

INCREMENTAL INNOVATION AS SUSTAINABLE DEVELOPMENT OF AGRICULTURE : CASE STUDY OF FARMER'S CARD (KARTU TANI)

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ABSTRACT

The agricultural technology and system have contributed positively to the expansion of agricultural development in Indonesia. While the increased output benefits the majority of farmers, a subset experiences stagnation or even loss. Weather, fertilizer quality and availability, price, and marketing, among other variables, significantly impact the performance of a farm. The research object, Kartu Tani's system, was introduced in Indonesia in 2017; however, it only receives a one-third benefit from users, resulting in a twenty percent lower profit margin when compared to comparable products that use alternative fertilizers. The efficacy of digitization may be compromised in the absence of user readiness. Strategies (system role simplification) and business model approaches (system role modification) are methods for optimizing the kartu tani's system. By capitalizing on the momentum of digitalization and collaboration, significant innovations will be put forth. As a means of attracting users who are able to allocate greater financial resources, Kartu Tani has emerged as a pioneering advantage in agricultural systems.

Keywords: Incremental Innovation, Kartu Tani

INTRODUCTION

Fertilizer production is a critical operational component of the agricultural industry, serving as a vital infrastructure to aid farmers in achieving higher levels of yield. The application of fertilizer to plants has the potential to enhance growth and augment yield (Chakim, 2020).

The use of fertilizers, which is directed towards the application of balanced and organic fertilizers according to recommendations, needs to be supported by access to obtain fertilizers at affordable prices (Zahara, 2021). In an effort to control the circulation of fertilizer and make it easier for farmers to access fertilizer, the government has made a

policy of providing fertilizer to farmers through fertilizer price subsidies. Subsidized fertilizer is fertilizer whose procurement and distribution receive subsidies from the government. This program was implemented to meet farmers' needs for fertilizer at affordable prices. The types of fertilizer that receive subsidies include Urea, SP-36, ZA, NPK Phonska and organic fertilizer (Kementerian Pertanian Republik Indonesia, 2022). The government has implemented fertilizer subsidy and distribution policies, starting from the needs planning stage, setting the highest retail price (HET) and the amount of

subsidies and distribution systems to fertilizer users (Wianto et al., 2020).

The provision of subsidized fertilizer is based on a definitive group needs plan (RDKK) which is the real needs of farmers for one period in farming management. The RDKK is then used as the basis for distributing subsidized fertilizer at the distributor level (Sucahyo et al., 2022). The preparation of the RDKK is carried out by farmer groups with the assistance of field instructors. As a program with a very broad target, the implementation of fertilizer subsidies faces various problems and obstacles, which result in a decrease in the effectiveness of the program. The problems and obstacles faced include:

- 1) misuse of distribution of subsidized fertilizer;
- 2) the gap between availability and need;
- 3) the occurrence of target/target bias; and
- 4) the occurrence of fertilizer distribution that has not been on target, seepage, fertilizer shortages, and price increases at the farmer level (Gusti et al., 2022).

The farmer's card is a tool used by farmers to redeem subsidized fertilizer. Apart from that, farmer cards can be used for savings for farmers, cash withdrawals, daily shopping, bill payments and inter-bank transfers. To get a farmer's card,

farmers must join a farmer's group. The type and amount of subsidized fertilizer received by farmers through farmer cards is in accordance with the land area, commodities and types of fertilizer prepared through a definitive plan for group needs (RDKK) by extension workers together with farmers which is then uploaded to Sistem Informasi Manajemen Pangan Indonesia (SIMPI) (Kementerian Perdagangan Republik Indonesia, 2023).

The farmer card program was initiated in 2016, but was only implemented simultaneously at the beginning of 2018. This happened because the implementation and use of the farmer card, especially at the farmer level, still found many obstacles in the field, and there were several rejections in various regions. This program is aimed at farmers, most of whom have low educational backgrounds with limited ability to apply technology. The success of this program is supported by farmers' knowledge in using farmer cards (Jorgi et al., 2019). Innovations in the system are thought to be able to increase the effectiveness of implementing the farmer card program. Therefore, research related to farmer cards needs to be reviewed further. This information is important, considering that

the farmer's card is a relatively new program, so it still requires various improvements for wider implementation in the future (Moko et al., 2018).

In his book, Christensen states that users really want to know which parties have the ability to support their goals as quickly as possible and measure their success based on three criteria, namely the level of transparency, convenience of delivery, and representing costs that match value. Meanwhile, supporting technology that provides routine solutions to problems and disruptive business models in an affordable way are two necessary conditions for increasing business scale (Lubis et al., 2020).

Technological developments have a huge influence on the direction of change and innovation, high demands for efficiency and effectiveness cause manufacturers to need to innovate (Lubis et al., 2018). In short, there are several characteristics to determine the classification of innovation that companies should consider, such as incremental innovation has a low risk of being acquired and aims to expand and offer increased productivity and collaboration by providing competitive advantages, focus on product system performance and demand from customers. By understanding these differences, corporations can determine the right strategy for them to use to maintain their ability and capacity to compete with other corporations and start-ups to develop a healthy ecosystem, without the need to destroy harmony by monopolizing the industry.

This paper aims to describe the implementation of the farmer card program, and reveal the relationship between the level of knowledge and the effectiveness of the program. The benefit of this research is to provide information as study material for evaluating the implementation of the Central Java farmer card program as one of the regional and

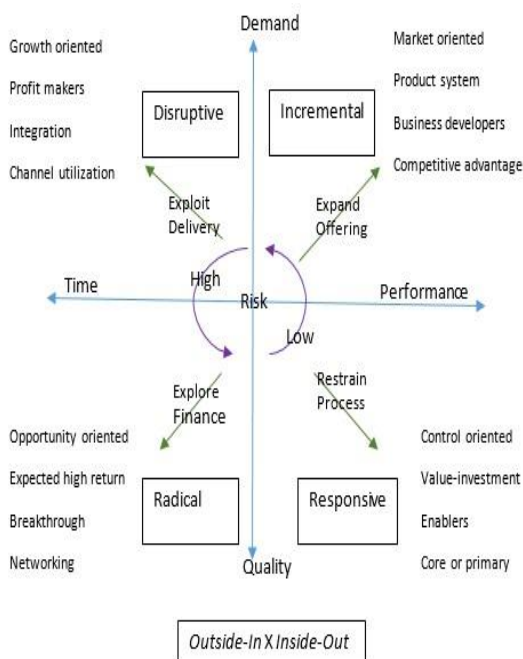


Figure 1. Innovation Theory

central government policies and can be a reference for related research.

LITERATURE REVIEW

A. Agricultural Government Policy

With the rapid advancement of technology, the use of technology has become an integral part of daily routines in all aspects. Along with the rapid growth of information systems, organizations need to clearly understand consumer perception and acceptance by considering the important factors that determine the successful adoption of Information Systems projects (Wu & Wang, 2005). Meanwhile, in computing devices and cyberspace, individuals need to identify every possible approach to create a new set of limits, boundaries, and limitations to negotiate multiple interests and components to gain benefits in a given space (Lubis & Handayani, 2021).

As the latest service innovation in the field of agricultural information systems, the farmer's card provides several benefits such as instructors and customers can know the allocation of their respective fertilizer needs accurately, customers can see information on the availability of subsidized fertilizer and customers can easily find places to purchase subsidized

fertilizer at affordable prices more efficient. Compared to the previous mechanism (Gusti et al., 2022). Therefore, there are challenges in optimizing the characteristics of farmer cards, such as developing mechanisms for registration and purchasing subsidized fertilizer. Another challenge is related to the verification, validation and standardization of data according to the needs of the system development itself (Wianto et al., 2020).

The need for information system services is influenced by various factors such as service quality, convenience, accuracy and compatibility of the devices used (Narayanaswami, 2017). If previously managed conventionally and with individual status, now it is managed by farmer groups and managed professionally (Jorgi et al., 2019).

Policies issued by the government will bring good or bad situations to all business actors and may not be suitable and pleasing to all interests, but policies must be encouraged to avoid the accumulation of long-term problems (Moko et al., 2018). On the other hand, the farmer's card program influences the intention to purchase subsidized fertilizer through perceived value, thereby influencing preferences (Sucahyo et al.,

2022). Meanwhile, comparative studies show that user experience, task success, and earnings are positive although there is no difference in terms of user happiness (Moko et al., 2018). By displaying a fixed price when ordering, it will be easier for customers to know how much to prepare. This is different from conventional fertilizers which often set prices too high and you have to bid for a while just to get them down, which of course takes time and money (Chakim, 2020). It is hoped that the changes made will add value to the product by simplifying the production process (Wianto et al., 2020).

B. Implementation of The Farmers' Card Program at The Farmers' Level

The majority of farmers follow the instructor's directions and support the farmer card program because easy to redeem subsidized fertilizer. Farmer groups have various roles in implementing the farmer card program, including: data collection on group members and registration for making farmer cards by collecting photocopies of KTP, KK and land SPPT; preparation of RDKK (Definitive Group Needs Plan) for applying for subsidized fertilizer according to land area; socialization and introduction of the farmer card program; redemption or

purchase of subsidized fertilizer at retailers. a definitive plan for group needs (RDKK) is prepared by farmer group administrators assisted by extension workers (Kementerian Pertanian Republik Indonesia, 2022).



Figure 2. Kartu Tani's Information System

Before the implementation of the farmer's card program, there were many cases related to the distribution of subsidized fertilizer, including misuse of subsidized fertilizer which resulted in fertilizer shortages and long fertilizer distribution times. In making and implementing farmer cards, many obstacles are still found, including:

- 1) seen from the production side, namely the difficulty of getting farmers to collect copy of KTP and SPPT;
- 2) seen from the usage side, namely farmers experience difficulties in redeeming/purchasing using farmer cards because farmers have to activate and save first at the bank and it takes a lot of time to purchase subsidized fertilizer. Another thing that farmers complain about is the long queue at the bank which makes

farmers discouraged from going to the bank.

C. Effectiveness of Implementing The Farming Card Program

The effectiveness of the implementation of the farmer's card program can be seen from the suitability of the implementation and use of the farmer's card with the objectives, namely the fulfillment of the 6 right principles (quantity, type, place, time, quality and price) in the distribution, control and supervision of subsidized fertilizer. Judging from the scope aspect, the majority of farmers know the scope of the farmer's card program, but there are still farmers who do not understand, especially regarding SIMPI (Indonesian Food Information System) and fertilizer allocation based on regional regulations. This is because farmers only know that subsidized fertilizer is regulated and compiled by extension workers and tend to be indifferent regarding the allocation of subsidized fertilizer. Judging from the organizational structure aspect, there are still some farmers who do not understand, especially regarding the RDKK (Definitive Group Needs Plan) for subsidized fertilizer applications. This happens because farmers hand over all authority to request fertilizer

subsidies to group administrators and extension workers (Chakim, 2020).



Figure 3. Benefit of Kartunani

Judging from the aspect of guidelines and how to use farmer cards, the majority of farmers know and there are no problems regarding this (Jorgi et al., 2019). Farmers who are most aware of the farmer card program are farmer group administrators, and farmer group members who have higher education and have the desire to oversee government programs; Meanwhile, farmers who don't know much about the farmer's card program are group members who have low education, follow group decisions and tend to be indifferent to the program being delivered (Jorgi et al., 2019). Farmers' knowledge of the farmer card program is relatively good, but needs to be improved, especially in this aspect scope, organizational structure and benefits of the program, by means of continuous assistance by extension workers and related parties in implementing the farmer's card program.

D. Incremental Innovation Management

It may still fail to respond to new competition because there is no effort to reuse technological advantage capabilities and recognize the constraints posed by legacy obligations by calculating the value of wins, considering cooperation and achieving new market expansion (Lennerts et al., 2020). Incremental technology is a strategy to survive in the market, but this is not the main cause because existing technology is unable to compete with performance to satisfy consumers (Ettlie et al., 1984). Interestingly, incremental innovation theory presents some interesting inconsistencies for management scholars, but its core concept is still widely misunderstood (Ettlie et al., 1984).

Additionally, current customers and established business models rely on incumbent companies investing in new innovations to enhance the capabilities of their products and services. Efforts to add value to current business activities are deemed unattractive to current incumbents, but are attractive to new entrants who find opportunities to satisfy a smaller number of customers due to fewer competitors. As a result, legacy systems are typically unmotivated to develop innovations that promise lower margins, target smaller

markets, and introduce low-quality products and services that their legacy customers cannot use (Ettlie et al., 1984).

Therefore, innovation adoption will be influenced by the characteristics of the innovation and the success of the information system (Venkatesh et al., 2003). Therefore, to conduct progressive research related to IT on incremental topics, it is important to understand the various types of incremental innovation (Lubis et al., 2018). Incremental technologies may be improvements that are the result of innovations for which the organization failed to see the opportunities (Ettlie et al., 1984).

RESEARCH METHOD

This research uses basic theory to investigate the problems faced by the fertilizer distribution system through method collection and data analysis. This starts with a simple question about the current implementation of information systems in the world of agriculture. Then, those recurring ideas, concepts, or elements are tagged with code for review to extract new information. Meanwhile, it also uses previous literature reviews in journals, conference proceedings, theses and expert author articles. For data collection, agricultural websites and public

repositories were examined as well as leading databases including google scholar, IEEE, Springer, ACM and Science Direct were explored and research papers within 10 years were studied to broaden the scope of understanding in relation to historical efforts. Among the various kinds of agricultural problems, a similar problem is often faced, namely the availability of fertilizer. The site targets people who are familiar with everyday issues, whether they are farmers themselves or other people connected to farmers.

Researchers investigate innovation trends in the Indonesian context through article reports in newspapers, journals and articles. To analyze the trend of balance between demands and expectations, this research proposes an analytical review of various aspects based on design problems and problems using PACT (people, events, context and technology). The qualitative model used has four stages, namely preference analysis and needs assessment.

It is important to restart the former IT function as a driver or problem solver in their daily lives, as well as develop a system where customers are satisfied with the collection of features offered. In addition, identification of obstacles and design requirements must be carried out to find alternative solutions and provide a win-win solution.

After impact evaluation, appropriate adoption strategies should be developed in light of customer acceptance and societal readiness. Meanwhile, this model also implies that a different set of criteria is required depending on the type of client, which can be divided into four levels. The first level contains contextual factors that influence customers. In particular, environmental incidents and the emergence of emerging markets may impact client needs. The second level contains the perspective of the client's needs and preferences, which forms the basis of the analysis. The third level emphasizes different obstacles, where most potential clients face several obstacles in the consumption mechanism where existing clients have a level of saturation. Consequently, the fourth level which focuses on effects, reveals the Value Perception results. Each customer may consider value differently, depending on

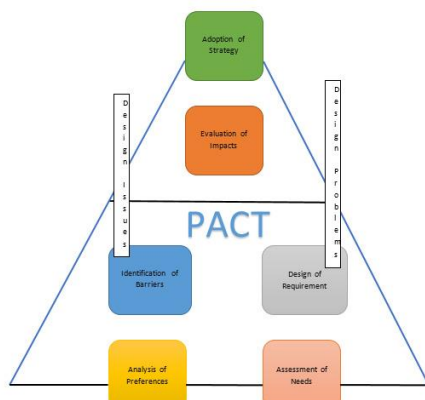


Figure 4. Qualitative Model of Investigation Service Oriented Framework.

several integrated factors such as culture, religion, and norms. These values are reflected in their lifestyle, including eating and sleeping patterns. Understanding user behavior is one step to identifying user experience.

DESIGN PROBLEMS AND ISSUES

This research uses 12 criteria in PACT to analyze preferences while design problems are related to needs assessment, namely risk mitigation, learnability, exclusivity, maneuverability and flexibility, multiple paths, physical movement, bandwidth, information visualization, good overview, digital acceptance, aspects of intimacy and attraction, and finally difficulty accessing the system (Benyon, 2005). Meanwhile, obstacles come from design problems, namely inoperability, brand avoidance, application imitation, sustainability and survivability, recovery plans, misunderstanding and misdirection, product requirements and infrastructure resources, scheduling problems, conventional architecture, consumer perception, language barriers and posture/size. Thus, through understanding these preferences, needs and constraints, organizations or developers can develop design requirements by creating a priority

list involving musts and would-haves. Importantly, organizations must define and develop service level domains, know the ethical dimensions and determine the drivers of customer protection at the organizational level and train employees to appreciate the value of customer data more than others (Nadeem et al., 2021).

Lack of general understanding of how the system works causes it to be a barrier factor to exploiting system flow which causes processes not to run as they should (Ritonummi et al., 2023). Integration of different systems is needed to provide automatic cooperation and coordination between each organization and related institutions such as regulators, agricultural extension workers, farmer groups, and farmers (Schut et al., 2016). On the other hand, subsidized fertilizer prices can be estimated by setting the Highest Retail Price (HET) size using a permit system to verify and validate the completeness and correctness of the data. It is important to keep current information clear and accurate even if handled by different units or divisions. The system embedded in the farmer's card that receives data sent by related staff periodically must go through a proper inspection mechanism and a strict authorization structure. Therefore, security procedures need to be

adapted to the readiness of systems involving users, activities, structures and technology in the observed environment (Mulyadiana et al., 2018). Apart from that, there are a number of statutory regulations that have specific problems which may have different principles, attributes and considerations, giving rise to different interpretations in the field, making it difficult for the public to understand these regulations (Bryer, 2013). However, intensive regulations that codify an industry's past can pose significant obstacles for additional innovators trying to improve upon entrenched traditional or conventional businesses (Bourke et al., 2020). In general, low data quality will affect satisfaction with the services introduced by digital libraries. Automated metadata tools can be implemented in farm cards to generate multiple alerts for low-quality records. Providing fertilizer on target can reduce and eliminate the risk of potential misuse of fertilizer (Liu & Luo, 2011). Therefore, incremental innovation is an attempt to improve existing therapeutic classes by improving the structure of complex systems, reformulating existing system pathways to improve administration, increasing the amount of fertilizer available, discovering new physiological interactions of already

known fertilizers, exploring new uses of existing fertilizer (Ritala & Hurmelinna-Laukkanen, 2013). This is often based on the experience of the information system service provider and the needs of the farmer (Dockès et al., 2019). Prevention is always better than cure, thanks to the advancement of Big Data analysis, it is easy to capture, analyze and compare the sustainability of systems to offer new mechanisms in a better way (Gholami et al., 2023). A clear strategy whose goals and vision are communicated passionately, bottom-up innovation is facilitated and funded on a large scale and innovation centers organize, encourage and reflect on the change process, these are the key ingredients to generate constant change for incremental innovation strategies (Lubis et al., 2018). The study of organic fertilizers in agricultural science may show potential for development when viewed from the current agricultural model, which is unavoidably linked to poverty, inaccessibility to education, inadequate agricultural services and inability to access agricultural program information due to discrimination (Wianto et al., 2020). System integration can show more accurately where education and prevention are needed to produce more fertile farms at lower costs (Jorgi et al., 2019).

CONCLUSION

This research focuses on the role of customer analysis in the process of creating incremental innovation that bridges the gap between existing regulations and the regulations that should exist. Additionally, when organizations investigate farmer behavior, further parameters must be considered in determining the potential of an innovation, which provides a solution to a specific problem in a particular customer segment. Determination of market parameters, collection of information and analysis about new technologies, assessment of distribution channels and competitive analysis are other important steps necessary for the success of an incremental innovation adoption strategy. In addition, the proposed weighting requirements in the scoring model could be augmented by other components in the PACT because it is unlikely that all of these factors are equally important. Therefore, this research is limited to aspects of incremental innovation based on initiatives and characteristics from the literature review, such as preference analysis, needs assessment, identification of barriers, design requirements, impact evaluation, and strategy adoption. Further analysis of incremental innovation must accommodate

the results of the logical initiation of the analysis stage with case studies in comparing several factors in a particular context.

REFERENCES

- P Benyon, D. , T. P. & T. S. (2005). *Designing Interactive Systems: People, Activities, Contexts, Technologies*. Pearson Education Limited.
- Bourke, J., Roper, S., & Love, J. H. (2020). Innovation in legal services: The practices that influence ideation and codification activities. *Journal of Business Research*, 109. <https://doi.org/10.1016/j.jbusres.2019.11.057>
- Bryer, A. R. (2013). Understanding Regulation: Theory, Strategy, and Practice. *Accounting in Europe*, 10(2). <https://doi.org/10.1080/17449480.2013.834747>
- Chakim, M. L. (2020). Pengaruh Implementasi Kartu Tani Terhadap Efektivitas Penyaluran Pupuk Bersubsidi Di Kabupaten Kendal, Jawa Tengah. *Jurnal Pangan*, 28(3). <https://doi.org/10.33964/jp.v28i3.444>
- Dockès, A. C., Chauvat, S., Correa, P., Turlot, A., & Nettle, R. (2019). Advice and advisory roles about work on farms. A review. In *Agronomy for Sustainable Development* (Vol. 39, Issue 1). <https://doi.org/10.1007/s13593-018-0547-x>
- Ettlie, J. E., Bridges, W. P., & O'Keefe, R. D. (1984). Organization Strategy And Structural Differences for Radical Versus Incremental Innovation.

- Management Science, 30(6).
<https://doi.org/10.1287/mnsc.30.6.682>
- Gholami, H., Lee, J. K. Y., & Ali, A. (2023). Big Data Analytics for Sustainable Products: A State-of-the-Art Review and Analysis. *Sustainability (Switzerland)*, 15(17).
<https://doi.org/10.3390/su151712758>
- Gusti, I. M., Gayatri, S., & Prasetyo, A. S. (2022). The Affecting of Farmer Ages, Level of Education and Farm Experience of the farming knowledge about Kartu Tani beneficial and method of use in Parakan Distric, Temanggung Regency. *Jurnal Litbang Provinsi Jawa Tengah*, 19(2).
<https://doi.org/10.36762/jurnaljateng.v19i2.926>
- Jorgi, R. S., Gayatri, S., & Dalmiyatun, T. (2019). Relationship Between the Level of Farmer Knowledge and the Effectiveness of Farmer Card Program (Program Kartu Tani) Implementation in Semarang Regency. *Agraris*, 5(2).
<https://doi.org/10.18196/agr.5278>
- Kementerian Perdagangan Republik Indonesia. (2023). Peraturan Menteri Perdagangan Nomor 04 Tahun 2023. In Kementerian Perdagangan.
- Kementerian Pertanian Republik Indonesia. (2022). Peraturan Menteri Pertanian Nomor 10 Tahun 2022. In Kementerian Pertanian.
www.peraturan.go.id
- Lennerts, S., Schulze, A., & Tomczak, T. (2020). The asymmetric effects of exploitation and exploration on radical and incremental innovation performance: An uneven affair. *European Management Journal*, 38(1).
<https://doi.org/10.1016/j.emj.2019.06.002>
- Liu, Z., & Luo, L. (2011). A Comparative Study of Digital Library Use: Factors, Perceived Influences, and Satisfaction. *Journal of Academic Librarianship*, 37(3).
<https://doi.org/10.1016/j.acalib.2011.02.015>
- Lubis, M., Arif Ridho, L., Lubis, B., & Lubis, A. (2018). Incremental Innovation towards Business Performance: Data Management Challenges in Healthcare Industry in Indonesia. *MATEC Web of Conferences*, 218.
<https://doi.org/10.1051/mateconf/201821804015>
- Lubis, M., & Handayani, D. O. D. (2021). The relationship of personal data protection towards internet addiction: Cyber crimes, pornography and reduced physical activity. *Procedia Computer Science*, 197.
<https://doi.org/10.1016/j.procs.2021.12.129>
- Lubis, M., Lubis, A. R., & Ernovianti, E. (2020). Disruptive Innovation Service Oriented Framework: A Case Study of Transportation in Indonesia.
<https://doi.org/10.5220/0008889604960504>
- Moko, K. W., Suwanto, S., & Utami, B. W. (2018). Perbedaan Persepsi Petani Terhadap Program Kartu Tani Di Kecamatan Kalijambe Kabupaten Sragen. *Caraka Tani: Journal of Sustainable Agriculture*, 32(1).
<https://doi.org/10.20961/carakatani.v32i1.15926>
- Mulyadiana, A. T., Marwanti, S., & Rahayu, W. (2018). Analysis of the effectiveness of fertilizer subsidy policy and its effect on rice production in Karanganyar Regency. *IOP Conference Series: Earth and Environmental Science*, 142(1).

- <https://doi.org/10.1088/1755-1315/142/1/012047>
- Nadeem, W., Juntunen, M., Hajli, N., & Tajvidi, M. (2021). The Role of Ethical Perceptions in Consumers' Participation and Value Co-creation on Sharing Economy Platforms. *Journal of Business Ethics*, 169(3). <https://doi.org/10.1007/s10551-019-04314-5>
- Narayanaswami, S. (2017). Urban transportation: Innovations in infrastructure planning and development. *International Journal of Logistics Management*, 28(1). <https://doi.org/10.1108/IJLM-08-2015-0135>
- Ritala, P., & Hurmelinna-Laukkanen, P. (2013). Incremental and radical innovation in coopetition-the role of absorptive capacity and appropriability. *Journal of Product Innovation Management*, 30(1). <https://doi.org/10.1111/j.1540-5885.2012.00956.x>
- Ritonummi, S., Siitonen, V., Salo, M., & Pirkkalainen, H. (2023). Exploring barriers that prevent employees from experiencing flow in the software industry. *Journal of Workplace Learning*. <https://doi.org/10.1108/JWL-11-2022-0146>
- Schut, M., van Asten, P., Okafor, C., Hicintuka, C., Mapatano, S., Nabahungu, N. L., Kagabo, D., Muchunguzi, P., Njukwe, E., Dontsop-
Nguezet, P. M., Sartas, M., & Vanlauwe, B. (2016). Sustainable intensification of agricultural systems in the Central African Highlands: The need for institutional innovation. *Agricultural Systems*, 145. <https://doi.org/10.1016/j.agsy.2016.03.005>
- Sucahyo, I., Mubaroq, H., & ... (2022). Implementasi Program Kartu Tani Terhadap Ketersediaan Pupuk 2021 Di Desa Tegalmojo, Kecamatan Tegalsiwalan, Kabupaten *Journal of Innovation ...*, 2(4).
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly: Management Information Systems*, 27(3). <https://doi.org/10.2307/30036540>
- Wianto, A. O., Kartono, D. T., & Padmaningrum, D. (2020). The Role of Extension in Promoting Kartu Tani to Farmer Adoption Rate in Pati Regency. *International Journal of Science and Society*, 2(1). <https://doi.org/10.54783/ijssoc.v2i1.83>
- Wu, J.-H., & Wang, S.-C. (2005). What drives mobile commerce? *Information & Management*, 42(5). <https://doi.org/10.1016/j.im.2004.07.001>
- Zahara, E. L. (2021). Permasalahan Subsidi Pupuk di Indonesia. *Buletin APBN*, VI.