sources, integrate advanced analytics, and deliver tailored solutions that meet the specific needs of farmers and agribusinesses. The ability to customize and target solutions to specific farm needs further amplifies the value derived from these platforms, ensuring that farmers can apply the most relevant and effective strategies to their unique conditions. Moreover, digital platforms enhance transparency and access to critical agricultural data, democratizing information that was once inaccessible to smaller or less technologically equipped farmers. This transparency fosters trust among stakeholders and drives collective action towards more sustainable and efficient farming practices. By enabling discovery and experimentation, these platforms encourage innovation, allowing farmers to test new techniques and share their findings with a broader community, thereby contributing to the continuous improvement of agricultural practices.

The success of these mechanisms in creating value is undeniable, yet much of the value is interpreted through the lens of financial profit. For many farmers, the primary value of data lies in the profits derived from utilizing them compared to not utilizing them, as data allow them to optimize processes, reduce costs, and enhance productivity—ultimately increasing their financial returns. The emphasis on quantifying economic value can sometimes overshadow the importance of ensuring that the value generated by digital platforms also contributes to broader goals like sustainability and equity within the agricultural sector (Bustamante, 2023). Yet, achieving these broader goals is not without challenges, especially when it comes to ensuring equitable access and adoption. Although large agribusinesses/farms may adopt advanced technologies with greater ease, smaller farms may struggle to keep pace (Ciasullo et al., 2024; Saggi & Jain, 2018) and could face barriers such as limited digital literacy, infrastructure deficiencies, and higher costs (Janssen et al., 2017; Birner et al., 2021; Sadovska et al., 2023). To ensure equitable value distribution, platforms must be adaptable, accessible, and inclusive of diverse farm sizes. Moreover, the concentration of data ownership and dependency on proprietary platforms raise concerns (Anidu & Dara, 2021; Hackfort et al., 2024; Baarbé et al., 2019; Kaur & Dara, 2023; Rozenstein et al., 2024). A key consideration here is not merely who owns the data, but who captures the value from them. With platforms controlling much of the data infrastructure, questions arise about how much value remains with the farmers and how much is controlled by the platforms. Ensuring data protection, safety, and security is crucial to maintaining trust and fostering long-term loyalty among users. Without robust data governance frameworks, the potential for value creation could be compromised by privacy and security risks, undermining the benefits of platforms (Kieti et al., 2021).

While digital platforms are central to unlocking the full potential of agricultural data, their continued success depends on addressing the challenges of inclusivity, data governance, and equitable value distribution. Particular attention should be paid to ensuring that the value created through digitalization reaches small farms and under-resourced areas, where infrastructure limitations or cost barriers can otherwise hinder access. Though the digitalization process may differ between developed and

developing countries (Coble et al., 2018; Eastwood et al., 2023; Janssen et al., 2017; Baarbé et al., 2019), with each facing distinct challenges, the mechanisms of value creation mostly remain relevant across contexts. Therefore, it is crucial to delve deeper into the value creation mechanisms from agricultural data and develop methodologies that enable both the creation and capture of value. These methodologies should be designed to address the unique needs and constraints of various stakeholders, ensuring that data-driven innovations not only enhance productivity and profitability but also contribute to broader societal goals such as sustainability and inclusivity.

Given these dynamics, this research represents one of the first steps in an ongoing effort to develop a comprehensive understanding of how to create value from agricultural data. The insights gained from this study will inform the next stages of research, which will focus on developing robust methodologies to measure the value of data in agri-data ecosystem. This will include balancing economic outcomes with societal goals, ensuring that the benefits of digital platforms contribute to the long-term sustainability and resilience of the agricultural sector.

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