

Effectiveness of Digital Media as a Communication Medium for Agribusiness and Agricultural Extension in South Kalimantan

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Abstract

The development of information and communication technology has transformed the way agricultural information is delivered to farmers. Digital media provides opportunities to accelerate information dissemination, expand the reach of extension services, and enhance interaction between farmers, extension workers, and agribusiness actors. This study aims to analyze the effectiveness of digital media use as a communication medium for agribusiness and agricultural extension services in South Kalimantan and to identify supporting and inhibiting factors for its use. The study used a qualitative approach with a narrative literature review method. Data sources were research journal articles published in the last 10 years, with particular attention to research conducted in South Kalimantan and other studies relevant to the digitalization of agricultural extension services in Indonesia. The analysis was conducted through identification, grouping, comparison, and synthesis of research findings. The results of the study indicate that digital media has been used as a channel for delivering agricultural information, primarily through WhatsApp, YouTube, Facebook, extension websites, and agricultural applications. In South Kalimantan, WhatsApp use by tidal swamp farmers in Barito Kuala is high, while YouTube use is moderate and Facebook and Instagram are low. Research in Banjarbaru shows that the attitudes of women's farmer group members towards extension services in the digital era are high. The effectiveness of digital media remains influenced by digital literacy, internet network quality, user characteristics, information quality, extension worker capabilities, and institutional support. Therefore, digitalization of extension services needs to be implemented through a combination of digital media and face-to-face communication tailored to the characteristics of farmers.

Keywords

Digital Media, Agribusiness Communication, Agricultural Extension, Farmers, South Kalimantan



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INTRODUCTION

Communication is a crucial element in agribusiness development because production, processing, marketing, and farmer decision-making processes require accurate information. Farmers need information on production technology,

production facilities, weather conditions, prices, markets, pest and disease control, and agricultural innovation. In these conditions, agricultural extension workers play a strategic role as a liaison between sources of innovation and farmers. Developments in information and communication technology have provided new alternatives for delivering agricultural information through various digital media. The digitalization of agricultural extension has grown in line with the increasing use of smartphones and the internet. Social media, agricultural applications, websites, and internet-based communication services allow agricultural information to be delivered without the need for face-to-face meetings. Research by Sirajuddin and Kamba (2021) shows that the use of information and communication technology in agricultural extension is related to farmers' perceptions of the technology's usefulness and ease of use. These findings indicate that farmers' acceptance of digital media is determined not only by the availability of the technology but also by the extent to which the technology is perceived as useful and easy to use. The use of digital technology also provides opportunities for extension workers to expand their service reach. Cahyono et al. (2020) explain that Cyber Extension can play a role in assisting agricultural extension workers in carrying out their duties in the digital era. This study used the Technology Acceptance Model framework to examine the adoption of Cyber Extension by agricultural extension workers. Meanwhile, Sugihono et al. demonstrated that the integration of information and communication technology, including social media and smartphones, can present both opportunities and challenges in transforming agricultural extension services.

In the context of farmers, digital media is not only used to receive extension materials but also to seek information and communicate with other farmers. Research on the use of Cyber Extension shows that the use of digital media as an information source can be related to improving farmers' capabilities in managing innovation. Other research on digital agricultural applications in Indonesia shows that performance expectations, business expectations, facilitating conditions, and behavioral intentions are factors related to the use of digital applications by small-scale farmers. The problem of agricultural digitalization is not only related to the availability of applications. Satria et al., (2024/2025) found that the adoption of digital agricultural technology by small-scale farmers in Indonesia still faces obstacles such as limited digital literacy, internet and electricity quality, economic factors, and a mismatch between infrastructure development and user training. These findings suggest that technology provision must be accompanied by increased user

capabilities and institutional support. This condition is relevant to South Kalimantan, which has diverse agricultural characteristics, including tidal swamps and lowlands.

Research by Alif et al., (2023) on tidal swamp farmers in Sungai Kambat Village, Cerbon District, Barito Kuala Regency, showed that social media has been used in agricultural activities. WhatsApp utilization is in the high category, YouTube is in the medium category, while Facebook and Instagram are in the low category. This finding indicates that the types of media used by farmers vary in their level of utilization. Another study conducted in Banjarbaru City on the behavior of Women Farmers Group members in agricultural extension activities in the digital era showed that the attitude element was in the high category at 71.64%, while knowledge and skills were in the fairly high category at 65.12% and 57.32%, respectively. Internal and external factors were also found to have a positive and significant influence on the behavior of KWT members in extension activities in the digital era. This condition shows that the digitalization of agricultural communication in South Kalimantan has developed, but its effectiveness cannot be measured solely by the existence of technology. Communication effectiveness needs to be seen from the media's ability to convey relevant, easy-to-understand, and reliable information, and can help farmers make decisions and implement innovations. Thus, it is necessary to examine various research findings to obtain a more comprehensive picture of the effectiveness of digital media as a communication medium for agribusiness and agricultural extension. Based on this description, this study aims to analyzing the effectiveness of using digital media as a medium for agribusiness communication and agricultural extension in South Kalimantan, identifying the forms of digital media used, and analyzing the supporting and inhibiting factors for the effectiveness of digital communication in agricultural activities.

METHODS

This study employed a qualitative approach with a narrative literature review method. This approach was used to identify, compare, and synthesize research findings related to the use of digital media in agribusiness communication and agricultural extension. The literature review method was chosen because the study aimed to gain an understanding of digital media utilization patterns and factors influencing its effectiveness based on previous research. The research data sources were scientific journal articles published between 2017 and 2026. Sources were selected based on topic suitability, source quality, year of publication, and relevance to the research location. Particular attention was paid to research conducted in South

Kalimantan, while research from other regions in Indonesia was used as a comparison to strengthen interpretation.

The source criteria used include: (1) discussing information and communication technology, digital media, social media, Cyber Extension, or agricultural applications; (2) having a relationship with agricultural communication, extension, or agribusiness activities; (3) in the form of research articles or scientific studies that can be traced; and (4) published in the last ten years according to the assignment requirements. The analysis was conducted in four stages. The first stage is the identification of relevant sources. The second stage is grouping findings based on the type of digital media, users, benefits, effectiveness, and obstacles. The third stage is a comparison of research results, especially between research in South Kalimantan and research in other regions. The fourth stage is a synthesis to obtain conclusions regarding the effectiveness of digital media in agribusiness communication and agricultural extension. The effectiveness of communication in this study is understood through several aspects, namely the ability of digital media to accelerate information access, increase communication reach, facilitate interaction, improve farmer understanding, support the implementation of innovation, and assist farmers in farming activities. This approach is used so that effectiveness is not only understood based on the intensity of media use, but also based on the benefits of the communication produced.

FINDINGS AND DISCUSSION

Utilization of Digital Media in Agricultural Communication

The study results show that digital media has become an integral part of the agricultural communication process in Indonesia. The media used include WhatsApp, Facebook, YouTube, Instagram, the Cyber Extension website, agricultural applications, and various other digital platforms. Differences in media characteristics lead to varying levels of utilization. WhatsApp is one of the most widely used media because it offers direct communication and allows for the formation of communication groups. Through groups, extension workers can send materials, make announcements, answer questions, and discuss farming issues. These characteristics enable WhatsApp to function as both interpersonal and group communication. Research by Alif et al. (2023) provides empirical evidence highly relevant to the South Kalimantan context. Among tidal swamp farmers in Sungai Kambat Village, Barito Kuala Regency, WhatsApp utilization is high. Meanwhile, YouTube is in the medium category, and Facebook and Instagram are in the low category. These differences can be explained by the characteristics of each medium.

WhatsApp provides relatively direct two-way communication, while YouTube functions more as a source of audiovisual materials. Facebook and Instagram have more open and content-based communication characteristics, so their utilization levels can be influenced by farmers' habits and information needs.

These findings demonstrate that agricultural communication strategies should not adopt a "one-size-fits-all" approach. Extension workers need to select media based on farmer characteristics, the type of information, and the communication objectives. Brief information about activity schedules or farming issues can be delivered via WhatsApp, while material requiring visual demonstrations can be developed through video.

The Effectiveness of Digital Media as an Information Channel

The effectiveness of digital media can be seen in its ability to accelerate and expand access to information. Research on the integration of ICT in extension services shows that information and communication technology provides opportunities for extension workers to expand services and communicate with farmers through digital media. Compared to communication that relies entirely on face-to-face meetings, digital media allows information to be retransmitted when farmers need it. Extension materials can also be stored in the form of photos, documents, videos, or messages for later review. However, the speed of information delivery does not always equate to communication effectiveness. Information that is fast but difficult to understand or does not meet farmers' needs will not result in optimal communication. Therefore, message quality remains a crucial factor. Sirajuddin and Kamba (2021) demonstrated the importance of perceived usefulness and ease of use in ICT acceptance by farmers. Thus, effective digital media is not only available but also perceived as useful and easy to use by its users.



Figure 1. Digital-based outreach to the community

The effectiveness of digital media can be seen in its ability to accelerate and expand access to information. Research on the integration of ICT in extension services shows that information and communication technology provides opportunities for extension workers to expand services and communicate with farmers through digital media. Compared to communication that relies entirely on face-to-face meetings, digital media allows information to be retransmitted when farmers need it. Extension materials can also be stored in the form of photos, documents, videos, or messages for later review. The use of digital technology in extension services can increase service reach and provide flexibility for farmers in accessing information. However, the speed of information delivery does not always equate to communication effectiveness. Information that is fast but difficult to understand or does not meet farmers' needs will not result in optimal communication. Therefore, message quality remains a crucial factor. The effectiveness of digital communication is also influenced by users' ability to understand and use the technology. Sirajuddin and Kamba (2021) demonstrated the importance of perceived usefulness and ease of use in ICT acceptance by farmers. Thus, effective digital media is not only available but also perceived as useful and easy to use by its users. In addition, digital media can increase the reach and flexibility of extension services because extension workers can convey information to more farmers without always having to meet in person.

The digitalization of agricultural extension services also allows for the delivery of agricultural information more tailored to the needs and conditions of farmers. Digital media also enables two-way communication. Farmers can ask questions, raise concerns, and share experiences through various digital platforms. This type of communication can support the learning process and knowledge exchange between farmers and extension workers (Dahlan et al., 2024). However, the implementation of digital media still faces several obstacles, such as limited internet access, device availability, digital literacy skills, and differences in farmers' abilities to use technology. Therefore, the use of digital media in extension services needs to be tailored to the conditions and capabilities of the target group to ensure the information provided is truly useful.

Digital Media and Farmer Behavior

One indicator of successful extension communication is changes in farmer knowledge, attitudes, skills, and behavior. Research in Banjarbaru City shows that

extension activities in the digital era have received a relatively positive response from KWT members. Attitudes were in the high category at 71.64%, while

Knowledge and skills were in the fairly high category at 65.12% and 57.32%, respectively. These results show that acceptance of digitalization is not only in the form of technology use, but also related to user responses to extension activities. Internal and external factors each had a positive and significant influence on the behavior of KWT members. The coefficient of influence of internal factors was recorded at 0.430, while external factors were 0.455. These findings reinforce the view that the effectiveness of digital communication is the result of the interaction between technology and humans. Technology can be a communication channel, but the user's ability to understand, assess, and apply information still determines the final outcome.

Overall, this analysis emphasizes that the effectiveness of digital communications should not be measured solely based on the availability or intensity of technology use. This effectiveness is the result of a dynamic interaction between technological capabilities and the availability of human resources. Even though technology functions as a channel for conveying information, the farmer's ability to understand, assess and apply this information in farming remains the main determinant of the final outcome of the communication. To maximize the impact of digital extension in South Kalimantan, mentoring strategies need to focus on increasing farmers' practical skills to balance the positive attitudes that have been formed.

The Role of Extension Workers in Digital Communication

Digitalization does not eliminate the role of extension workers. On the contrary, technological changes have expanded their role. Extension workers are not only information providers but are also required to be able to search, verify, package, and disseminate information in a format that suits the characteristics of farmers. Research by Cahyono et al., (2020) on the adoption of Cyber Extension demonstrates the importance of technology adoption in implementing digital-based extension services. Research on the digital performance of extension workers also shows that the ability of extension workers to utilize technology is a crucial part of extension transformation. In practice, extension workers need to be able to create concise and easy-to-understand materials. Lengthy technical information can be packaged into images, infographics, short videos, or simple messages. This is crucial because farmers have different levels of education, experience, digital skills, and information needs. Therefore, digitalization should not be understood as replacing extension

workers with technology. Technology serves as a tool that strengthens extension workers' ability to reach and serve farmers.

The shift in communication paradigm from conventional to digital demands a fundamental reconstruction of the role of agricultural extension workers. Extension workers no longer merely act as linear information disseminators, but must transform into content curators and digital network facilitators. Cahyono et al., (2020) suggest that the effectiveness of agricultural information systems, such as Cyber Extension, adopted by extension workers is heavily influenced by their level of technological competence and perceived usefulness in simplifying their workload. However, the reality on the ground demonstrates a digital capacity gap among extension workers themselves. Kustiari and Budiman (2023) in their research on the digital performance of extension workers emphasized that many senior extension workers experience anxiety or psychological discomfort due to rapid technological change, often resulting in the use of digital media merely as an administrative formality, rather than substantive integration. Therefore, agribusiness digitalization in South Kalimantan requires a structured capacity building program for extension workers, including training in the production of audiovisual extension media that is adaptive to local swamp characteristics, as well as data literacy skills so that extension workers are able to translate macro market price trends into tactical recommendations for their assisted farmer groups.

Barriers to Digital Media Use

Despite its numerous benefits, digital extension services face a number of obstacles. Satria et al. showed that the adoption of digital agricultural technology by smallholder farmers in Indonesia still faces challenges such as digital literacy, limited internet and electricity infrastructure, economic factors, and a mismatch between infrastructure investment and training. These obstacles are also reflected in research on the use of social media in agricultural extension activities.

Extension services in other regions. Anang and Cipani (2022), for example, found that barriers to using social media in extension services included poor internet connectivity, farmer age, limited technological skills, and smartphone ownership. These findings are important for South Kalimantan because agricultural conditions are not uniform. Rural areas, swampy areas, and areas far from service centers can have varying network quality and device access. Therefore, digitalization programs for extension services need to consider the digital divide. Digital literacy is also a crucial factor. Research on readiness to adopt information technology in farmer

groups shows that digital readiness is not only related to technical capabilities, but also encompasses digital skills, digital ethics, digital security, and digital culture.

Although digital transformation promises efficient information distribution, the reality on the ground shows a significant digital divide in Indonesia's agricultural sector, particularly in peripheral areas. Satria et al., (2024) emphasized that the main obstacle to agricultural technology adoption is not solely farmer reluctance, but rather the result of limited basic infrastructure, such as unstable electricity networks and weak telecommunications signals in rural areas. In the geographic context of South Kalimantan, these spatial barriers are further complicated given that the majority of productive agricultural areas are tidal and lowland swamp ecosystems. Swamp farmers in areas like Barito Kuala often operate in remote areas with minimal signal transmission towers. This unstable internet connection directly limits farmers' ability to access high-bandwidth visual extension platforms like YouTube or independent agricultural applications, forcing them to rely on lightweight text-based platforms like WhatsApp. Beyond structural infrastructure issues, another crucial obstacle is the low substantive digital literacy capacity at the farmer level.

Az-Zahra et al., (2024) stated that the digital readiness of farmer groups is often stuck at the operational skills level (simply being able to turn on a device and open social media applications), but is still very weak in the aspects of information skills and strategic skills, namely the ability to sort out the validity of agricultural information, avoid disinformation (hoaxes), and execute digital data into economic decisions in the field. This limited literacy is exacerbated by sociopsychological factors in the form of cultural resistance, where senior farmers tend to feel insecure in contact with digital application interfaces that are considered complicated. Economic factors also play a role; the cost of internet quotas and limited capital to update smart devices (smartphones) compatible with modern agricultural applications place digital technology as a new expense burden for small farmers, rather than as an investment instrument for farming.

Media Suitability with Farmer Characteristics

The synthesis results show that digital media cannot be separated from the characteristics of its users. Farmers who are accustomed to using smartphones are likely to be more receptive to digital media than farmers with limited experience using technology. Research by Sihombing et al., (2024) on digital agricultural applications among small-scale farmers showed that performance expectations, effort expectations, and facilitating conditions were related to application use through behavioral intentions. The study also showed that age can moderate some of the

relationships between variables. This means that digital extension services need to be designed with user segmentation in mind. Young farmers can be more easily directed to digital applications and audiovisual content, while farmers who are less familiar with technology may require direct assistance. This approach is also in line with research findings in Barito Kuala. The high use of WhatsApp compared to other media suggests that simple and familiar media may be a more easily accepted option by farmers.

In the social reality of farmers in South Kalimantan, the high adoption of WhatsApp occurs because the platform offers a very low effort expectancy; that is, the application is very easy to operate, does not require high device specifications, and resembles the traditional word-of-mouth communication patterns that farmers are already familiar with. In contrast, specialized agricultural applications or macro-visual social media are considered to have less performance expectancy. concrete for swamp farmers because the content presented is often general (macro) and less applicable to the specific characteristics of local swamp cultivation.

The variables of age and demographic background also act as moderator variables. mempertegas polarisasi digital ini. Karakteristik petani di Kalimantan Selatan didominasi oleh kelompok usia tua dengan tingkat pendidikan formal yang relatif rendah, yang secara alamiah menurunkan tingkat adopsi teknologi kompleks. Namun demikian, riset Pahlevi et al., (2024) di Banjarbaru memberikan anomali positif di mana anggota Kelompok Wanita Tani (KWT) menunjukkan determinasi sikap yang tinggi (71,64%) terhadap digitalisasi penyuluhan. Hal ini membuktikan bahwa faktor lingkungan sosial, dukungan kelompok, dan pendampingan penyuluh yang intensif (sebagai bagian dari facilitating conditions) mampu mengompensasi kelemahan aspek keterampilan teknis individual petani. Oleh sebab itu, strategi intervensi digital tidak boleh disamaratakan; petani muda potensial dapat diarahkan menjadi early adopters untuk mengeksplorasi aplikasi agribisnis dan pemasaran digital, sedangkan petani senior tetap dikawal melalui kombinasi media komunikasi yang paling sederhana.

Integrasi Komunikasi Digital dan Tatap Muka

Berdasarkan keseluruhan hasil kajian, penggunaan media digital tidak sebaiknya berdiri sendiri. Komunikasi tatap muka tetap diperlukan terutama untuk materi yang membutuhkan praktik, demonstrasi, diskusi mendalam, atau penyelesaian masalah spesifik. Media digital dapat digunakan sebelum kegiatan tatap muka untuk memberikan informasi awal, selama kegiatan untuk mendukung dokumentasi dan diskusi, serta setelah kegiatan untuk melakukan pendampingan.

Dengan pola tersebut, komunikasi digital dan komunikasi interpersonal dapat saling melengkapi. Pola integrasi tersebut juga sesuai dengan kondisi petani yang memiliki tingkat kemampuan digital yang berbeda. Petani yang mampu menggunakan media digital dapat memperoleh informasi secara mandiri, sedangkan petani yang mengalami kesulitan tetap mendapatkan pendampingan melalui komunikasi langsung. Keberhasilan digitalisasi komunikasi agribisnis tidak boleh diartikan sebagai substitusi total terhadap interaksi fisik, melainkan sebuah konvergensi strategis melalui pendekatan Blended Extension (Penyuluhan Bauran). Sugihono et al., (2024) menekankan bahwa integrasi teknologi informasi tidak bertujuan untuk menghapus komunikasi interpersonal, melainkan sebagai akselerator efisiensi sebelum dan sesudah interaksi tatap muka dilakukan.

Agricultural innovations, particularly those related to the introduction of new varieties or integrated pest management in tidal swamps, are characterized by a high level of complexity and testability, requiring direct demonstration plots in the field to provide farmers with empirical confidence. In this integrated scheme, digital media such as WhatsApp serves as a pre-extension channel for disseminating initial modules or early weather warnings, while face-to-face meetings focus on providing critical discussions, solving specific problems, and strengthening social ties (social capital) within farmer groups. This blended model minimizes the risk of exclusion for senior farmers who are technologically challenged, as knowledge transfer is ensured through direct mentoring, while also accommodating the needs of younger farmers who desire fast and independent access to information. This harmonious integration of technological and humanistic aspects is an absolute prerequisite for creating an inclusive and sustainable agricultural communication ecosystem in South Kalimantan.

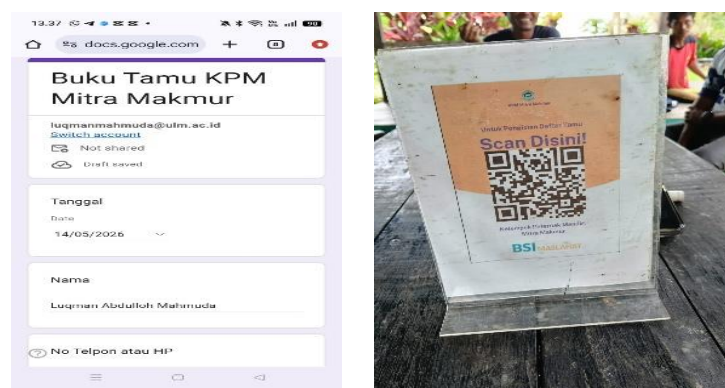


Figure 2. Digital media facilitates interaction and marketing for farmer groups.

Implications for Agribusiness Communication in South Kalimantan

The effectiveness of digital communication is not only crucial for extension activities but also for the overall agribusiness system. Digital information can be used

to connect farmers with input sources, markets, consumers, financial institutions, extension workers, and other business actors. Digital communication can support the process of seeking price information, promoting agricultural products, marketing products, exchanging experiences, and making decisions. Thus, the use of digital media has the potential to strengthen relationships between actors in the agribusiness system. In the context of South Kalimantan, local research on social media use by farmers in Barito Kuala and the behavior of farmer-group (KWT) in Banjarbaru indicates that digitalization has become an integral part of regional agricultural communication. However, the development of digital communication must still take into account local agricultural characteristics. Swamp conditions, different commodities, farmer capabilities, network quality, and varying information needs require communication strategies to be tailored at the local level.

Developing an agribusiness communication strategy in South Kalimantan must take into account the unique local geographic characteristics, which are dominated by tidal swamp and lowland swamp ecosystems. The high use of platforms like WhatsApp among tidal swamp farmers in Barito Kuala Regency demonstrates the importance of choosing familiar and easily accessible communication channels. Therefore, the delivery of agribusiness information needs to be site-specific to address the technical challenges of cultivation, water management, and the supply chain of commodities typical of swampland areas.

Given the challenges of limited internet connections, infrastructure constraints, and varying levels of digital literacy in rural and swampy areas, digital communication is not positioned to completely replace face-to-face communication. The strategic implication for South Kalimantan is the implementation of a blended communication approach. Digital platforms such as WhatsApp and YouTube are used for rapid information dissemination and visual demonstrations, while in-person meetings are maintained for practical demonstrations and problem-solving. This approach ensures that agribusiness communication services remain inclusive for all levels of farmers, including senior farmers and those in remote areas. Digital transformation demands a reorientation of the role of agricultural extension workers in South Kalimantan from mere conveyors of linear information to content curators and facilitators of digital networks. Extension workers need structured digital capacity building to be able to filter, verify, and present technical information and market dynamics in a concise, communicative format tailored to local farmer needs. In this way, extension workers can optimize digital technology as a tool to expand the reach and effectiveness of agribusiness assistance in the region.

CONCLUSION

Based on the literature review, the use of digital media has become an essential part of agribusiness communication and agricultural extension in Indonesia, including South Kalimantan. Digital media offers benefits such as accelerated access to information, expanded communication reach, ease of interaction, and opportunities for farmers to obtain information flexibly. In the South Kalimantan context, WhatsApp is one of the media platforms with high utilization rates among tidal swamp farmers in Barito Kuala, while YouTube is in the medium category and Facebook and Instagram are in the low category. In Banjarbaru City, the attitude of KWT members towards extension activities in the digital era is in the high category, while knowledge and skills are in the moderate category. The effectiveness of digital media is determined not only by the availability of technology, but also by ease of use, usefulness, information quality, digital literacy, network quality, farmer characteristics, extension worker capabilities, and institutional support. Therefore, digitalization of agricultural extension needs to be carried out inclusively and without eliminating face-to-face communication.

A strategy that can be developed is combining digital communication with interpersonal communication. WhatsApp can be used for routine communication and discussions, YouTube or short videos for demonstration materials, while in-person meetings remain for practice and mentoring. Extension workers also need to be strengthened in their digital capacity to produce accurate, relevant, simple, and tailored information to farmers' needs. Further research can be conducted through direct surveys of farmers in several districts/cities in South Kalimantan to quantitatively measure the relationship between the intensity of digital media use, digital literacy, communication quality, and the successful implementation of agricultural innovations.

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