AGRITROPICA Journal of Agricultural Sciences

Content available at :
https://ejournal.unib.ac.id/index.php/jagritropica/index

ISSN (PRINT) 2621-217X **ISSN(ONLINE) 2621-699X**

Determinants of Technological Innovation on the Income of Urban Farming Farmers in the Digital Economy Era

Noor Salim[1], Darwati Susilastuti[2], Henita Fajar Oktavia[3], and Safira Fathin[4]

[1]Universitas Mercu Buana, Jakarta, Provinsi DKI Jakarta
[2,3,4]Universitas Borobudur, Jakarta, Provinsi DKI Jakarta
Corresponding Author: 1975801189@mercubuana.ac.id[1]

ABSTRACT: The rapid growth of urbanization in urban areas raises doubts about the future of urban farming. However, urban farming can survive due to the ability of urban farming to innovate in expanding its functions in various factors that hinder it. Farmers as actors need to be empowered with various knowledge and technological innovations. The purpose of the study was to analyze the simultaneous and partial effect of variables on land area, risk-taking courage, farmer's age, and sources of information on technological innovation in urban farming farmers in the digital economy era, what factors are dominant, and analyze the effect of technological innovation on farmers' income—survey research method with OLS Multiple Regression of primary data analysis technique on 70 respondents. The result of the research is that the source of information has a significant effect on technological innovation and is the dominant factor with a value of β =57.6%. In contrast, the variables of land area, risk-taking courage, and age have no effect. Technological innovation has a significant impact on income. The research finding is that technological innovation in urban farming is not influenced by land area, age of farmers, and risk-taking courage but predominantly by sources of information that have implications for farmers' income.

Keywords: Technological innovation, land, urban farming

Reference to this paper should be made as follow:
Salim, N., D. Susilastuti, H. F. Oktavia, and S. Fathin. 2022. Determinants of Technological Innovation on the Income of Urban Farming Farmers in the Digital Economy Era. *Agritropica: Journal of Agricultural Science*. 5(2): 50-61. Doi: https://doi.org/10.31186/J.agritropica.5.2.50-61

INTRODUCTION

The rapid growth of urbanization raises doubts about the future of agriculture. Urbanization encourages the conversion of undeveloped land into built-up land. The agricultural sector is considered unsuitable for urban development (Anggrahita & Guswandi, 2018). The leading cause is urbanization, and the non-natural reason is the lack of government attention to urban agriculture, which is reflected in the public policies that have been set (Campbell, 2016). However, urban agriculture can survive due to the ability of urban agriculture to expand agricultural functions amid various factors that hinder it (Orsini et al., 2013). Urban agriculture provides opportunities for improved food supply, ecology, environmental health, local economies, social integration, and mutual sustainability (Orsini et al., 2013; Georgescu, 2018).

One of the dominant factors that continue to motivate people to carry out agricultural businesses in urban areas is the economic factor in the form of its contribution to household income (Ammatillah et al., 2018). Another opinion also explains that the primary motivation for households to do urban farming is to get financial benefits (Poulsen et al., 2015).

Urban agriculture is not only limited to overcoming food sufficiency amid competition for scarce resources such as water and land but also the presence of agriculture in urban areas provides positive values that have an impact on the ecological and economic sustainability of the urban regions (Fauzi et al., 2016; Susilastuti, 2017; Georgescu, 2018). There are signs of development opportunities; urban agriculture needs to be strengthened, one of which is a technological innovation to compete in the digital economy era. Although the economic contribution to the regional economy is low at only 0.08 percent in DKI Jakarta (BPS DKI Jakarta Province, 2019), another advantage that is economically invaluable but can be quantified is the ecological function that can produce nitrogen, energy-saving in soil, and roots, and the positive impact in preventing runoff (Georgescu, 2018).

Innovation is defined as new ideas and practices, not only limited to objects or goods produced but also include ideology and beliefs leading to change in all life forms (Hanafie, 2010). Technology and innovation must be implemented and carried out by farmers in this digital economy era so that agriculture must also be digital, not only from its human resources (Susilastuti et al., 2018) but also to be active in technological innovation (UMN, 2016).

Technological innovation is the adoption or process of changing behavior, either in the form of knowledge, attitudes, or skills in a person after receiving an innovation. Factors that affect the speed of adopting innovations include the size of the farm owned and controlled, income level, courage to take risks, age, level of participation in groups/organizations outside their environment, activities to seek information and new ideas, resources information used (Hanafie, 2010; Abu & Soom, 2016).

Farmers, as managers and farmers, make decisions in each of their activities. The courage to take risks with careful calculations is one element of decision-making. Technological innovation has risks for an activity (Hanafie, 2010). The right decision to innovate is one indicator of business success.

Farmer's age is related to work experience. Experienced farmers have policies in decision-making (Salim et al., 2019). However, with the development of information technology, the younger generation is faster to innovate. Therefore, it is necessary to know the influence of age on the development of digital technology today. Sources of information are a determining factor in technology development, and excellent and faithful will produce instructions or guidelines for technology development, namely as a source of ideas for innovating. Sources of information are not only for improving cultivation systems. Abu and Soom (2016) state that the resilience of urban farmers is also influenced by access or sources of information about credit and marketing.

Information technology is vital in facilitating the process of exchanging information quickly without time and space and can be accessed by everyone (Susilastuti et al., 2018). Urban farming farmers struggle to get the necessary support to strengthen their business management and marketing, capture market share, lack market information, and cope with shocks (Abu & Soom, 2016; Dasaraju et al., 2020).

Various efforts to increase farmers' household income are one of the main goals in the dynamics of sustainable national development. They have become an important thing to pay attention to because considering the pressure of the threat of poverty on farming communities. Various efforts to increase farmers' household income are one of the main goals in the dynamics of sustainable national development and have become an important thing to pay attention to because of the pressure of the threat of poverty on farming communities (Dumasari, 2014; Susilastuti, 2017).

Implementing technological innovations in urban farming should be easier because farmers always use them for sales, marketing, and so on. Technology adoption is influenced by farmers' knowledge, experience, and access to technology (Marino et al., 2012).

Agricultural productivity in urban farming is seen not only in farmer competence but mainly in land, courage to take risks, age, and sources of information. By knowing the factors that influence technological innovation, it is hoped that the development of urban farming can provide high actual income, not spend income on applying technological innovation.

The aims of this research are 1). Analyzing the simultaneous and partial effects of land variables, risk-taking courage, age, and sources of information on technological innovations of urban farming farmers in the digital economy era; 2). Analyzing what factors are dominant among land, courage to take risks, age, and sources of information on technological innovations of urban farming farmers; and 3) – analyzing the effect of technological innovation on the income of urban farming farmers.

MATERIALS AND METHODS

The study was conducted in the DKI Jakarta area, which was determined purposively. Survey research with an affordable sample of 70 urban agricultural farmers who meet the following criteria: 1). Using social media, such as WhatsApp, Instagram, and so on; 2). As a managing farmer for owned or leased land. Quantitative data collection techniques use a list of questions, both manual and google form.

The independent variables are land area, courage to take risks, age of farmers, and sources of information, while technological innovation is the dependent variable in the first model. Technological innovation is proxied recursively to farmers' income as the second dependent variable in the second model. Both equation models were analyzed using multiple linear and straightforward linear regression methods (Ghozali, 2018).

RESULTS AND DISCUSSION

Descriptive Analysis

The types of agricultural businesses carried out by farmers are very diverse; most are ornamental plant entrepreneurs, 38.6%, and the second most are small land agricultural entrepreneurs, with as much as 22.9% of vegetables. It illustrates that urban agricultural businesses are still dominated by horticulture businesses, namely ornamental plants, and fresh vegetables. It is the opinion of Georgescu (2018) that urban agriculture provides fresh vegetables and urban ornamental plants.

The age range of farmers is between 21-65 years and the most are 41-50 years old as much as 33%. The existence of young farmers is very encouraging. However, there is a need for government support, especially in terms of capital. It has implications for government policies in providing support to novice farmers (farm bill policy), which should be focused on young farmers who are expected to contribute a lot to increasing agricultural production rather than old, novice farmers starting a business in the agricultural sector for investment purposes (Susilowati, 2016). This opinion is also supported, where age, can influence a person to respond to something new. A period in the productive category is said to be more accessible and more open to accepting innovations with technological advances (Prasetyo et al., 2019).

Farmers' education is at most SMA, which is as much as 50%. The level of education affects the ability to think and encourages someone to want to know and seek experience so that the information received will become knowledge. According to Susilastuti et al. (2018), technology adoption is influenced by education level.

This will assist in empowering communities to provide better access to natural resources and improve agricultural technology, banking, and financial services. Technology adoption can be essential in fighting urban poverty and promoting sustainable development by creating information-rich and livelihood-supporting societies (Mendhe et al., 2020).

The range of land area is 10 m^2 to more than 100 m^2, the most land area is 11-50 m^2, as much as 43%. Land optimization needs to be done by planting through vertical, stratified, and other systems. This is very useful for agricultural development, which is expected to increase and overcome the food needs of urban residents and other ecological benefits (Prasetyo et al., 2019). Optimal land use is also available in urban agriculture to integrate various functions in densely populated areas while simultaneously meeting residents' specific needs and preferences and protecting the environment (Lovell, 2010).

Farmer income data shows the range of fewer than 5 million rupiahs to more than 100 million rupiahs per month, at most less than 5 million per month, as much as 51.4%. Farmer income is directly related to land productivity (Susilastuti, 2017).

Classic assumption test

The classical assumption test of model one and two shows that the model meets the Residual Normality Test through the histogram and P-P plot graph where the points spread around the line and follow a diagonal line which means the data is normally distributed (Ghozali, 2018). The multicollinearity test resulted in a VIF value <10 and a tolerance value > 0.10 for all variables, so it was concluded that there was no multicollinearity (Haslinda & Majid, 2016). The autocorrelation test was detected using the Durbin-Watson test, with the result that there was no positive or negative autocorrelation with a new value of 1.627 in model 1 and 0.831 in model 2 (Ghozali, 2018). The scatterplot test found a pattern formation, meaning that heteroscedasticity has occurred in the regression model in both model one and model 2 (Salim et al., 2019).

Simultaneous Effect Test

The results of the F test show a P value 0.000 (0.05), meaning that simultaneously the variables of land, courage to take risks, age, and sources of information significantly affect technological innovation (Table 1)

Table 1. F Test Results Model I

ANOVA[b]					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	262.981	4	65.745	19.848	.000[a]
Residual	215.305	65	3.312		
Total	478.286	69			

Source: Primary Data Processed (2021)

Based on Table 2, the value of the coefficient of determination (R^2 adj.) is 0.522, which indicates that simultaneously the variables of land, risk-taking, age, and sources of information can explain their influence on technological innovation by 52.2%, while 47.8% is explained by other variables not studied.

Table 2. R^2 Test Result Model I

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.742[a]	.550	.522	1.627

Source: Primary Data Processed (2021)

Partial Effect Test

Based on the t-test (Table 3), the variables of land, courage to take risks, and age of each P-value (0.05), means that it does not affect technological innovation. Meanwhile, for the source of information variable, the P-value is 0.000 (0.05), which means it is significantly positive for technological innovation.

Table 3. t Test Result Model I

Coefficients[a]					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	6.338	1.554		4.078	.000
Land	-.005	.090	-.007	-.057	.955
Courage to take risks	.185	.108	.225	1.716	.091
Age	.002	.018	.007	.087	.931
Source of information	.494	.097	.576	5.108	.000

Source: Primary Data Processed (2021)

Based on Table 3, the multiple linear regression equation is formulated as follows:

$$\text{Inov. Tech} = 6{,}338 - 0{,}005 Land + 0{,}185 Risks + 0{,}002 Age + 0{,}494 Information$$

Based on the above equation, it can be interpreted as follows: (1). The constant value of 6.338 (positive) means that if the value of the independent variables (land, courage to take risks, age, and sources of information) is equal to zero or fixed, then technological innovation is worth 6.338 units; (2). Land coefficient = -0.005, meaning that if the land variable increases by 1 unit while the other independent variables are considered constant, the technological innovation variable decreases by 0.005 units; (3). The coefficient of courage to take risks = 0.185, which means that if the courage to take risks increases by 1 unit and other independent variables are considered constant, then the technological innovation variable increases by 0.185 units; (4). The magnitude of the age coefficient = 0.002, which means that if the age variable increases by 1 unit and other independent variables are considered constant, then the amount of the technological innovation variable increases by 0.002 units; (5). Information Source Coefficient= 0.494, meaning that if the information source variable increases by 1 unit and the other independent variables are considered constant, then the technological innovation variable increases by 0.494 units.

Dominant Factor Test

The Beta coefficient (Table 3) for the information source variable is 0.576 or 57.6% 50%. It shows that the source of information is the dominant factor influencing technological innovation in urban farming.

The Effect of Technological Innovation on the Income of Urban Farming Farmers

The P-value of the recursive Y variable (ŷ) to the Income variable is 0.18≤α (0.05) (Table 4). It means that technological innovation has a significant and positive effect on the income of urban farming farmers.

Table 4. F Test Result Model II

ANOVA[b]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	47.208	1	47.208	5.870	.018[a]
	Residual	546.864	68	8.042		
	Total	594.071	69			

Source: Primary Data Processed (2021)

Based on Table 5, the value of the coefficient of determination (R2) is 0.079 indicating the effect of technological innovation on income is only 7.9%, and the remaining 92.1 percent is influenced by other factors not examined.

Table 5. R^2 Test Result Model II

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.282[a]	.079	.066	2.83586

Source: Primary Data Processed (2021)

Table 6. t Test Result Model II

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	15.183	3.391		4.478	.000
Y Rekursif	.424	.175	.282	2.423	.018

Source: Primary Data Processed (2021)

Based on Table 6, the regression equation is formulated as follows:

$$\text{Income} = 15{,}183 + 0{,}424\ \widehat{\text{Technological Innovation}}$$

Based on the regression equation above, it can be interpreted as follows: 1). The constant value of 15,183 (positive) means that if the value of the Technological Innovation variable is equal to zero or stable, then the income is 15,183 units; 2). The technological innovation coefficient = 0.424, which means that if the technological innovation variable increases by 1 unit, then the income variable increases by 0.424 units.

The results of the variable analysis of the land area, courage to take risks, age of farmers, and sources of information significantly affect technological innovation with a coefficient of determination of 52.2%. It shows that land area, courage to take risks, age of farmers, and sources of information are essential factors in developing technological innovation in urban farming. Other factors influence technological innovation, for example, community, idea-seeking activities

(Hanafie, 2010), adoption and education processes (Susilastuti et al., 2018), institutions, and the role of government (Salim et al., 2019), and others.

The variable land area analysis results are harmful and have no significant effect on technological innovation in urban farming. It shows that land area is not absolute in developing technological innovations in urban agriculture. Land in urban agriculture can be increased efficiency and productivity by maximizing utilization through increasing vertical land area, increasing the cropping index, and utilizing underutilized space (Sastro, 2016; Hakim, 2020). Urban agriculture is defined simply as using narrow land, whereas modern farming is a vertical agriculture system on limited land (Georgescu, 2018). Quantitatively, the land is not easily expanded for various reasons (Salim et al., 2019). The negative coefficient on the land area can be explained that increasing land area productively requires other factors that must be met, for example, the availability of capital, labor, cultivation systems, and other production inputs (Susilastuti, 2017).

The analysis results of the risk-taking variable have a positive value but have no significant effect on technological innovation in urban farming. Farmers' courage to take risks with measuring indicators, namely courage to take risks, readiness to take risks, willingness to try, and information technology as challenges are still needed in making technological innovation decisions in urban farming. According to Hanafie (2010), risk analysis is necessary in every innovation decision-making to minimize business losses. Farmers' courage in taking risks is influenced by the business environment and individual conditions of farmers (Rahmawati & Triyono, 2017), education (Susilastuti et al., 2018), and business experience (Salim et al., 2019). Government and farmer institutions also influence the adoption of technology and good management practices (Mariano et al., 2012; Salim et al., 2019).

The analysis results of the variable age of farmers are positive and have no significant effect on technological innovation in urban farming. It means that farmers of various ages can follow technological innovation in urban farming; however, the older the farmers, the wiser they will be in making decisions in technological innovation. Length of farming provides work experience and influences decision-making and farmer productivity (Salim et al., 2019).

The farmers in this study were in the productive age range, namely, 21-65 years, and most were 41-50 years old, as much as 33%. The existence of young farmers may lack potential due to a lack of ability to adapt information (Dewi, 2011) and difficult challenges, namely capital problems (Susilowati, 2016). However, in the use of information technology in the digital economy era, being a young farmer has its advantages, namely becoming an internet user. In accordance with data from Kuncoro's explanation (2020) that the penetration of internet users in 2018 based on age was highest at the age of 20-24 years (88.5%); 25-29 years (82.7%); 30-34 (76.5%); 35-39 years (68.5%); 40-44 years (51.4%); 45-49 years (47.6%); 50-54 years (40.9%); 55-59 years (40%); 60-64 years (16.2%); and 65 and over (8.5%) (remark: ignoring internet users aged 5-19 years).

The analysis results of the information source variables are positive and significantly affect technological innovation in urban farming. It means that the availability of various sources of information with measuring indicators is the search for information, community, types, and benefits of information media that significantly affect technological innovation in urban farming.

According to Rachmawati & Sadikin (2014), accessible sources of information that can disseminate or convey information can accelerate the progress of agricultural businesses in urban farming technology innovations. It is indicated by the magnitude of the Beta value of the Information Source, which is 0.576 or 57.6%, so the source of information is the dominant factor in the development of technological innovation. Sources of information are essential in the development of urban farming of the perpetrators; this is because businesses in Indonesia have recently been faced with marketing difficulties and a lack of management and technology skills. And inadequate business networks in running their business (Theodora et al., 2021). Today's agriculture is directed at market-oriented agriculture to increase farmers' income so that information about agricultural technology that is considered adequate and efficient is necessary (Rachmawati & Sadikin, 2014). Thus, the source of information will become an intelligent factory, and increased automation becomes a critical path to be taken in the market (Ravi & Chelliah, 2021).

Technological innovation in urban farming does not directly affect the income of urban farming farmers. This is because technological innovation cannot have a direct effect when applied to urban farming. Therefore, with a recursive approach, technological innovation is transformed into recursive technological innovations that can affect the income of urban farming farmers (Salim et al., 2020).

The results of the analysis of the effect of technological innovation on farmers' income have a positive and significant contribution. The invention produces knowledge, skills, and attitudes that affect behavior change in technology adoption (Hanafie, 2010) so that farmers can use technological innovations (Fatchiya et al., 2016).

If we look at the conditions in the field, on average, urban farming farmers in DKI Jakarta apply technological innovations independently or with their respective farmer groups and have not been coordinated, resulting in the income generated is not optimal. According to Mariano et al. (2012) and Salim et al. (2019), farmer institutions and the role of government contribute positively to farmers' income.

In the development of information technology in the digital economy era, Indonesia has the most significant digital economy potential in Southeast Asia. It is projected that by 2025, the value of digital economy transactions will reach around Rp. 1,826 trillion. It is also supported by high internet users, where internet penetration in 2019 by region is on the island of Java with a percentage of 55%. The devices connected daily to the internet are smartphones/cell phones (Kuncoro, 2020). It is a challenge and opportunity for urban farming farmers who need the application of technological innovations in addition to affecting income and minimizing the occurrence of problems, such as global competitiveness, inability to adopt new technology, and market access (Somalaraju, 2020). The threat of market competition is the main factor affecting internet marketing and e-commerce (Kuncoro, 2020).

Far et al. (2020) argues that in the current era of competition, it is not agricultural commodities that compete but the people behind the product. Thus, increasing farmers' income is part of the primary goal of national development to improve people's living standards because growing farmers' income is an indicator of farmers' welfare. Suppose the application of technological innovation can run. In that case, it can provide economic benefits by providing more profitable agricultural products, social benefits such as the effect of reducing unemployment, and blessings on environmental preservation, which align with the concept of sustainability development (Wuryaningrat, 2016). In the current condition, where Covid-19 is still a pandemic, urban farming farmers must continue to be encouraged to build resilience or increase their income. This is done in several ways: utilizing trade to increase farmer productivity and income (Torero, 2020).

CONCLUSION

Technological innovation in urban farming is influenced by land variables, courage to take risks, age, and sources of information with a coefficient of determination (R^2 adj.) of 0.552. Technological innovation in urban farming is partially not influenced by the variables of land area, courage to take risks, and the farmer's age.

The information source variable has a significant and positive effect on technological innovation in urban farming and is the dominant factor with a value of 57.6%. Thus, the development of technological innovation is strongly influenced by farmers' availability, presence, and reach of information sources.

Technological innovation recursive proxy has a significant and positive effect on farmers' income; thus, farmers' income will increase with increasing technological innovation.

ACKNOWLEDGMENTS

Thank you to the Rector of the University of Mercu Buana and the Rector of the University of Borobudur Jakarta for the opportunity and grant funding for the 2021 Domestic Cooperation Research scheme so that research can be carried out.

REFERENCES

Ammatillah, C.S., Tinaprilla, N., Burhanudin. (2018). Peran Pertanian Perkotaan Terhadap Pendapatan Rumah Tangga Tani Di DKI Jakarta. *Jurnal Pengkajian Dan Pengembangan Teknologi Pertanian*, *21*(2), 177–187. https://doi.org/10.21082/jpptp.v21n2.2018.p177-187.

Anggrahita, H., & Guswandi, G. (2018). Keragaman Fungsi dan Bentuk Spasial Pertanian Kota (Studi Kasus: Pertanian Kota di Jakarta). *Jurnal Wilayah Dan Lingkungan*, *6*(3), 148. https://doi.org/10.14710/jwl.6.3.148-163.

Abu, G. A., & Soom, A. (2016). Analysis Of Factors Affecting Food Security In Rural And Urban Farming Households Of Benue State, Nigeria. *International Journal of Food and Agricultural Economics (IJFAEC)*, *04*(1), 55–68. https://doi.org/http://dx.doi.org/10.22004/ag.econ.231375.

BPS Provinsi DKI Jakarta. (2019). *Statistik Daerah Provinsi DKI Jakarta 2019*. Diambil dari https://jakarta.bps.go.id/publication/

Campbell, L. K. (2016). Getting Farming On The Agenda: Planning, Policymaking, And Governance Practices Of Urban Agriculture In New York City. *Urban Forestry and Urban Greening*, *19*(December), 295–305. https://doi.org/10.1016/j.ufug.2016.03.011.

Dasaraju, H., Somalaraju, K., & Kota, S. M. (2020). MSMEs in Developing Economies and Their Role in Achieving Sustainable Development Goals in the Context of Covid19: A Theoretical Exposition. *International Journal of Small and Medium Enterprises and Business Sustainability*, *5*(1), 93–120.

Dumasari. (2014). Kewirausahaan Petani Dalam Pengelolaan Bisnis Mikro Di Pedesaan. *Ajie Asian Journal of Innovation and Enterpreneurship*, *3*(3), 196–202.

https://doi.org/10.20885/ajie.vol3.iss3.art4.

Dewi, I. A. L. (2011). Akses Informasi Pasar, Modal, Dan Teknologi Oleh Petani Di Daerah Perkotaan. *DwijenAGRO*, *2*(2), 1–13. Diambil dari http://ejournal.undwi.ac.id/index.php/dwijenagro/article/view/278.

Far, R. A. F., Saleh, A., Hubeis, M., & Susanto, D. (2020). Factors Affecting Social Capital in the Development of Entrepreneurial Behavior in Enbal Cassava Processors. *Journal of the Social Sciences*, *48*(3), 3734–3747.

Fatchiya, A., Amanah, S., & Kusumastuti, Y. I. (2016). Penerapan Inovasi Teknologi Pertanian dan Hubungannya dengan Ketahanan Pangan Rumah Tangga Petani. *Jurnal Penyuluhan*, *12*(2), 190-197. https://doi.org/10.25015/penyuluhan.v12i2.12988.

Fauzi, A. R., Ichniarsyah, A. N. Agustin, H. (2016). Pertanian Perkotaan : Urgensi, Peranan, Dan Praktik Terbaik. *Jurnal Agroteknologi*, *10*(1), 49–62. Diambil dari https://jurnal.unej.ac.id/index.php/JAGT/article/view/4339/3278.

Georgescu, M. (2018). *The Value Of Urban Agriculture And Quantifies Its Benefits On A Global Scale. Research Outlines Interconnected Benefits Of Urban Agriculture*. Diambil dari https://news.asu.edu/20180110-discoveries-asu-urban-agriculture-study-benefits-global-impact.

Ghozali, I. (2018). *Aplikasi Analisis Multivariate Dengan Program IBM SPSS 25*. Semarang: Badan Penerbit Universitas Diponegoro.

Hakim, M.A. L. (2020). Urban Farming Metode Teknologi Dan Inovasi Baru Pada Pertanian Perkotaan (Urban Farming Technology and Methods New Innovations in Urban Agriculture) (February 9, 2021). Diambil darihttps://ssrn.com/abstract=3782290 or http://dx.doi.org/10.2139/ssrn.3782290.

Haslinda & Jamaluddin, M. (2016). Pengaruh Perencanaan Anggaran Dan Evaluasi Anggaran Terhadap Kinerja Organisasi Dengan Standar Biaya Sebagai Variabel Moderating Pada Pemerintah Daerah Kabupaten Wajo. *Jurnal Ilmiah Akuntansi Peradaban*, *II*(1). https://doi.org/https://doi.org/10.24252/jiap.v2i2.3015.

Hanafie, R. (2010). *Pengantar Ekonomi Pertanian*. Yogyakarta: CV. ANDI OFFSET.

Kuncoro, M. (2020). *Pertumbuhan Ekonomi & Tantangan Internet Of Things Di Era Pandemi Program Doktoral Universitas Borobudur, Kamis 8 Oktober 2020*. Jakarta (Online).

Lovell, S. T. (2010). Multifunctional Urban Agriculture For Sustainable Land Use Planning In The United States. *Sustainability*, *2*(8), 2499–2522. https://doi.org/10.3390/su2082499.

Mendhe, H., Sadaphal, S., & Fulsawange, S. (2020). Use Of Ict Tools For Effective Transfer Of Technology. *JETIR*, *7*(11), 240–242. Diambil dari https://www.jetir.org/papers/JETIR2011038.pdf

Mariano, M. J., Villano, R., & Fleming, E. (2012). Factors Influencing Farmers' Adoption Of Modern Rice Technologies And Good Management Practices In The Philippines. *Agricultural Systems*, *110*, 41–53. https://doi.org/https://doi.org/10.1016/j.agsy.2012.03.010.

Orsini, F., Kahane, R., Womdim, R. N, & Gianquinto, G. (2013). Urban Agriculture In The Developing World: A Review. *Agronomy for Sustainable Development*, *33*(4), 695–720. https://doi.org/10.1007/s13593-013-0143-z.

Prasetyo, D. A., Lestari, E. & Utami, B. W. (2019). Sikap Masyarakat Terhadap Program Peningkatan Dan Pengembangan Pertanian Perkotaan (Urban Farming) Di Kecamatan Jebres Kota Surakarta *Agritexts : Journal of Agricultural Extension*, *43*(2), 80–88. https://doi.org/https://doi.org/10.20961/agritexts.v43i2.41637.

Poulsen, M. N., McNab, P. R., Clayton, M. L., & Neff, R. A. (2015). A Systematic Review Of Urban Agriculture And Food Security Impacts In Low-Income Countries. *Food Policy*, *55*, 131–146. https://doi.org/10.1016/j.foodpol.2015.07.002.

Ravi, U., & Chelliah, S. (2021). Non-Financial Factors Determining Employees Wellbeing in the SMEs Sector in Malaysia. *International Journal of Small and Medium Enterprises and Business Sustainability*, *6*(1), 34–52. Diambil dari https://www.usakti-cisbucs.com/index.php/volume-06-number-01-march-2021/161-non-financial-factors-determining-employees-wellbeing-in-the-smes-sector-in-malaysia.

Rahmawati, N., & Triyono, T. (2017). Keberanian dalam Mengambil Keputusan dan Risiko sebagai Karakter Wirausaha Petani Padi Organik di Kabupaten Bantul. *AGRARIS: Journal of Agribusiness and Rural Development Research*, *3*(2). https://doi.org/10.18196/agr.3253.

Rachmawati, N., & Sadikin, I. (2014). Pemanfaatan Sumber Informasi Teknologi Pertanian Dalam Upaya Meningkatkan Pendapatan Petani. *Prosiding Seminar Nasional Agro Inovasi Kreativitas Tiada Henti Untuk Kesejahteraan Masyarakat Dan Petani* (pp. 203-213). BPTP Jawa Barat, Diambil dari http://perpustakaan.pertanian.go.id/repository_litbang/uploaded_files/BPTP_Jabar/24_Nia_rahmawati.pdf.

Somalaraju, K., & Dasaraju, H. (2020). Daunting Problems of Micro, Small, and Medium Enterpreses (MSMEs) in India: An Enterpreneurial Perception. *International Journal of Small and Medium Enterprises and Business Sustainability*, 5(1): 17-41.

Salim, M. N., Susilastuti, D., & Rafiqah, I. W. (2020). Determinant Of Msmes Performance And Its Impact On Province Grdp In Indonesia. *International Journal of Business, Economics and Management*, *7*(1), 1–13. https://doi.org/10.18488/journal.62.2020.71.1.13.

Salim, M. N., Susilastuti, D., & Oktavia, H. F. (2019). Determinant Analysis Of Productivity On Rice Management In Indonesia. *International Journal of Business, Economics and Management*, *6*(6), 369-383. https://doi.org/10.18488/journal.62.2019.66.369.383.

Susilastuti, D., Aditiameri., Marhaeni, L. S., Mansuri; Udiarto, B. K. (2018). Application of Information Technology on Potato Productivity. *Conference Proceedings Jakarta Indonesia, ICABE 2018* (pp. 17–26). Diambil dari https://www.borobudur.ac.id/wp-content/uploads/2019/04/ICABE_2018_CONF_PROCEEDINGS.pdf.

Susilastuti, D. (2017). Poverty Reduction Models: Indonesian Agricultural Economic Approach. *European Research Studies Journal*, *XX*(3A), 164–176. https://doi.org/10.35808/ersj/702.

Susilowati, S. H. (2016). Fenomena Penuaan Petani dan Berkurangnya Tenaga Kerja Muda serta Implikasinya bagi Kebijakan Pembangunan Pertanian. *Forum Penelitian Agro Ekonomi*, *34*(1), 35. https://doi.org/10.21082/fae.v34n1.2016.35-55.

Sastro, Y. (2016). *Teknologi Akuaponik Mendukung Pengembangan Urban Farming*. Jakarta : Balai Pengkajian Teknologi Pertanian (BPTP).

Theodora, D., Hasudungan, A., Djohan, S., Abdurrahman, A., Rozalie, L., & Putranto, P. D. (2021). Empowering Marketing, Financial, and Operational Aspects of Micro-Sized Entrepreneurship with Business Canvas Approach: The Case Study of Sweet Potatoes Crackers Business of Mrs. Atim (Ubi Kremes Ibu Atim) in Sukatani, Cianjur, West Java. *International Journal of Small and Medium Enterprises and Business Sustainability*, *6*(1), 79–98.

Torero, M. (2020). Prepare agriculture for the next Covid-19. *Gaftaworld's*, (246). Diambil dari https://www.gafta.com/write/MediaUploads/Gaftaworld/GaftaworldNov20.pd.

UMN. (2016). *Principles of Macroeconomics*. https://doi.org/https://dx.doi.org/10.24926/8668.1701.

Wuryaningrat, N. F. (2016). Pemasaran Produk Pertanian : Masalah Dan Solusinya. *Tasharruf: Journal Economics and Business of Islam*, *1*(2). https://doi.org/10.30984/tjebi.v1i2.383.