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Social Environmental Support in Encouraging Entrepreneurial Behavior of Millennial Farmers in the Special Region of Yogyakarta, Indonesia: An Effort to Realize Sustainable Agriculture

Raden Rara Aulia Qonita[1,2*], Masyhuri[1], Jamhari[1] and Hani Perwitasari[1]

[1]Department of Agricultural Socioeconomics, Faculty of Agriculture, Universitas Gadjah Mada, Yogyakarta, Indonesia; [2]Department of Agribusiness, Faculty of Agriculture, Universitas Sebelas Maret, Surakarta, Indonesia

[*]*Corresponding author:* radenrara@staff.uns.ac.id

Abstract

Sustainable agriculture offers new hope in overcoming the challenges of the decreasing interest of the younger generation in the agricultural sector. Millennial farmers, as part of this younger generation, are the key to successfully implementing sustainable agricultural development. This study aims to explore the influence of the role of parents, friends, extension workers, and media exposure on the entrepreneurial behavior of millennial farmers, and to explore the influence of entrepreneurial behavior on the financial performance of millennial farmers. The research was conducted in the Special Region of Yogyakarta, Indonesia, which was the first province to inaugurate 1,000 millennial farmers. The research sample consisted of 200 millennial farmers, selected using a simple random sampling method. The analysis employed Partial Least Square Structural Equation Modeling (PLS-SEM). The results reveal that the role of parents does not significantly influence millennial farmers' entrepreneurial behavior. The role of friends, agricultural extension workers, and media exposure significantly influence millennial farmers' entrepreneurial behavior. Friends provide motivation, support, and share information. Agricultural extension workers offer knowledge transfer, technology, and programs from the government. Media exposure contributes by providing knowledge and shaping perceptions and behavior. Entrepreneurial behavior has a positive and significant influence on financial performance. The research results impact millennial farmers' regional commissariat/farmer groups, the extension services by agricultural extension workers, and the media for millennial farmers. It is recommended that policies be implemented to strengthen the role of the regional commissariat of millennial farmers/farmer groups, improve extension services, and develop media relevant to millennial farmers.

Keywords: agricultural entrepreneurship; farmers' entrepreneurial behavior; media exposure

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INTRODUCTION

Agriculture is one of the main sectors in Indonesia (Viandari et al., 2022), and it has an essential role in the economy. Agriculture plays a role as a food provider, ensuring food security, providing employment, and environmental sustainability. In Indonesia, the agricultural sector faces a significant challenge, namely the declining interest of the millennial generation in the agricultural sector amidst the modernization era and a variety of more attractive job career options. Nowadays, the younger generation is less interested in agricultural

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activities due to unfavorable perceptions of agriculture (Effendy et al., 2023), such as the negative stigma associated with farming, including being perceived as dirty, low-income work, and other similar stereotypes (Effendy et al., 2022). These conditions have led to a decline in human resources in the agricultural sector. To address this challenge, sustainable agriculture offers a promising solution (Fuhrmann-Aoyagi et al., 2024). Sustainable agriculture has become a global issue (Kurniawan et al., 2023). It is a practice that balances productivity, environmental conservation, and social welfare. The hope is that agricultural activities carried out by the younger generation not only fulfil current needs but also maintain environmental quality and community welfare for future generations.

The younger generation's involvement in the agricultural sector is essential for achieving sustainable agriculture. Their participation can bring significant improvements to the agricultural sector (Todde et al., 2024). Millennial farmers are young people who use innovations, smart agriculture, and science-based research in their work that has long-term viability, profitability, and productivity (Figurek et al., 2024). With their ability in science, technology, and innovation, millennial farmers are well-equipped to implement sustainable agricultural practices through entrepreneurship. Gall et al. (2023) said that millennial farmers play a vital role in increasing agricultural competitiveness as they have the potential to establish a sustainable agricultural system.

Millennial farmers have a good understanding of new technologies and innovations, positioning them as actors in agricultural development and transformation. Digital technology advancements further empower millennial farmers to actively grow and innovate within agriculture businesses. They are expected to develop businesses in agriculture and provide economic benefits through implementing entrepreneurial behavior while maintaining environmental sustainability. Farmers' entrepreneurial behavior is influenced by various factors (Saragih et al., 2019), with the social environment as a driving factor (Metallo et al., 2021) because the involvement of millennial farmers in the agricultural sector cannot be separated from the support of the social environment, so it is expected to improve the financial performance of farm businesses.

Humans often take action because the social environment influences them. The social environment is closely related to human relationships in various social settings, such as family, school, and friends (Effendy et al., 2023), home, and work (Khaerani and Handayani, 2022). In this research, the family environment refers specifically to parents. Parents, as the primary source of emotional and financial support, can encourage their children to develop a career in sustainable agriculture. However, in reality, not all parents support their children to work in the agricultural sector (Nilsson, 2016). Friends can motivate and influence career decisions through social interaction and information sharing. However, interest among friends in agricultural careers is often limited.

Agricultural extension workers play a role in providing technical knowledge and practices that support the agricultural sector. Sometimes, agricultural extension workers work based on government programs. Meanwhile, media exposure increases awareness and inspires the younger generation, especially millennial farmers, by showcasing potential innovations and opportunities in agriculture. The social environment can support millennials' willingness to engage in agriculture (Novisma and Iskandar, 2023) and influence entrepreneurial decisions. This condition triggers millennial farmers to take concrete steps through entrepreneurial behavior to develop better farming businesses.

Millennial farmers' entrepreneurial behavior can be influenced by the social environment that supports business sustainability and impacts financial performance. Social environment can encourage and support millennial farmers to implement innovations and enhance efficiency on their farms (Liu et al., 2021). Moreover, it helps millennial farmers in securing fair prices for their products and expanding market reach. These factors contribute to increased productivity and profitability (Wilson, 2014), ultimately improving financial performance and strengthening the resilience of the agricultural economy (Zhang et al., 2023).

Nurlaela (2020) previously examined entrepreneurial behavior, focusing on the roles of parents, extension workers, and groups. Building on this, the current study addresses gaps in the existing research by integrating additional elements of the social environment that influence millennial farmers' entrepreneurial behavior. Specifically, this study incorporates the roles of parents, friends, agricultural extension workers, and media exposure. By including the variables of friends and media exposure,

this research broadens and complements the existing framework, offering a more comprehensive perspective on the factors that encourage entrepreneurial behavior in millennial farmers.

This research is based on Kurt Lewin's Field Theory, which posits that life space can be further developed in entrepreneurship because it is always dynamic and changes occasionally. The theory describes the environment that shapes entrepreneurial behavior (Kjellman and Ehrsten, 2005), but it also depends on the different social situations in the environment. A person is driven by certain needs and goals when having a relationship with the environment (von Fircks, 2022). Kurt Lewin mentioned that behavior (B) is a function of person (P) and environment (E) (Kjellman, 2014), B(f) = P, E (von Fircks, 2022). Another theory used in this study is a social cognitive theory about learning from the social environment, which reflects the mutual interaction among personal, behavioral, and social/environmental variables (Schunk and DiBenedetto, 2023). This mutual interaction illustrates how environmental factors influence personal factors (Butz and Usher, 2015; Nguyen and Nguyen, 2024), environmental factors influence behavioral factors (Nguyen and Nguyen, 2024), and personal factors influence behavioral factors (Schunk and DiBenedetto, 2023; Nguyen and Nguyen, 2024).

In this study, the concept of reciprocity is in the form of interaction in the social system of millennial farmers. The existence of information through media exposure and the social environment (parents, friends, and agricultural extension workers) causes millennial farmers to think and influence themselves, which will lead to behavior. Thus, this study is expected to provide a more comprehensive overview of the factors shaping millennial farmers' entrepreneurial behavior and offer more effective recommendations to support millennial farmers in achieving a successful agricultural business. The novelty of this research is the integrative approach that observes various social-environmental factors simultaneously and focuses on millennial farmers with great potential for a sustainable agricultural sector. The study has two primary objectives: to examine the social environmental support that fosters entrepreneurial behavior in millennial farmers and to assess the impacts of this entrepreneurial behavior on their financial performance.

MATERIALS AND METHOD

Location and time of the research

The research employs a basic descriptive method (Obielodan et al., 2021). This research method aims to provide a systematic, actual, and accurate description through sample or population data (Tanjung and Nababan, 2016) about the facts, characteristics, and relationships among the researched phenomena (Rukajat, 2018). The research was conducted from February to May 2024. The research location was determined purposively in the Special Region of Yogyakarta because it is the pioneer region or the first province to inaugurate 1,000 millennial farmers. This province is located between 110°00'0" to 110°50'0" E and 7°33'0" to 8°12'0" S (Figure 1), with an area of 3,133.15 km^2 or 0.17% of the total area of Indonesia (1,860,359.67 km^2) (Statistics of Special Region of Yogyakarta, 2024).

Population and sample

The population of this study is millennial farmers in the Special Region of Yogyakarta, totaling 1,308 individuals (Department of Agriculture and Food Security of DIY, 2022). Indonesia uses the term 'millennial farmers' while other countries often refer to them as 'young farmers'. Millennial farmers are young people or the younger generation interested and actively engaged in agriculture (Ardyanti et al., 2024). Following the Regulation of the Minister of Agriculture of the Republic of Indonesia Number 4 of 2019 (Minister of Agriculture of the Republic of Indonesia Regulation Number 04, 2019), millennial farmers are individuals aged 19 to 39 years who are adaptive to digital technology (Head of Agricultural Counseling and Human Resources Development Agency Decree, 2021). These farmers are members of the *Komisaris Daerah Petani Milenial* (*Komda Petani Milenial*) or regional commissioner of millennial farmers, a regency- or city-level organization where they reside. Each *Komda* has a millennial farmer ambassador as a representative of millennial farmers selected through a forum.

The sample of this research comprises millennial farmers aged 19 to 39 years with an agricultural business and registered as members of the regional commissariat of millennial farmers in the regency/city of domicile. The sample size for Partial Least Square Structural Equation Modeling (PLS-SEM)

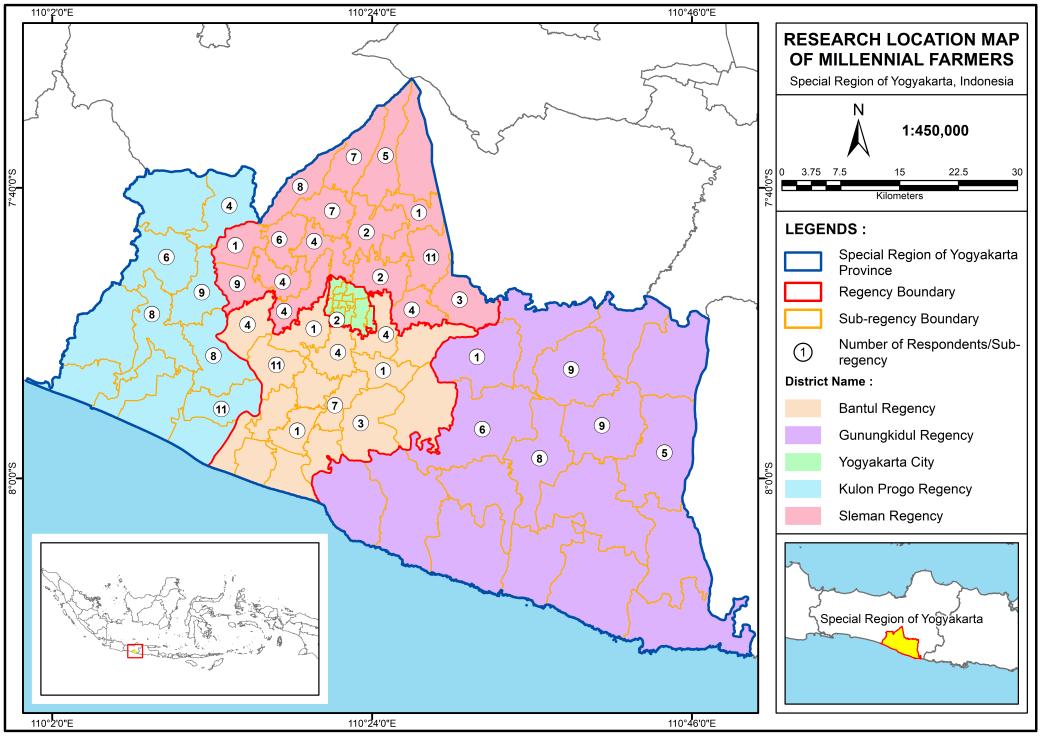

Figure 1. Map of the Special Region of Yogyakarta

analysis should be greater than (a) 10 times the largest number of formative indicators measuring a single construct or (b) 10 times the largest number of structural paths directed at a particular construct in the structural model. This rule of thumb is equivalent to saying that the minimum sample size should be 10 times the maximum number of arrows pointing at latent variables anywhere in the PLS path model (Hair et al., 2014, 2017). Kline (2016) noted that sample sizes in SEM studies typically range from 200 to 300 and the current study used a sample size of 200.

The number of millennial farmer samples in each regency or city was calculated using the sampling fraction per cluster formula. According to Wahyudi (2017), the formula determines the number of samples based on population data if the desired sample number is proportional to the sample set. Sampling in each regency/city was done by simple random sampling, with a lottery technique through a spin wheel on the website wheelofname.com. The distribution of the sample size is presented in Table 1. The research sample was taken from the Special Region of Yogyakarta because the focus was only on the first province inaugurated. This condition may limit the broader applicability of the research results. Therefore, future research can be designed to involve other provinces that have inaugurated millennial farmers.

Table 1. Sample size of millennial farmers

Regency/ Municipality	Population (people)	Sample (people)
Sleman	512	78
Gunungkidul	246	38
Bantul	232	36
Kulon Progo	304	46
Yogyakarta	13	2
Total	1,307	200

Source: Department of Agriculture and Food Security of Special Region of Yogyakarta (2022)

Data collection techniques

This study used primary data collected through interviews and questionnaires (Sipayung et al., 2023), as well as secondary data sourced from the Department of Agriculture and Food Security and the regional commissariat of millennial farmers. The research framework includes four endogenous latent variables and two exogenous latent variables (Table 2). Data collection employed a 5-point Likert scale (Man et al., 2024), where respondents rated their level of agreement with positive statements as follows: 1 (Strongly disagree), 2 (Disagree), 3 (Neutral), 4 (Agree), and 5 (Strongly agree).

Data analysis

Data were analyzed using PLS-SEM with Smart PLS 4.0 software to evaluate the predicted relationship between variables by examining the potential influence or interaction between

them. The latent variable indicators used in the analysis were reflective.

RESULTS AND DISCUSSION

Millennial farmers are young individuals aged 19 to 39 years (Minister of Agriculture of the Republic of Indonesia Regulation Number 4, 2019). The profile of millennial farmers in the Special Region of Yogyakarta reveals exciting characteristics. The average age of millennial farmers is 31.2 years, reflecting a generational shift from older to younger farmers. In terms of gender, male millennial farmers dominate with a percentage of 86%, while female millennial farmers contribute 14%. The education level of millennial farmers also varies. The majority (50%) have a senior high school education level while 10.5% have attended junior high school, and 6% hold a diploma. However, there is a positive trend, with 33.5% of millennial farmers having completed a bachelor's degree. This indicates a growing interest among the younger generation, including those with higher education, in pursuing careers in the agricultural sector.

This study uses four endogenous latent variables: the role of parents, friends, extension workers, and media exposure. Two exogenous latent variables are entrepreneurial behavior and business performance. Table 2 details the endogenous and exogenous latent variables of millennial farmers.

This study uses PLS-SEM analysis using SmartPLS version 4 software, which includes multivariate statistical analysis. This analysis

Table 2. Latent variables and research indicators

Latent variable	Indicators	Mean
X1: Role of parents	X1.1: Parents model entrepreneurial behavior (Palmer et al., 2021)	3.83
	X1.2: Parents provide business experience (Nurlaela et al., 2020)	3.77
	X1.3: Parents provide entrepreneurial knowledge (Rusdiana, 2018)	3.82
	X1.4: Parents help in entrepreneurial activities (Adi and Idris, 2021)	3.67
	X1.5: Parents provide advice in business activities (Kirkwood, 2007)	3.65
X2: Role of friends	X2.1: Friends provide positive encouragement in entrepreneurial behavior intentions (Engle et al., 2011)	3.95
	X2.2: Friends serve as a source for exchanging information (Anwarudin et al., 2020)	4.10
	X2.3: Friends serve as motivators (Anwarudin et al., 2020)	3.89
	X2.4: Friends serve as individuals who channel or share skills (Anwarudin et al., 2020)	3.69
X3: Role of agricultural extension worker	X3.1: Agricultural extension workers serve as consultants (Anwarudin et al., 2020)	3.21
	X3.2: Agricultural extension workers provide training (Abdullah et al., 2021)	3.14
	X3.3: Agricultural extension workers provide coaching (Anwarudin et al., 2020)	3.25
	X3.4: Agricultural extension workers provide assistance (Anwarudin et al., 2020)	3.19
	X3.5: Agricultural extension workers as motivators-provide motivation (Padmaswari et al., 2018; Anwarudin et al., 2020)	3.18
X4: Media exposure	X4.1: Media provides news and information (Mubeena et al., 2020)	3.96
	X4.2: Media influences entrepreneurial attitudes (He et al., 2021)	3.86
	X4.3: Media influence entrepreneurial behavior (He et al., 2021)	3.84
	X4.4: Media is a source of business inspiration (Zafar et al., 2012)	3.92
Y1: Entrepreneur behavior	Y1.1: Business innovation practices (Guan et al., 2019)	3.92
	Y1.2: Business management practices (Forth and Bryson, 2018)	3.89
	Y1.3: Business strategy practices (Ardley and Naikar, 2021)	3.09
Y2: Financial performance	Y2.1: Increased business transactions (Feng and Chen, 2020)	4.18
	Y2.2: Increased business profit (Veliu and Manxhari, 2017; Feng and Chen, 2020)	4.21
	Y2.3: Increase in assets (Veliu and Manxhari, 2017)	4.22
	Y2.4: Capital growth (Viviani et al., 2020)	4.16

is for model theory testing, which focuses on prediction studies, exploration, and development of structural models (Hair et al., 2019). The PLS model consists of a measurement model and a structural model. Model evaluation in PLS consists of (1) measurement model evaluation, (2) structural model evaluation, and (3) overall model evaluation or evaluation of model goodness and fit (Hair et al., 2021).

Evaluation of the measurement model (Outer model)

The measurement model describes the causality between variables and the items that measure them. Evaluation of the reflective measurement model consists of several steps. First, the validity measure is described in the outer loading value or loading factor (LF), where the acceptable LF is ≥ 0.70 (Hair et al., 2021). LFs represent the variance in a question explained by the question items and are referred to as the variance extracted from the question items (Hair et al., 2022).

Second, the reliability of the research variables is assessed through Cronbach's alpha and composite reliability (CR) ≥ 0.70, and convergent validity is evaluated using the average variance extracted (AVE) ≥ 0.50 (Hair et al., 2021). Cronbach's alpha measures internal consistency reliability that assumes equal indicator loadings. CR is a measure of internal consistency reliability, which, unlike Cronbach's alpha, does not assume equal indicator loadings. The AVE is the degree to which a latent construct explains the variance of its indicators (Hair et al., 2022).

Third, the discriminant validity check ensures that variables differ from each other and are statistically tested. The Fornell and Lacker criterion is used to measure discriminant validity, which compares the square root of each construct's AVE with its correlations to other constructs in the model (Hair et al., 2022). Discriminant validity is accepted if the AVE root value > correlation between variables (Hair et al., 2022) and the heterotrait-monotrait (HTMT) ratio of correlation is less than 0.90 (Henseler et al., 2015). The HTMT is the mean of all correlations of indicators across constructs measuring different constructs relative to the (geometric) mean of the average correlations of indicators measuring the same construct (Hair et al., 2022). Evaluation of the formative measurement model is seen from the significance of the outer weight or path coefficient with a *p*-value < 0.05, and there is no multicollinearity between variables with an outer variance inflation factor (VIF) < 5 (Hair et al., 2017). VIF quantifies the severity of collinearity among the indicators in a formative measurement model (Hair et al., 2022).

The first evaluation is the outer model evaluation. Indicators that measure variables are considered valid if the outer loading is > 0.70. The outer loading values range between 0.713 and 0.952. A high outer loading value indicates that the indicators are strongly correlated in measuring variables. Figure 2 shows the outer loading and path coefficient.

The second evaluation focuses on the reliability of the variables, measured using

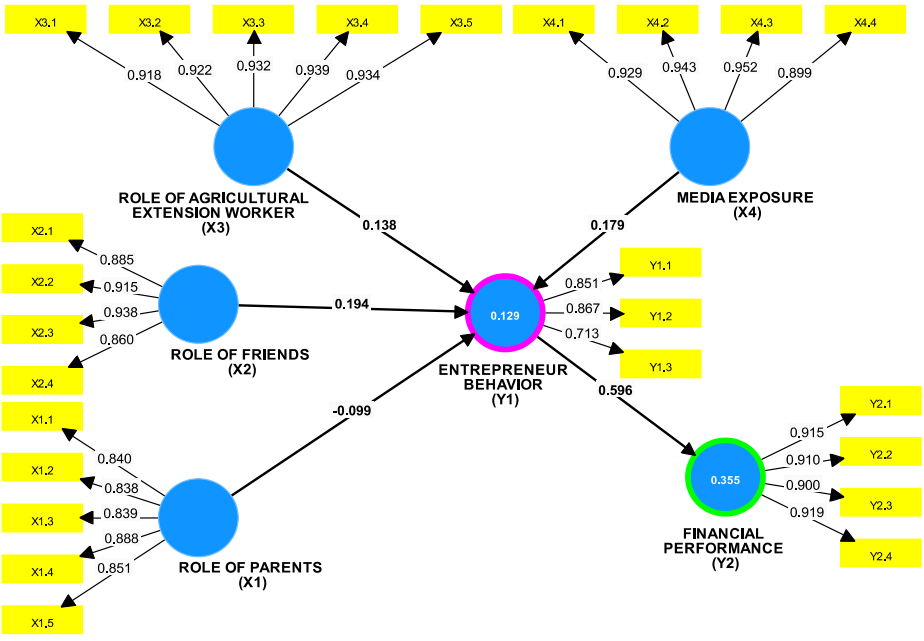

Figure 2. Outer loading and path coefficient

Table 3. Reliability level of measurement variables

Variable	Cronbach's alpha	Composite reliability (Rho A)	Composite reliability (Rho C)	Description
Role of parents (X1)	0.914	1.052	0.929	Reliable
Role of friends (X2)	0.923	0.966	0.945	Reliable
Role agricultural extension worker (X3)	0.961	0.978	0.969	Reliable
Media exposure (X4)	0.949	0.964	0.963	Reliable
Entrepreneur behavior (Y1)	0.745	0.774	0.853	Reliable
Financial performance (Y2)	0.932	0.933	0.951	Reliable

Cronbach's alpha, composite reliability (Rho A), and composite reliability (Rho C), where the estimation shows satisfactory results above 0.70 (reliable) (Hair et al., 2022). These results indicate that the measurement variables have good internal consistency. Each indicator is reliable to measure each variable. The reliability of measurement variables is accepted as reliable and is presented in Table 3.

The third evaluation is the level of convergent validity with AVE, where the recommended value is above 0.50 (Hair et al., 2017). The AVE value of all research variables is above 0.50, which indicates acceptable convergent validity, as presented in Table 4.

The fourth evaluation centers on the discriminant validity of the variables, assessed using the Fornell and Lacker criteria and discriminant validity of variables. The Fornell and Lacker criteria evaluate variable discriminant validity. A variable has good discriminant validity if the root AVE of the variable is greater than its correlation with other variables (Hair et al., 2022). The diagonal value in the Fornell and Lacker table represents the root AVE, and the other values are the correlations between variables, as presented in Table 5. The AVE root of the entrepreneur behavior (Y1) is 0.813. The value of 0.813 is higher than the correlation value with financial performance (Y2) of 0.596, media exposure (X4) of 0.265, the role of agricultural extension worker (X3) of 0.242, the role of friends (X2) of 0.273, and the role of parents (X1) of 0.049. This indicates that the discriminant validity of entrepreneurial behavior (Y1) is accepted. Like other variables, the overall evaluation results show that the discriminant validity evaluation of all measurement variables is accepted. The overall Fornell Lacker evaluation results show that the AVE root of each variable is greater than its correlation compared to other variables, so the discriminant validity of the variables is accepted.

Table 4. AVE value

Variable	AVE
Role of parents (X1)	0.725
Role of friends (X2)	0.810
Role agricultural extension worker (X3)	0.863
Media exposure (X4)	0.867
Entrepreneur behavior (Y1)	0.662
Financial performance (Y2)	0.830

Discriminant validity of variables is called HTMT. According to Henseler et al. (2015), the discriminant validity evaluation is accepted if HTMT is less than 0.90. The estimation results show that all pairs of measurement variables have HTMT less than 0.90 (Table 6). Thus, the evaluation of variable discriminant validity using HTMT is declared acceptable. The HTMT results show that the variable divides the variance by the measurement items that measure it; each item has a higher value than when the variable divides the variance by the measurement items on other variables.

Structural model evaluation (Inner model)

The structural model evaluation begins by examining collinearity between variables using the inner VIF. An inner VIF value < 5 indicates low or no multicollinearity between variables. As shown in Table 7, all inner VIF values are below 5, confirming that multicollinearity between variables is minimal or nonexistent. These results indicate that the estimated PLS model parameters generated are acceptable or unbiased (Hair et al., 2022).

The second step in structural model evaluation involves analyzing the direct effects through a partial test to determine the significance of the relationships between variables. A direct effect is considered significant if the t-statistic value > 1.96 or the *p*-value < 0.05. The testing process in PLS-SEM uses bootstrapping. The results of processing data are presented in Table 8.

Table 5. Fornell and Lacker

Variable	Y1	Y2	X4	X3	X2	X1
Entrepreneur behavior (Y1)	0.813					
Financial performance (Y2)	0.596	0.911				
Media exposure (X4)	0.265	0.261	0.931			
Role agricultural extension worker (X3)	0.242	0.145	0.330	0.929		
Role of friends (X2)	0.273	0.229	0.349	0.356	0.900	
Role of parents (X1)	0.049	0.054	0.276	0.251	0.329	0.851

Note: Diagonal value is the root of AVE

Table 6. HTMT

Variable	Y1	Y2	X4	X3	X2	X1
Entrepreneur behavior (Y1)						
Financial performance (Y2)	0.698					
Media exposure (X4)	0.319	0.276				
Role of agricultural extension worker (X3)	0.275	0.151	0.346			
Role of friends (X2)	0.314	0.238	0.371	0.374		
Role of parents (X1)	0.057	0.067	0.316	0.269	0.351	

Role of parents (X1) → Entrepreneur behavior (Y1)

The role of parents (X1) has no significant effect on entrepreneur behavior (Y1). This is because millennial farmers in the Special Region of Yogyakarta have strong self-reliance values and autonomy characteristics. Millennial farmers exhibit a strong sense of independence, making decisions about their lives and farming activities without relying heavily on other people's guidance and advice, including their parents. They rely more on their abilities and knowledge, supported by the accessibility of information and modern technology. Moreover, not all millennial farmers come from farming families, and this limits the transfer of agricultural knowledge and practices from one generation to the next (from parents to children), as it happens in a traditional farming family (Breitenbach and Foguesatto, 2023).

Sometimes, the parents of millennial farmers cannot provide relevant advice or input related to their children's agricultural business. This condition causes a decreasing direct influence of parents on their children's farming. This shift allows millennial farmers to confidently explore innovations aimed at improving farm efficiency and yields while embracing the risks involved. Risk-taking is one of the entrepreneurial characteristics that influence entrepreneurial intention (Lone and Baba, 2024). Thus, the values of self-reliance are changing the dynamics in farming families and driving a transformation in agricultural practices. The younger generation now plays an important and dominant role in determining the future of agriculture.

Nchanji et al. (2024) highlighted that the young generation in Ghana, West Africa, does not consider agriculture the primary source of income. Parents often discourage their children from pursuing careers in agriculture due to concerns about poor economic conditions. In Ghana, young people frequently turn to agriculture as a last option. Nandi et al. (2022) mentioned that parents prefer their children to live safe and secure lives rather than a career in agriculture. They also want their children to have a steady income to fulfill family needs by working not in the agricultural sector but in the government sector. However, parents are open to agricultural entrepreneurship if policy measures effectively address the associated challenges. Anwarudin et al. (2019) noted that families often do not support their children's continued participation in the family farming business.

The millennial farmers' research results differ from the outcomes of a previous study (Nchanji et al., 2024), that parents in Cameroon, Central Africa, influence young people's interest in agriculture. Parents often emphasize the value of perseverance, believing that children must endure challenges to grow and develop life skills, learn about agriculture, and have their first job in the agricultural sector because agriculture is an inherent part of the Cameroonian economy. Rahaman et al. (2023) found that parents influence children's employment choices in the Ghanaian labor market, especially in the

Table 7. Inner VIF

Relation	VIF
Role of parents (X1) → Entrepreneur behavior (Y1)	1.175
Role of friends (X2) → Entrepreneur behavior (Y1)	1.294
Role of agricultural extension worker (X3) → Entrepreneur behavior (Y1)	1.228
Media exposure (X4) → Entrepreneur behavior (Y1)	1.234
Entrepreneur behavior (Y1) → Financial performance (Y2)	1.000

Table 8. Direct effect analysis outcomes

Relation	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T-statistics (|O/STDEV|)	*P*-value	Description
Role of parents (X1) → Entrepreneur behavior (Y1)	-0.059	-0.043	0.064	0.929	0.353	Not significant
Role of friends (X2) → Entrepreneur behavior (Y1)	0.116	0.112	0.057	2.032	2.032	Significant
Role of agricultural extension worker (X3) → Entrepreneur behavior (Y1)	0.082	0.083	0.039	2.110	0.035	Significant
Media exposure (X4) → Entrepreneur behavior (Y1)	0.107	0.107	0.053	2.004	0.045	Significant
Entrepreneur behavior (Y1) → Financial performance (Y2)						

agricultural sector, highlighting the important role of parents. García-Rodríguez et al. (2022) mentioned that parents have the most influence on the intention to support children's entrepreneurial behavior. Wimatsari et al. (2019) also emphasized the critical role of parents in fostering positive attitudes toward agriculture, given their proximity and influence as family members who may pass on farming businesses.

These findings underline the positive and significant role of parents in shaping millennial farmers' engagement in agriculture. This condition creates implications for the focus of government policy. For example, the government added entrepreneurship education to develop an entrepreneurial spirit since basic education. The government collaborates with various stakeholders to create a conducive environment for agricultural entrepreneurial development. The government organizes entrepreneurial training to stimulate interest and intention in agriculture entrepreneurship. These policies are expected to encourage the emergence of entrepreneurs in agriculture.

Role of friends (X2) → Entrepreneur behavior (Y1)

The role of friends (X2) significantly affects entrepreneur behavior (Y1) among millennial farmers. This condition is attributed to their participation in the regional commissariat of millennial farmers in each regency/city. This is an organization established by the government. This platform is dedicated to supporting young farmers to receive special programs for millennial farmers. Millennial farmers leverage this association to share knowledge and information on agricultural and non-agricultural topics. The community serves as a valuable resource, providing knowledge, skills, motivation, and critical information on aspects such as crop varieties, land management, cultivation techniques, pest and disease control, post-harvest processes, and marketing strategies (Anwarudin et al., 2019). This is in line with research from Mekonnen et al. (2022) which states that friendship relationships are important in receiving information. Because agricultural information is transferred through social interactions (Pratiwi and Suzuki, 2017) and information dissemination depends on the level of interaction between farmers in the friendship network (Chaudhuri et al., 2021), the majority of farmers rely on friends in the association group to receive information (Kusnandar et al., 2024).

Millennial farmers can also share stories about their problems. Millennial farmers often seek advice and suggestions from their peers for production or general agricultural issues (Noy and

Jabbour, 2017). The support of friends makes it easier to start a business and overcome problems (Shahzad et al., 2021). According to Hieu and Loan (2022), friends are important in motivating and shaping entrepreneurial intentions. Millennial farmers can also share their successes in solving problems and managing their farms, thus inspiring and motivating the other millennial farmers to take business risks. This condition is in line with the results of research by Agholor et al. (2024), showing that agricultural entrepreneurs are influenced by various factors that inspire their decision-making.

Moreover, friendship relationships between millennial farmers can foster a new economy with increased demand to expand markets and reach new customers (Alzate et al., 2024), so they expand business networks, strengthen business conditions, establish cooperation, and open new business opportunities. However, the results of millennial farmers' research differ from the results from Ilczuk et al. (2023), which suggest that the role of friends in supporting the business is not significant in influencing the business. Based on these conditions, the role of friends can be enhanced by strengthening the role of millennial farmer communities or farmer groups as a forum for sharing knowledge, experience, and mutual support. Strengthening the role of friends can be done by strengthening the role of millennial farmer communities or farmer groups as a forum for sharing knowledge, experience, and mutual support. It is necessary to develop media that are more specific and relevant to the needs of millennial farmers. For example, applications offering up-to-date information on agricultural technology, market trends, and business opportunities could better support their entrepreneurial endeavors and foster stronger peer collaboration.

Role of agricultural extension worker (X3) → Entrepreneur behavior (Y1)

The role of agricultural extension workers (X3) significantly influences entrepreneur behavior (Y1). This condition occurs because agricultural extension workers act as mediators, connecting farmers with science and technology. They provide both theoretical knowledge and practical applications (Indriasari et al., 2024), teaching essential agricultural techniques, technology, and innovations. This guidance aims to increase agricultural production and quality of yields.

Agricultural extension workers also provide knowledge about post-harvest handling, product marketing, business management, and financial management, helping millennial farmers develop their businesses. They also inform farmers about government programs, which supports the findings of Kusnandar et al. (2024). Agricultural extension workers help millennial farmers access government programs, such as low-interest loans, assistance with agricultural production facilities, and training to increase business knowledge. They also facilitate connections with other institutions or farmer groups in different regions, helping expand the millennial farmer network.

Agricultural extension workers also act as mentors to assist millennial farmers' business activities, as well as monitor and evaluate government programs. These programs are prepared based on the bottom-up method, which involves the active participation of millennial farmers in designing activities that address their particular challenges. Agricultural extension workers play a pivotal role in influencing behavioral changes among millennial farmers by providing information and knowledge. Behavioral changes are evident in agricultural activities because of information that positively influences farmers' activities (Adeyeye et al., 2024).

Agricultural extension workers support the modernization process in agriculture because they have a profession and position as support staff (Mutimba, 2024). They provide advice or information (Pratama et al., 2024) through an extension that can connect the information gap so that farmers can make the right decisions (Man et al., 2024). Agricultural extension is essential for changing farmers' practices (Curry, 2024). It provides extension services that will impact entrepreneurial behavior (Pongsiri et al., 2019) and positively affect entrepreneurial behavior (Wale et al., 2021).

Based on these conditions, agricultural extension needs to be adjusted to the needs and characteristics of millennial farmers, by incorporating more interactive and technology-based methods. This approach ensures that the extension services resonate with the preferences and working styles of millennial farmers, fostering greater engagement and effectiveness. To support this transformation, it is recommended to implement policies that strengthen the role of regional commissariats of millennial farmers and farmer groups. This can be achieved by strengthening institutions, enhancing the skills of members, improving access to resources, expanding networks, promoting joint business development, boosting overall performance, and

conducting periodic evaluations. Furthermore, extension services should be improved by increasing the capacity of agricultural extension workers, diversifying extension methods, fostering partnerships and cooperation with related institutions, upgrading infrastructure, and implementing consistent monitoring and sustainable evaluation processes.

Media exposure (X4) → Entrepreneur behavior (Y1)

Media exposure (X4) significantly influences entrepreneur behavior (Y1), driven by the rapid development of the internet, which impacts media development. Various types of media, including printed media, radio, television, and social media, play an essential role for millennial farmers by enhancing their knowledge and providing access to valuable information. Information from these media sources assists them in making informed decisions about their farms and businesses.

Media exposure also reshapes millennial farmers' perceptions and opinions regarding the business potential within the agricultural sector. Among these media, social media has experienced the most rapid growth. Social media functions as a source of information, facilitator, motivator, and guide (Nurfathiyah et al., 2024). Farmers use and develop social media for agricultural business and information sharing (Dilleen et al., 2023). Social media has the potential to transform the behavior of young farmers, encouraging them to develop business skills and increase their income (Gever et al., 2024). It contributes positively to farmers' technical skills through information exchange, knowledge sharing, networking, and cooperation (Syafrial et al., 2024).

Jalil and Zakaria (2024) added that social media is not limited to socializing but also serves as a vital platform for building networks, such as market access. Through these networks, farmers can use social media to promote and market their agricultural products, thereby reaching a broader consumer base. The power of social media contributes to the entrepreneurial behavior of millennial farmers. Social media is a platform required for every business venture or to start an agriculture business. Media exposure encourages millennial farmers to be more self-reliant, innovative, and successful in business development through entrepreneurial behavior.

The findings of this study align with the results of prior research (Gurjar et al., 2017; Siddeswari and Gopal, 2021), that media exposure has a positive and significant relationship with entrepreneurial behavior. Based on these conditions, it is necessary to develop media that are more specific and relevant to the needs of millennial farmers. For example, applications designed to provide the latest information on agricultural technology, market trends, and business opportunities would be instrumental in enhancing their entrepreneurial capacities and overall business success.

Therefore, it is recommended to establish policies aimed at developing media platforms tailored to the needs of millennial farmers. These platforms could include popular social media networks such as *TikTok*, *Instagram*, and *Facebook*, which are widely used for information sharing and networking. Additionally, agricultural-specific applications like *Pak Tani Digital*, *Agree*, *iGrow*, *Plantix*, and *Picture This* could be leveraged to provide targeted resources. Moreover, websites and blogs managed by the government, private sector, and research institutions, as well as video-sharing platforms like *YouTube* and *Vimeo* can also be enhanced to provide comprehensive and credible information to millennial farmers.

Entrepreneur behavior (Y1) → Financial performance (Y2)

Entrepreneur behavior (Y1) has a significant positive effect on financial performance (Y2). Millennial farmers demonstrate entrepreneurial behavior by implementing innovation or creativity practices and developing new ideas. These innovations are novel and unique, enabling millennial farmers to enhance their income and profitability. Moreover, they implement sound business management strategies by effectively managing human and financial resources, which helps reduce operating costs and improve profit margins. Millennial farmers monitor market conditions as a basis for identifying opportunities and threats. This market awareness allows them to formulate and execute appropriate business strategies, which can lead to increased sales and higher business income.

Overall, millennial farmers adopt a holistic approach to entrepreneurship, integrating innovation, good management, and appropriate market strategies. These actions help millennial farmers to increase profitability, ensuring the sustainability of their businesses amidst the challenges and dynamics of the modern agricultural industry. Arnis et al. (2018) highlight that entrepreneurial behavior has significantly impacted financial performance. This condition is in line with research conducted by Novisma and Iskandar (2023) that entrepreneurial

behavior practiced by millennial farmers has an important role in improving agricultural production performance. Moreover, factors such as persistence, responsiveness to business opportunities, innovations, willingness to take risks, and self-reliance in business influence the perspective of farm financial performance.

Third, the evaluation of the effect of variables at the structural level is conducted using the f-square. The f-square value for the direct impact can be interpreted as follows: low influence (f-square = 0.020), moderate influence (f-square = 0.150), and high influence (f-square = 0.350) (Cohen, 1988; Hair et al., 2021).

Based on Table 9, the effect of the role of parents (X1) on entrepreneurial behavior (Y1) at the structural level, with an f-square value of 0.000, is classified as a very low influence category. The effect of the role of friends (X2) on entrepreneurial behavior (Y1) at the structural level, with an f-square value of 0.024, falls into a moderate influence category, but it is close to high. The role of agricultural extension worker (X3) on entrepreneurial behavior (Y1) at the structural level, with an f-square value of 0.000, is considered to be in a very low influence category. The effect of media exposure (X4) on entrepreneur behavior (Y1) at the structural level, with an f-square value of 0.008, is considered to be in a very low influence category. The effect of entrepreneurial behavior (Y1) on financial performance (Y2) at the structural level, with an f-square value of 0.481, is classified as a high-influence category.

Figure 3 illustrates that all outer loading indicators are valid for measuring the respective measurement variables, with the outer loading values exceeding 0.70, which confirms their validity in line with the criteria set (Hair et al., 2022). The t-statistic hypothesis testing for the direct effects shows that the causality of the measurement model, which refers to the relationship between variables and indicators (measurement items), is both valid and significant. It is shown by the t-statistical value exceeding 1.96. The analysis of the influence between variables indicates significant direct effects (t-statistics > 1.96) on entrepreneurial behavior (Y1) are the role of friends (X2), the role of agricultural extension worker (X3), and media exposure (X4). However, the role of parents (X1) is not significant (t-statistic < 1.96). The role of entrepreneurial behavior (Y1) has a significant and positive impact on improving financial performance (Y2).

Evaluation of goodness and model fit

PLS analysis is a variance-based SEM analysis for model theory testing focusing on prediction studies. To assess the acceptability of the proposed PLS model, several measures are used. These include R-square, Q-square Predict, Standardized Root Mean Square Residual (SRMR) (Hair et al., 2019), PLS predict (Shmueli et al., 2016), and Cross-Validated Predictive Ability Test (CVPAT) (Liengaard et al., 2021).

R-square describes the variation in endogenous variables that can be explained by other exogenous/endogenous variables in the model. According to Chin (1998), the qualitative interpretation value of R-square is 0.19 (low influence), 0.33 (moderate influence), and 0.66 (high influence). R-square value is shown in Table 10.

As presented in Table 10, the results indicate that the influence of the role of parents (X1), the role of friends (X2), the role of agricultural extension workers (X3), media exposure (X4) to entrepreneurial behavior (Y1) is 12.9%, which represents a very low influence. The remaining 87.1% is influenced by other variables not included in the model. The effect of

Table 9. F-square

Relation	F-square
Role of parents (X1) → Entrepreneur behavior (Y1)	0.000
Role of friends (X2) → Entrepreneur behavior (Y1)	0.024
Role of agricultural extension worker (X3) → Entrepreneur behavior (Y1)	0.000
Media exposure (X4) → Entrepreneur behavior (Y1)	0.008
Entrepreneur Behavior (Y1) → Financial performance (Y2)	0.481

Table 10. R-square

Variable	R-square	R-square adjusted
Entrepreneur behavior (Y1)	0.129	0.111
Financial performance (Y2)	0.355	0.351

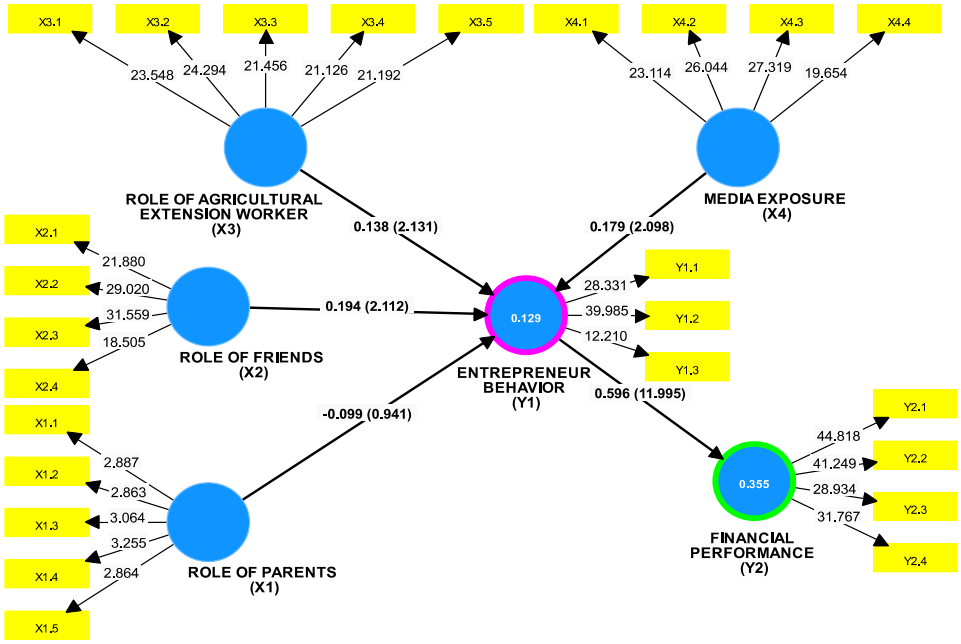

Figure 3. T-statistic hypothesis testing

entrepreneurial behavior (Y1) on financial performance (Y2) is 35.5%, signifying a moderate influence. Meanwhile, the remaining 64.5% is influenced by other variables.

Q-square is a measure of predictive accuracy to assess how well changes in exogenous (independent) and endogenous (dependent) variables can predict endogenous variables like entrepreneurial behavior (Y1) and financial performance (Y2). This measure is a form of validation in PLS to state the suitability of model predictions (predictive relevance) (Hair et al., 2017). The predicted Q-square value is an improvement over the previous Q-square. The value is obtained through the blindfolding procedure. The Q-square prediction value above 0 indicates that the model has acceptable predictive relevance. However, according to Hair et al. (2019), the value of Q-square predict > 0 is called small predictive relevance, the value of Q-square predict > 0.25 is considered medium predictive relevance, and Q-square predict > 0.50 indicates high predictive relevance. The Q-square prediction value is shown in Table 11.

The estimated model results confirm that the Q-square predicted values for entrepreneur behavior (Y1) and financial performance (Y2) are above 0, suggesting that the model has acceptable predictive relevance, which is classified as in the small category.

SRMR is one measure of goodness of fit in the PLS-SEM model. SRMR compares the estimated model correlation matrix with the empirical data correlation matrix. The recommended value is < 0.08, indicating a good fit model (Hair et al., 2017) but the SRMR value between 0.08 and 0.10 is called an acceptable fit (Schermelleh-Engel et al., 2003). SRMR values are presented in Table 12.

As detailed in Table 12, the SRMR value of the model is 0.049, smaller than 0.08. It means that the model is a good fit, indicating that the model used aligns well with the observed data. The PLS-SEM model is considered to describe the data well and accurately. A value of 0.049 indicates a good fit model, confirming that the model fits the data (Kline, 2016).

PLS predict is a form of model validation to show the predictive power of the PLS-SEM model created (Shmueli et al., 2016). PLS-SEM results have a measure of predictive power that can be shown by comparing the PLS-SEM algorithm with other algorithms, including other linear regression models (LM) (Hair et al., 2019). A PLS model is considered to have high predictive power if the value of the root mean squared error (RMSE) or mean absolute error (MAE) or the predictive error from the PLS model

Table 11. Q-square predict

Variable	Q-square predict
Entrepreneur behavior (Y1)	0.094
Financial performance (Y2)	0.068

Table 12. SRMR

	Saturated model	Estimated model
SRMR	0.049	0.054

Table 13. PLS predict value

Indicator	Q-square predict	PLS model		LM model		Difference between PLS and LM models	
		PLS-SEM_RMSE	PLS-SEM_MAE	LM_RMSE	LM_MAE	RMSE	MAE
Y1.1	0.090	0.883	0.643	0.905	0.675	-0.022	-0.032
Y1.2	0.032	0.895	0.669	0.921	0.700	-0.026	-0.031
Y1.3	0.060	0.938	0.764	0.988	0.813	-0.050	-0.049
Y2.1	0.057	0.653	0.502	0.683	0.536	-0.030	-0.034
Y2.2	0.058	0.748	0.555	0.790	0.593	-0.042	-0.038
Y2.3	0.049	0.672	0.535	0.707	0.559	-0.035	-0.024
Y2.4	0.055	0.702	0.541	0.748	0.585	-0.046	-0.044

is lower than the linear regression model (Hair et al., 2019). The PLS predict value is shown in Table 13.

Table 13 depicts that the endogenous indicators, consisting of entrepreneurial behavior (Y1) and financial performance (Y2), in the PLS model have RMSE and MAE values lower than the LM model. If the PLS model is compared with the LM, the difference between the RMSE and MAE values is negative, indicating that the PLS model outperforms the LM in terms of lower predictive errors. The PLS predict results show that the PLS model in this research has a high predictive power.

CONCLUSIONS

The social environment influencing millennial farmers' entrepreneurial behavior includes the role of friends, agricultural extension, and media exposure. Entrepreneurial behavior significantly enhances millennial farmers' financial performance. Policy recommendations should focus on strengthening the role of friends through active millennial farmer communities or groups. Agricultural extension services should be tailored to millennial farmers' needs, utilizing interactive and technology-based methods. Media's role can be enhanced by developing specific platforms like social media, agricultural apps, websites, blogs, and videos relevant to their needs. A key limitation of this study is its focus on a single province, which may restrict the broader applicability of its findings. Future research should expand to include other provinces for more generalized insights.

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