

## Digital Strategy, Digital Leadership, Organizational Agility, and Digital Transformation for Agricultural Business Sustainability: A Human Resource Management Review

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Digitalization has brought a transformation approach from all aspects. Various literatures state that agricultural digitalization is a necessity followed by aspects of human resource management for business sustainability. Various empirical evidence states that business continuity in the digital era is greatly influenced by various factors, including digital strategy, digital leadership, organizational agility, and digital transformation. The study aims to present empirical evidence regarding the practice and/or factors of digital strategy, digital leadership, organizational agility, and digital transformation by comparing the case of agricultural business sustainability and business sustainability in the context of human resource management practices. Using a systematic literature review approach involving 59 journals, consisting of 19 journals concerning the topic of agricultural business sustainability, and 40 journals in the context of human resource management. The journals as secondary sources are limited to the latest international research journals, namely publications between 2020-2024. The results of the analysis found that discussions on digital strategy, digital leadership, organizational agility, and digital transformation for agricultural business sustainability began to be carried out in 2023, and there is a possibility of increasing in the coming years. The future study agenda to produce theoretical building is an investigation into the role of digital leadership in creating scenarios for the development and sustainability of agricultural businesses. The second finding is that from the perspective of human resource management, the reconstruction of theoretical evidence of digital strategy, digital leadership, organizational agility, and digital transformation for business sustainability still needs to be explored further. The theoretical contribution is that for the sustainability of agricultural businesses, the role of digital leadership needs further proof of business transformation and sustainability. A review of human resource management practices is also needed because organizational agility with digital strategies is not enough to explain digital transformation. As a practical contribution, companies must adapt early on to transform their businesses with a digital approach, because the era of digital technology requires digitalization. There is already a lot of evidence of a company failing and experiencing severe decline due to ignoring digital transformation.

**Keywords:** Agricultural business, business sustainability, digital strategy, digital leadership, organizational agility, digital transformation, human resource management.

### INTRODUCTION

In this digital era, business activities have undergone quite fundamental changes, both in the way businesses operate, interact with customers, and compete in the global market (Warner and Wäger, 2019). It can even be said that the digital revolution that has changed the business world is due to modern technology (Urbach and Ahlemann, 2019), and

changes the way of life and interaction (Imamov and Semenikhina, 2021). The rapid digital revolution has changed the business paradigm around the world, especially in companies that utilize digital technology activities must actively adapt to change to remain competitive and sustainable, so it is a necessity in facing the Industrial Revolution 5.0.

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Coelho *et al.* (2022); Demir *et al.* (2019); Özdemir and Hekim, (2018); Sachsenmeier (2016) are of the view that the future of industry must focus on the integration and synergy between technology and humans. Likewise, Huang *et al.* (2022); Iliadis (2021); Morrar *et al.* (2017) that the presence of digital services seems to be an "urgent need" for companies to develop systems that are more adaptive to information technology as a form of digital transformation. Therefore, every business actor must be responsive to environmental changes (Pereira and Romero, 2017), and make technology the main foundation for operational activities and business strategies (Zhang *et al.*, 2023; Anshari and Almunawar, 2021). Thus, the extraordinary development of technology has changed business activities, all the changes that have occurred coupled with the equally important organizational redesign, have created conditions for a fully digital company. Laudon and Laudon (2022) stated that a digital company (digital firm) is a company whose almost all business activities are significantly connected to customers, suppliers, and employees who are run and mediated digitally, core business processes are run through digital networks that span the entire organization or connect several organizations. Furthermore, digital companies have managed the company's main assets (intellectual property, core competencies, financial assets, and human resources) through digital means, in addition, any information needed to support key business decisions is available anytime and anywhere in the company (Laudon and Laudon, 2022). Digital companies sense and respond to their environment much faster than traditional companies, giving them more flexibility to survive in turbulent times, in addition, digital companies offer opportunities for change for more flexible global organizations and management.

One of the interesting phenomena of digital companies today is related to the company's ability to implement digital technology or digital transformation and to be able to continuously run its business activities sustainably (sustainability). Globally, some companies have succeeded in implementing digital business, for example, some global companies including Google, Amazon, LEGO, Netflix, Disney, Starbucks, Unilever, IKEA, Alibaba, and Shoope.

Although several digital companies have changed the world and have been successful in implementing digitalization, this is very ironic with the survey report conducted by McKinsey & Company stated by Robinson (2019) that around 70% of companies fail in digital transformation, this is not solely due to technological factors but the main factor in digital transformational failure lies in management and readiness to adapt to change.

The rapid advancement of technology and its transformation are also utilized in agricultural development and productivity. Liu and Walsh (2019) stated that the increasing popularity of online shopping has led to an increase in the use of e-commerce in the agricultural sector. For example, Chinese

farmers are increasingly adopting e-commerce as a way to reduce costs and increase efficiency in the agricultural sector (Tang, 2014; Zhang, 2014).

Digital transformation in agriculture has also resulted in the development of new marketing channels for agricultural products. Continuous improvement of modern agricultural circulation systems has facilitated dramatic changes in the marketing channels of agricultural products. Some examples of digital platforms that connect farmers and investors or consumers include ThriveAgric, EZ Farming, and Farmcrowdy (Akinwale *et al.*, 2023). These platforms offer various features such as user-friendly interfaces, risk assessment scores for monitoring, and tracking systems for agricultural activities.

Another example is the DEMETER platform, which uses dynamic programming algorithms to help farmers increase sales and profits from their crops (Akinwale *et al.*, 2023). In addition, Agro World is a Naive Bayes-based system that provides Agriculture as a Service (AaaS), which predicts which crops to plant in a given season and the amount of harvest (Putra *et al.*, 2023). These digital platforms not only help farmers sell their crops more efficiently, but also provide valuable information and resources, such as news, discussion forums, and an e-commerce platform to purchase seeds, equipment, and manure (Putra *et al.*, 2023).

However, there are also challenges associated with the adoption of e-commerce in marketing agricultural products. The gap between those with access to digital technology and those without may limit the potential benefits of e-commerce, especially in rural areas where internet access may be limited (Xu *et al.*, 2017). Like other online platforms, e-commerce sites are vulnerable to cyberattacks, which can compromise sensitive data and disrupt operations. E-commerce can introduce new complexities into the supply chain, such as coordinating logistics, customs, and international shipping. Successful adoption of e-commerce requires a certain level of digital literacy among producers and consumers, which may still be lacking in some communities (Xu *et al.*, 2017). In summary, while e-commerce offers significant benefits for marketing agricultural products, it also presents challenges that need to be addressed to ensure successful implementation and adoption.

Paradigm shifts and digital transformation on the one hand are a necessity, at the same time giving rise to new challenges for business development. Experts and researchers have mentioned several issues that are the basis for future investigations in preparing company human resources for business sustainability (including in the agricultural sector). Chakravorti, 2022; Nasiri *et al.*, 2022; Ziyadin *et al.*, 2020) highlight Digital transformation. Then Senadjki *et al.* (2024); Al-Nuaimi *et al.* (2022); Erhan *et al.* (2022); Ruel *et al.* (2021); Trushkina *et al.* (2020); Băeșu and Bejinaru (2020) examine digital leadership in explaining the digitalization of companies for business sustainability. The digital leadership



in question is the process of leading digital transformation in an organization, which is manifested through the ability to direct, manage, and optimize the use of digital technology to achieve business goals.

Another factor that has been discussed by previous researchers in explaining digital transformation for business progress and sustainability is organizational agility (Troise *et al.*, 2022; Chanas *et al.*, 2019; Westerman, 2014). Organizational agility is the ability of an organization to respond to change quickly and effectively, and describes the organization's ability to: recognize unexpected changes in the environment; adapt to internal and external changes; meet customer needs and expectations quickly; and lead change by improving culture, practices, and results.

Attention is drawn to Porffirio *et al.* (2021); Correani *et al.* (2020); Hess *et al.*, 2020; Sebastian *et al.* (2020) that the success of the digital transformation process for the sustainability of the Company depends on the ability to create a strategy termed digital strategy. The digital strategy in question is a plan made to utilize digital technology to achieve business goals. The digital strategy relies more on short-term roadmaps that are linked to measurable business goals.

The above factors become new challenges in reviewing empirical and theoretical evidence. As a first step, it is necessary to map the role (implementation) of digital strategy, digital leadership, organizational agility, and digital transformation for business sustainability. This study uses a literature study approach by taking a comparative case of business sustainability in the agricultural sector and business sustainability in the context of human resource management practices.

## MATERIALS AND METHODS

This study uses a literature study paradigm which is also called a literature review. Various sources state that literature research or literature review is research that critically examines or reviews knowledge, ideas, or findings contained in a collection of academically oriented literature, and formulates its theoretical and methodological contributions to a particular topic (Lim *et al.*, 2022; Luft *et al.*, 2022; Creswell, 2018; Booth *et al.*, 2016; Boell and Cecez-Kecmanovic, 2014).

Literature review using systematic review design. Kosztyán *et al.* (2021); Pursell and McRae (2020) stated that a systematic review is a research approach based on reality-based or evidence-based practices and actions. In line with that, Lame (2019); Cash (2018); Sio *et al.* (2015) stated that a systematic literature review is a research method to identify, evaluate, and interpret all relevant research results related to a particular research question, a particular topic, or a phenomenon of concern. Another view is that a systematic review is a study that uses secondary data or sources (Snyder, 2019; Palmatier *et al.*, 2018; Jahan *et al.*, 2016; Boyd and

Solarino, 2016; Rodell *et al.*, 2016; Carlborg *et al.*, 2014). Based on the views outlined above, the systematic design of the literature review in research is based on relevant journals and scientific reports as empirical evidence.

There are three main stages or processes carried out in research with a systematic literature review, namely planning, implementation, and reporting (Chukwuere, 2023; Galvan and Galvan, 2017; Ravitch and Riggan, 2016; Tricco *et al.*, 2015). The operational stages in this study are explained in the Figure 1 scheme.

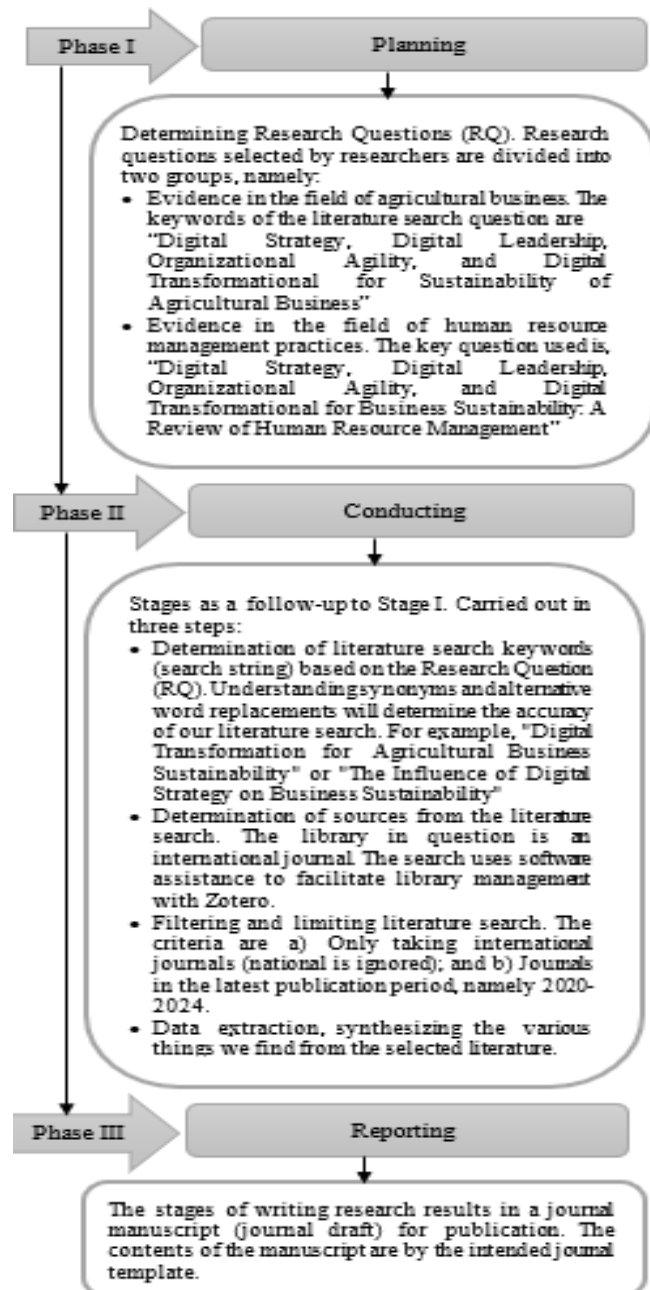


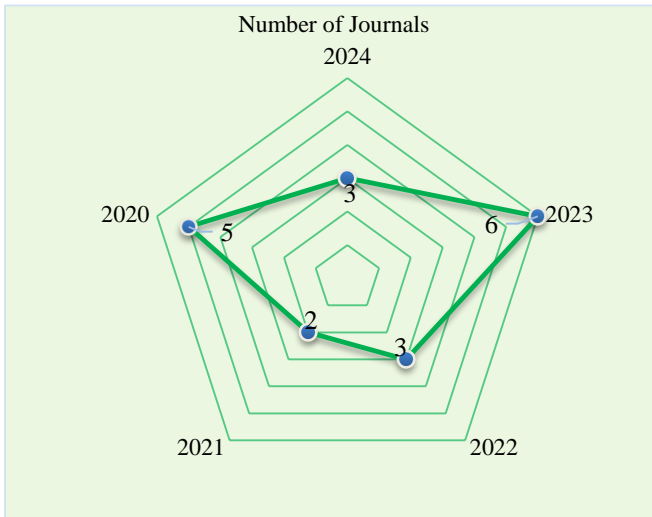
Figure 1. Stages of systematic literature review research.



Based on the three stages, 59 secondary sources were obtained, consisting of 19 journals on the sustainability of agricultural businesses in terms of implementing "Digital Strategy, Digital Leadership, Organizational Agility, and Digital Transformation". Then there are 40 journals related to human resource management practices in terms of "Digital Strategy, Digital Leadership, Organizational Agility, and Digital Transformation for Business Continuity".

**RESULTS**

**Sustainability of Agricultural Business:** The study on "Digital Strategy, Digital Leadership, Organizational Agility, and Digital Transformation" for the sustainability of agricultural businesses successfully identified 19 journals. During the observation period, the most journal publications were found in 2023, namely 6 journals or 31.58% of the total journals. The lowest frequency occurred in 2021, with only 2 journals or only 10.53%. More complete information is presented in Figure 2.

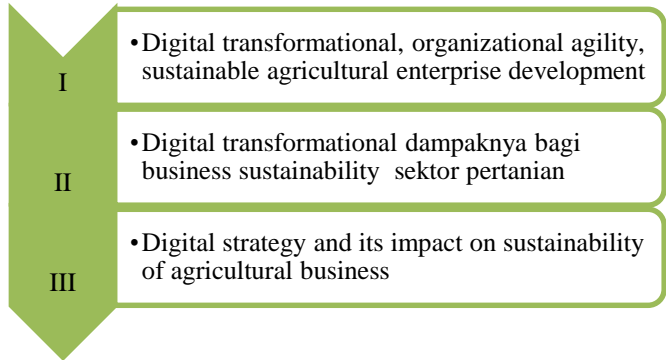


**Figure 2. Number of publications for agricultural business sustainability.**

Another fact found is a decrease in the frequency of publications in 2021 and 2022. This indicates a decrease in interest or interest in research on digital strategy, digital leadership, organizational agility, and digital transformation" for the sustainability of agricultural businesses.

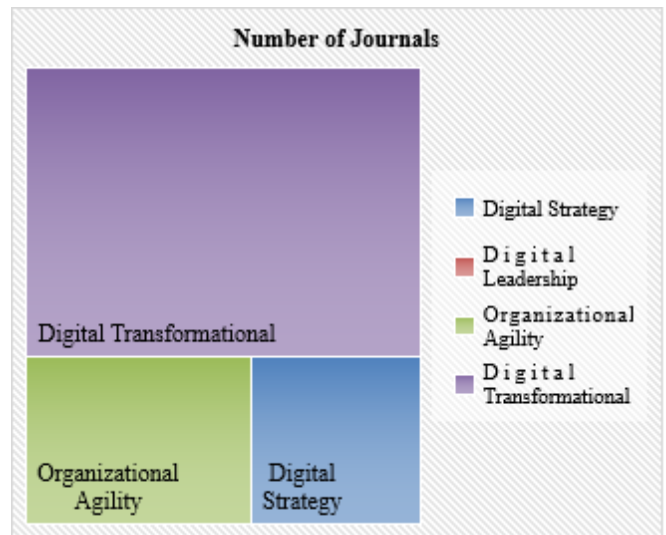
The next fact is the focus grouping of the topics discussed. As presented in Figure 3, the themes discussed are divided into three clusters. The largest cluster by number of journals is the theme "Digital transformation, organizational agility, sustainable agricultural business development" with 13 journals. Those who discuss this are [Dejanovic et al. \(2024\)](#); [Hassoun et al. \(2023\)](#); [Wang et al. \(2023\)](#); [Aké and Boiral \(2023\)](#); [Li and Lin \(2023\)](#); [Wang et al. \(2022\)](#); [Cavicchi et al.](#)

[\(2022\)](#); [Sarkar et al. \(2021\)](#); [Verevka et al. \(2021\)](#); [Li et al. \(2021\)](#); [Khanna \(2020\)](#); [Lin et al. \(2020\)](#); [Abadi et al. \(2020\)](#). The second cluster concerns the topic of "digital transformational impact on business sustainability in the agricultural sector" with five journals. Those interested in discussing this are [Kharashvili et al. \(2024\)](#); [Chen et al. \(2024\)](#); [Nencheva and Penev \(2023\)](#); [Frau et al. \(2022\)](#); [Hrustek \(2020\)](#). The third cluster with a focus on the research theme is "digital strategy and its impact on the sustainability of agricultural business". This theme is only reported by [Abbate et al. \(2023\)](#).



**Figure 3. Focus group research theme for agricultural business sustainability.**

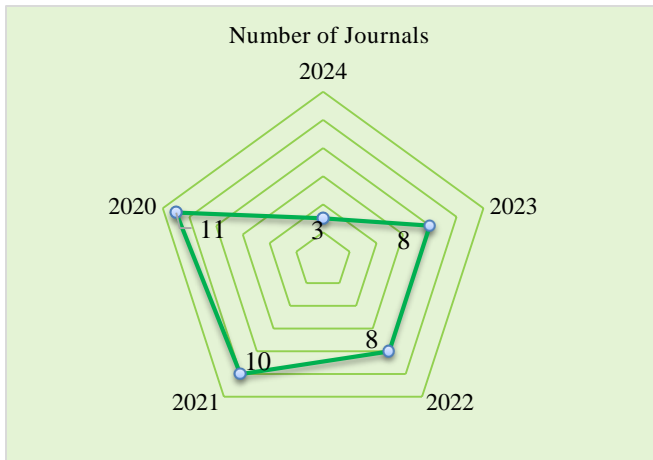
The last is the mapping of the frequency of studies from the four analysis focuses as presented in Figure 4. Digital transformation is the most studied, namely 12 journals, or equivalent to 63.16% of the total journals. Followed by organizational agility with 4 journals (21.05%) and digital strategy with 3 journals (15.79%). Meanwhile, digital leadership is not discussed at all.



**Figure 4. Frequency mapping of research study topics on agricultural business sustainability.**



**Human Resource Management Practices:** The study “Digital Strategy, Digital Leadership, Organizational Agility, and Digital Transformation” for business sustainability in terms of human resource management practices during the 2020-2024 period identified 40 journals. As seen in Figure 5, the highest frequency of research was conducted in 2020 with 11 journals contributing around 27.50% of the total. Followed by research conducted in 2021 with 11 journals or 25.00%. Then between 2022 and 2023, they have the same frequency, namely 8 journals or 20.00% each. Specifically in 2024, publications until the end of August were only 3 journals or contributing around 7.50% of the total identified.



**Figure 5. Number of publications in the journal of human resource management practices for business sustainability.**

The themes discussed regarding human resource management practices about digital strategy, digital leadership, organizational agility, and digital transformation for business sustainability are classified into seven cluster models. The seven models are generally divided into direct and indirect relationship models. The clusters of the relationship models are presented in Table 1.

The information shows that the highest frequency is the digital transformational relationship model with business sustainability as much as 18 or equivalent to 32%. This proves that researchers are more interested in analyzing the relationship between digital transformation and business sustainability in explaining the application of digital technology. Researchers are also interested in discussing the role of organizational agility with digital transformational with a publication frequency of 11 or 19%. Meanwhile, the study of organizational agility with digital strategy is the smallest with a publication frequency of only 1 or 2%. The mapping of the frequency of the cluster of the relationship model of research topics of human resource management practices is seen in Figure 6.

**Table 1. Research Topic Relationship Model Cluster.**

Model Cluster	Researcher	Frequency
<b>Direct Influence</b>		
Digital strategy with digital transformation	Cui (2024); Porfirio <i>et al.</i> (2021); Wessel <i>et al.</i> (2021); Correani <i>et al.</i> (2020)	5
Digital leadership with digital transformation	Chen <i>et al.</i> (2024); Cui (2024); ; Al-Nuaimi <i>et al.</i> (2022); Erhan <i>et al.</i> (2022); Troise <i>et al.</i> (2022); Persson and Manas (2021); Correani <i>et al.</i> (2020) Morkanyane <i>et al.</i> (2020)	9
Organizational agility with digital transformation	Cui (2024); Ly (2023); ; Troise <i>et al.</i> (2022); Al-Nuaimi <i>et al.</i> (2022); Ferraris <i>et al.</i> (2022); Li <i>et al.</i> (2021); Darvishmotevali <i>et al.</i> (2020); Nguyen <i>et al.</i> (2020)	11
Organizational agility with digital strategy	Shams <i>et al.</i> (2021)	1
Digital transformation with business sustainability	Chen <i>et al.</i> (2024); Su and Wu (2024); Yang and Deng (2023); Chen <i>et al.</i> (2023); Niu <i>et al.</i> (2023); Luo <i>et al.</i> (2023); Zhang <i>et al.</i> (2022); Santarius <i>et al.</i> (2023); Hajishirzi <i>et al.</i> (2022); Zhang <i>et al.</i> (2022); Guo and Chen (2021); Ballestar <i>et al.</i> (2021); Abdalla and Nakagawa (2021); Zuo <i>et al.</i> (2021); George <i>et al.</i> (2020); El-Hilali <i>et al.</i> (2020); Andriushchenko <i>et al.</i> (2020)	18
<b>Indirect Influence</b>		
Digital strategy as a moderation of the relationship between digital leadership and digital transformation	Saes <i>et al.</i> (2022); Wessel <i>et al.</i> (2021); Verhoef <i>et al.</i> (2021); Porfirio <i>et al.</i> (2021); Lipsmeier <i>et al.</i> (2020); Correani <i>et al.</i> (2020); Ates and Acur (2020); Porck <i>et al.</i> (2020)	8
Digital strategy as a moderator of the relationship between organizational agility and digital transformation	Shams <i>et al.</i> (2021); Al-Nuaimi <i>et al.</i> (2022); Fischer <i>et al.</i> (2020); Correani <i>et al.</i> (2020); Morakanyane <i>et al.</i> (2020)	5





**Figure 6. Cluster frequency mapping of research topic relationship model of human resource management practices.**

## DISCUSSION

**Sustainability of Agricultural Business:** Looking at the reviews that have been revealed, it can be seen that digital strategy and organizational agility (including digital leadership) are factors that contribute to shaping digital transformation. The issue of digital transformation has become a necessity for every company as a form of adaptation to advances in digital-based information technology. Referring to the views of [Dejanovic et al. \(2024\)](#); and [Kharraishvili et al. \(2024\)](#), digital transformation has been shown to have a positive impact on the progress and sustainability of agricultural businesses, which are characterized by optimal processes, increased productivity, and encouraging business sustainability. [Dejanovic et al. \(2024\)](#); [Bai et al. \(2023\)](#) continued that the integration of advanced technologies such as precision agriculture, data analytics, and artificial intelligence empowers farmers with real-time data for informed decision-making on crop management, resource utilization, and environmental conservation. Socio-economic benefits, including increased market access for smallholder farmers and rural development, underscore the importance of digitalization.

The opinion of [Dejanovic et al. \(2024\)](#) is supported by that reported by [Li and Lin \(2023\)](#) that with the mechanization of agricultural technology and digital information applications, it can create adaptive farmer behavior with digitalization. Furthermore, [Li and Lin \(2023\)](#); [Aké and Boiral \(2023\)](#) stated that digital transformation of agriculture is beneficial in land conservation as a manifestation of environmental performance through green capabilities.

The next empirical fact is the transformation of agriculture in responding to the challenges of resilience and global economic turmoil, especially during the Covid-19 pandemic and climate change ([Hassoun et al., 2023](#); [Abbate et al., 2023](#)). Such a situation is that food provision becomes more complicated due to mobility restrictions, climate change, and other environmental and social pressures, such as political instability, world population growth, and new disease

outbreaks. In responding to these challenges, the agri-food industry has succeeded in transforming company performance by increasing its efforts to provide food. It is increasingly strong that the transition to digital has become part of the innovation of the fourth industrial revolution (called Industry 4.0) which has and is reshaping most industries ([Hassoun et al., 2023](#)).

However, there are notes conveyed by [Verevka et al. \(2021\)](#) regarding the challenges of digital transformation of agriculture. [Verevka et al. \(2021\)](#) continued, that the main obstacles that have the most significant consequences for the development of the agricultural sector in the future in the context of its digitalization are the lack of digital transformation standards, low digital literacy of rural residents, and very limited network coverage in rural areas.

Next is the managerial level highlight, where agricultural digitalization as part of strategy and digital transformation is highlighted in the food supply chain framework. As stated by [Wang et al. \(2023\)](#) that the managerial framework for agricultural productivity requires digital transformation in the food supply chain (FSC). The expected expectation of the FSC scheme is to offer managerial guidelines to accelerate the growth of the food industry by using emerging Industry 4.0 key technologies. The proposed framework provides clarity on the “neglected” intermediate stage of data management between data collection and analysis. This study highlights the need for a balanced integration of IoT, CC, and BDA as Industry 4.0 key technologies to achieve successful agricultural digital transformation.

The progress of the agricultural sector in the digital era is also influenced by organizational agility. According to [Lin et al. \(2020\)](#), agricultural businesses can grow rapidly if they have the ability (agility) to take action in complex situations. Among the schemes proposed by [Lin et al. \(2020\)](#) is to accelerate the era of e-commerce for agricultural products so that they can enter every form of business market.

Completing the facts and evidence that have been reviewed, as a recommendation for the future agenda is about studies that have escaped the spotlight of previous researchers. The agenda in question is digital leadership. Future research studies on digital leadership are very much needed to provide real contributions in building theories about the role of digital leadership in digital transformation for the sustainability of agricultural businesses. Figure 7 presents a roadmap for future research.

**Human Resource Management Practices:** Human resource management (HRM) practices regarding the implementation of digital strategy, organizational agility, and digital leadership and transforming digital as business continuity are focused on seven topics (as referred to in Table 1). The researchers also emphasized that digital transformation is a must for every company to continue to advance and sustainably run its business. However, attention is paid to digital transformation efforts in HRM to position the



formation of digital strategy, organizational agility, and digital leadership as key factors for business sustainability. It was found that almost all researchers concluded that digital strategy, organizational agility, and digital leadership can accelerate the digital transformation process. The second report is that the weakness of previous research is the lack of references on the relationship between organizational agility and digital strategy in accelerating digital transformation directed at business sustainability. On this basis, it is recommended to conduct further investigations on organizational agility in determining digital strategy together with digital leadership and digital transformation in ensuring business sustainability. The emphasis is on considering the use of digital strategy moderating variables in conditioning the model built. The conceptual framework for future research is presented in Figure 8.



Figure 7. Roadmap and state of the art of future digital-based agricultural business sustainability research.

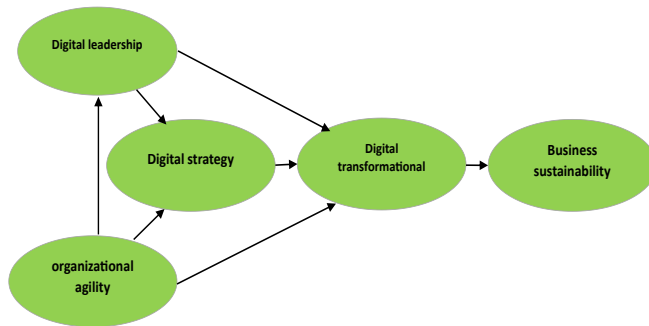


Figure 8. Conceptual framework for future research on human resource management practices for business sustainability.

**Conclusion:** Discussions on digital strategy, digital leadership, organizational agility, and digital transformation for agricultural business sustainability have begun to attract researchers since 2020 and peaked in 2023. It may increase in

the coming years. The future study agenda to produce theoretical construction is a study of the role of digital leadership in creating scenarios for agricultural business development and sustainability. What is more interesting is directed at the managerial aspect, food supply chain, and inclusive issues in agriculture. This is important as an adaptation to economic turmoil and climate change which have a real negative impact on agriculture.

From the perspective of human resource management, the reconstruction of theoretical evidence of digital strategy, digital leadership, organizational agility, and digital transformation for business sustainability still needs to be explored further. There are two focuses of the model that are often suggested, First is the relationship between organizational agility and digital strategy in accelerating digital transformation for business sustainability; and second is the placement of digital strategy as a moderating variable in explaining the role of digital strategy, digital leadership, organizational agility, and digital transformational for business sustainability.

**Authors' contributions:** First author: Zulkifli as the main contributor. Authors: Adnan Hakim, Endro Soekotjo, and Yusuf helped test the research instruments, data validity, and analysis sharpness. Authors: Samdin, Sudirman Zaid, Dedy Takdir Saefuddin, Rahmat Madjid, and Nursaban Rommy checked the quality of the manuscript content to make it worthy of publication in a reputable journal.

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