

(RESEARCH ARTICLE)



## Agricultural extension workers' perception of cyber extension

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### Abstract

Mastery of various information system technologies in the agricultural sector greatly supports the competence of agricultural extension agents. Extension agents must possess adequate competencies before conducting extension activities, education, or training for farmers to strengthen farmers' perceptions of technological innovation. This study aims to: (a) analyze the perceptions of extension agents toward Cyber Extension; (b) analyze the personal characteristics, motivation, and independence of agricultural extension agents in West Bandung Regency; and (c) analyze the partial and simultaneous effects of personal characteristics, motivation, and independence of extension agents on their perceptions of Cyber Extension in West Bandung Regency. The research method employed is a survey research method. The analytical tool used is multiple linear regression analysis. The results of the study indicate that: (a) agricultural extension agents in West Bandung Regency perceive Cyber Extension as playing an important role in supporting extension activities; (b) the primary motivation of agricultural extension agents in West Bandung Regency is to achieve high performance. Furthermore, the independence of extension agents is deemed satisfactory in emotional, intellectual, economic, and social aspects; (c) personal characteristics, motivation, and independence of extension agents have a significant simultaneous effect on their perceptions of Cyber Extension in West Bandung Regency. However, personal characteristics, when analyzed partially, do not significantly influence the perceptions of agricultural extension agents in West Bandung Regency regarding Cyber Extension. On the other hand, motivation and independence of extension agents partially have a significant effect on their perceptions of Cyber Extension in West Bandung Regency.

**Keywords:** Agricultural Extension; Cyber Extension; Perception; Motivation; Independence

### 1. Introduction

The Vision of Indonesia Emas 2045 emphasizes the development of superior human resources through quality education, including in the agricultural sector, as a strategic step to face globalization and enhance national competitiveness. To support this vision, the Long-Term Development Plan (RPJP) of the Republic of Indonesia 2005-2025 advocates for improving the relevance of education and training, including in the field of agricultural extension, to align with national development needs and labor market demands (RPJP, 2005-2025). One of the government's efforts in revitalizing agricultural extension is through the enactment of Law No. 16 of 2006, although the transformation of extension services continues to face challenges such as regional autonomy, conflicts of interest, and political distortions (Setiawan, 2023).

Advancements in agricultural technology have significantly improved the effectiveness and efficiency of cultivation practices. However, the number of agricultural extension agents with civil servant (PNS) status in Indonesia continues to decline due to limited regeneration, high retirement rates, and the integration of extension institutions with agricultural departments (Suhanda & Jahi, 2008). This situation affects the effectiveness of agricultural extension

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services, as extension agents face increased workloads. For instance, in West Java, a single extension agent is responsible for three villages, resulting in suboptimal extension services (Widakdo et al., 2021; Putra et al., 2023; Wijaya et al., 2019). Another challenge is the low motivation among agricultural extension agents to utilize information technology such as Cyber Extension. Motivation in this regard reaches only 29 percent, with most usage limited to administrative tasks or entertainment purposes (Wijaya et al., 2019). Studies indicate that only 40.6 percent of extension agents possess high competency in utilizing information technology (Rivan et al., 2022).

Cyber Extension emerges as an innovation to support information technology-based agricultural extension services. By integrating digital communication into agricultural systems, Cyber Extension aims to strengthen the capacity of extension agents in providing timely and relevant information to farmers (Sharma, 2006). This system offers easy access for extension agents and farmers to share information, extension modules, and agricultural technology innovations, designed to enhance productivity and competitiveness in agricultural outputs (Mulyandari, 2011; Adriyani, 2019). However, the adoption of Cyber Extension in Indonesia remains relatively low, as observed in Bogor Regency, where only 47.5 percent of respondents considered the system beneficial (Wijaya, 2015).

Mastery of various information system technologies in agriculture significantly enhances the competence of agricultural extension agents. Extension agents must possess adequate competencies before conducting extension activities, education, or training for farmers to strengthen farmers' perceptions of technological innovation. High-performing extension agents can position themselves as motivators, educators, and facilitators, thereby influencing behavioral changes among farmers in their agricultural practices (Rahmawati & M.I. Bahua, 2019).

This study aims to analyze the perceptions of extension agents toward Cyber Extension in West Bandung Regency, examine the personal characteristics, motivation, and independence of agricultural extension agents in West Bandung Regency, and assess the partial and simultaneous effects of personal characteristics, motivation, and independence on the perceptions of agricultural extension agents toward Cyber Extension in West Bandung Regency. According to Mardikanto (2006), the success of technology innovation adoption is significantly influenced by the perceptions of extension agents toward the technology. Therefore, a comprehensive understanding of the perceptions and factors influencing the adoption of Cyber Extension is expected to contribute to improving the quality of agricultural extension services in Indonesia.

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## 2. Methodology

This study focuses on the perceptions of extension agents toward the Cyber Extension innovation in West Bandung Regency. The research location was selected purposively because this region produced a nationally recognized outstanding extension agent in 2022 (swadayaonline.com). The research object encompasses the perceptions of agricultural extension agents, as defined by Sugiyono (2012), where a research object is an attribute, characteristic, or value of a person, object, or activity that exhibits specific variations determined by the researcher for study and subsequent conclusion. This study employs a quantitative approach based on the philosophy of positivism. The entire research is constructed deductively and quantitatively, with a descriptive type (explaining extension agents' perceptions of Cyber Extension) and correlational type (analyzing the influence of dominant factors on the perceptions of Cyber Extension).

This study employed a survey method, using questionnaires as the primary instrument to collect data from a population of 126 agricultural extension agents in West Bandung Regency. In addition, in-depth interviews were conducted with 17 key informants, including 16 heads of BPP/BP3K (Agricultural Extension Centers) and one farmer, to obtain more detailed information. Primary data were gathered through direct interviews with respondents using questionnaires and interview guides, while secondary data were collected from literature sources such as journals, books, and relevant institutional data, including those from the Ministry of Agriculture and the Central Bureau of Statistics (BPS).

The data collection instruments in this study included interviews, direct observations at the research site, and a literature review as part of the data-gathering procedure to extract information (Danial & Wasriah, 2009). The interview instrument was designed to facilitate data collection and processing, using primarily closed-ended questionnaires supplemented with some open-ended questions. The study population consisted of all agricultural extension agents in West Bandung Regency, and a census method was employed to include the entire population as respondents, in accordance with the definitions of population and sample provided by Sugiyono (2017).

Data were analyzed descriptively and qualitatively to illustrate perceptions of innovation and the factors influencing agricultural extension agents' perceptions of Cyber Extension. This involved calculating mean values and percentages and using a Likert scale to categorize the results. A quantitative approach was also applied by transforming ordinal data

into interval data using the Method of Successive Interval (MSI). Multiple linear regression analysis was employed to measure the effects of personal characteristics, motivation, and independence of extension agents on their perceptions of Cyber Extension.

**Table 1** Distribution of Extension Agents in West Bandung Regency

No	Research Location	Number of Extension Agents (People)
1	BP3K Batujajar	7
2	BP3K Cihampelas	7
3	BP3K Cisarua	7
4	BP3K Sindangkerta	8
5	BPP Ngamprah	10
6	BP3K Cikalongwetan	12
7	BP3K Cililin	7
8	BP3K Cipatat	11
9	BP3K Cipeundeuy	7
10	BP3K Cipongkor	7
11	BP3K Gununghalu	6
12	BP3K Lembang	7
13	BP3K Padalarang	8
14	BP3K Parongpong	7
15	BP3K Rongga	7
16	BP3K Saguling	8
	Total	126

### 3. Result and Discussion

#### 3.1. Characteristics of Agricultural Extension Agents in West Bandung Regency

The respondents in this study were agricultural extension agents in West Bandung Regency. The respondents were distributed across BP3K (Agricultural Extension Centers) in each district within West Bandung Regency. The observed characteristics of the extension agents included age, formal education, non-formal education, work experience, and accessibility to Cyber Extension.

**Table 2** Characteristics of Agricultural Extension Respondents in West Bandung Regency

Type of Characteristics	Percentage (%)
Age (years)	
27-36	29,37
37-45	49,21
46-53	21,43
Total	100
Formal Education	
SMP	5,56

SMA/SMK	30,16
D3	40,48
S1	22,22
S2	1,59
Total	100
Quantity of Non-Formal Education (times)	
<6	36,51
6 - 10	51,59
>10	11,90
Total	100
Non-Formal Education Based on Types of Training Attended	
Training on Administration and Management	13,27
Training on Farmer Institution Empowerment	11,67
Pre-service Training	14,76
Technical Training in Agriculture	22,08
Technical Training in Animal Husbandry	17,62
Functional Training	10,98
Leadership Training	9,61
Total	100
Employment Status	
Civil Servant (PNS)	38,89
Contract-Based Government Employee (PPPK)	17,46
Private Employee	43,65
Non-Permanent Employee (THL)	0,00
Total	100
Types of Extension Work	
Primary Job	91,27
Side Job	8,73
Total	100
Work Experience (years)	
3-10	14,29
11-17	49,21
18-24	14,29
25-32	22,22
Total	100

Agricultural extension agents in West Bandung Regency are predominantly aged 37–45 years (49.21%). This indicates that the majority of agricultural extension agents in the region are in early to late adulthood, characterized by optimal physical conditions, high levels of ambition, motivation, creativity, and innovation, as well as increasing emotional

stability (Ministry of Health, 2009). Additionally, the age range of 37–45 years represents a stage where individuals attain maturity in decision-making and problem-solving, utilizing broader perspectives (Papalia & Olds, 2009).

The majority of respondents hold an Associate Degree (D3) qualification (40.48%), while the frequency of respondents with a Master's Degree (S2) is the smallest (1.59%) among the formal education levels attained by agricultural extension agents in West Bandung Regency. Respondents with an Associate Degree (D3) tend to focus on practical aspects and technical skills, which in turn provide direct benefits for implementing agricultural programs in the field. However, the low number of extension agents with a Master's Degree (S2) raises concerns about limitations in strategic analysis and innovation development capabilities in the agricultural sector (Papalia & Olds, 2009; Sunaryo, 2013). The educational benefits possessed by an agricultural extension agent are not only advantageous for the individual but also significantly beneficial for the farmers they serve.

The frequency of respondents' participation in non-formal education is quite varied. The majority of respondents (51.59%) participated in formal education through agricultural training or courses 6–10 times a year. This reflects the efforts of agricultural extension agents to enhance their competencies, which ultimately impacts the quality of services provided to the farmers they support.

The types of training attended by agricultural extension agents in West Bandung Regency are presented in the Figure below. The majority of respondents (22.08%) have participated in technical agricultural training, which is the most attended type of training designed to meet job competency standards and support career development in the agricultural sector (BPPSDMP, Ministry of Agriculture, 2021). This training serves as a crucial instrument for enhancing the professionalism and specialized skills of agricultural extension agents, contributing to the effectiveness of their guidance to farmers and the improvement of agricultural productivity. The effectiveness of the training needs to be evaluated to ensure the relevance between the training attended and its application in the field, thereby supporting improvements in both individual and organizational performance.

The respondents, as agricultural extension agents in West Bandung Regency, hold various employment statuses. These statuses include Civil Servants (PNS), Contract-Based Government Employees (PPPK), Private Employees, and Non-Permanent Employees (THL). The majority of respondents are Private Employees (43.65%). Furthermore, field findings revealed the absence of agricultural extension agents with THL status in West Bandung Regency. This finding aligns with the declining number of THL extension agents in the region. In 2019 and 2020, there were 18 THL agricultural extension agents in West Bandung Regency. However, by 2021, the region no longer had agricultural extension agents with THL status (BPPSDMP, Ministry of Agriculture, 2021).

Agricultural extension work, as a profession, is not solely the primary job for extension agents in West Bandung Regency. Some extension agents consider agricultural extension as a side job. The main reason for having a side job is financial necessity, serving as a survival strategy for low-income households. This indicates that the income from being an agricultural extension agent is not sufficient to serve as the main or sole source of livelihood. This finding aligns with Daud (2022), who noted that some agricultural extension agents still earn below the city/regency minimum wage (UMK), with an income range of Rp. 2,100,000 to Rp. 2,700,000.

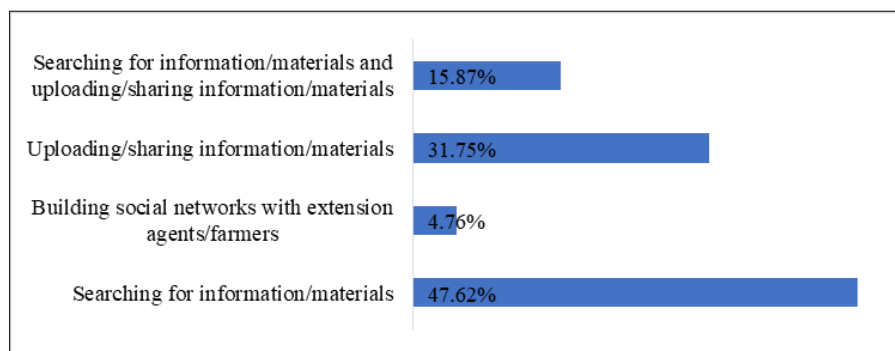
The majority of respondents have 11–17 years of work experience. This work experience contributes to the knowledge and skills of extension agents in performing their duties and addressing farmers' challenges. Work experience is a process of acquiring knowledge or skills related to job methods through an individual's involvement in task execution. With the knowledge and skills gained through work experience, agricultural extension agents are expected to optimize their efforts in resolving various issues faced by farmers, including those related to agricultural techniques, technology adoption, and farmer institutions.

The majority of respondents have accessed Cyber Extension; however, the frequency of access remains low, with 41.27% of respondents accessing it only occasionally. Respondents have not consistently utilized Cyber Extension in their extension activities, differing from the findings of Pakpahan et al. (2023), which reported a high utilization frequency of 62.2% in Deli Serdang Regency. This higher usage was influenced by extension agents' characteristics, environmental factors, motivation, and availability of facilities. Cyber Extension, a platform launched by the Ministry of Agriculture, provides information on technological innovations, including location-specific materials and the dissemination of agricultural technologies. These resources are utilized by regional and central extension agents to support extension activities (Adriyani, 2019).

**Table 1** Characteristics of Respondents Based on Frequency of Cyber Extension Access

Frequency of Access	Number of Respondents (people)	Percentage (%)
Never	0	0,00
Rarely	27	21,43
Occasionally	52	41,27
Frequently	33	26,19
Always	14	11,11
Total	126	100,00

There is a significant difference in the percentages of Cyber Extension utilization. Searching for information is the most common use, with the highest percentage at 47.62%. Conversely, utilizing Cyber Extension as a medium to build social networks with other extension agents or farmers is the least performed activity, conducted by only 4.76% of respondents. These findings indicate issues in the utilization of Cyber Extension. According to Adriyani (2019), the primary problem in utilizing Cyber Extension lies in the low skills and willingness of agricultural extension agents to write extension materials.

**Figure 1** Characteristics of Respondents Based on Types of Cyber Extension Utilization

## 4. Motivation and Independence of Agricultural Extension Agents in West Bandung Regency

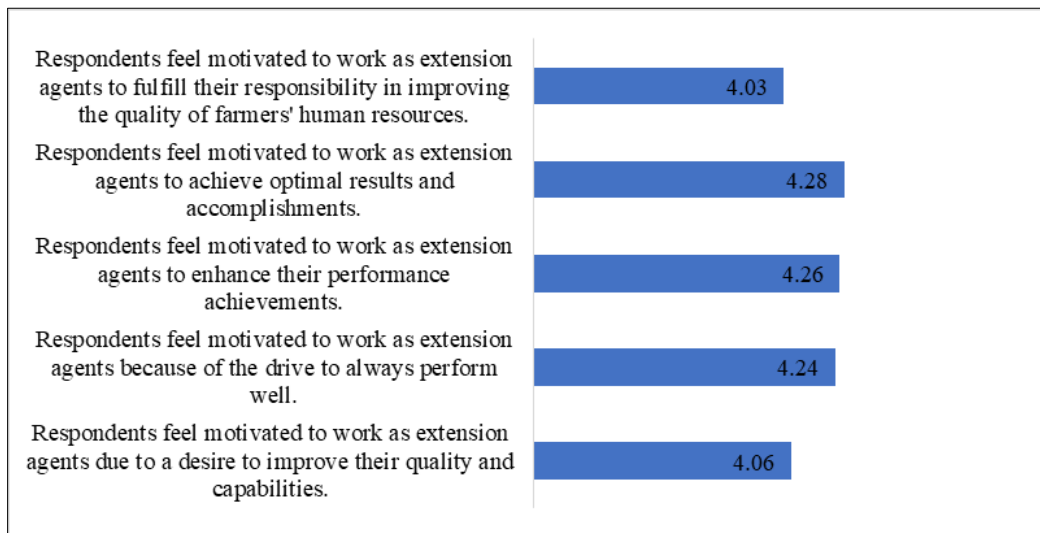
### 4.1. Motivation of Extension Agents

Motivation is a process that explains the intensity, direction, and persistence of an individual in achieving their goals. Similarly, the motivation of agricultural extension agents in using Cyber Extension plays a role in their duties. The motivation to utilize Cyber Extension can be observed in its influence on the implementation of agricultural extension activities. Extension agents use Cyber Extension driven by a desire to achieve better performance and secure higher positions than before (Manurung et al., 2016).

Motivation consists of: (1) The need for achievement: work motivation driven by the desire to enhance performance as an extension agent, stemming from responsibility, the aspiration to improve work quality, and self-appreciation; (2) The need for power: work motivation arising from the desire to attain higher positions; (3) The need for recognition: motivation to gain acknowledgment from farmers for tasks performed; (4) The need for income: work motivation derived from the need for income or salary as compensation for carrying out extension duties.

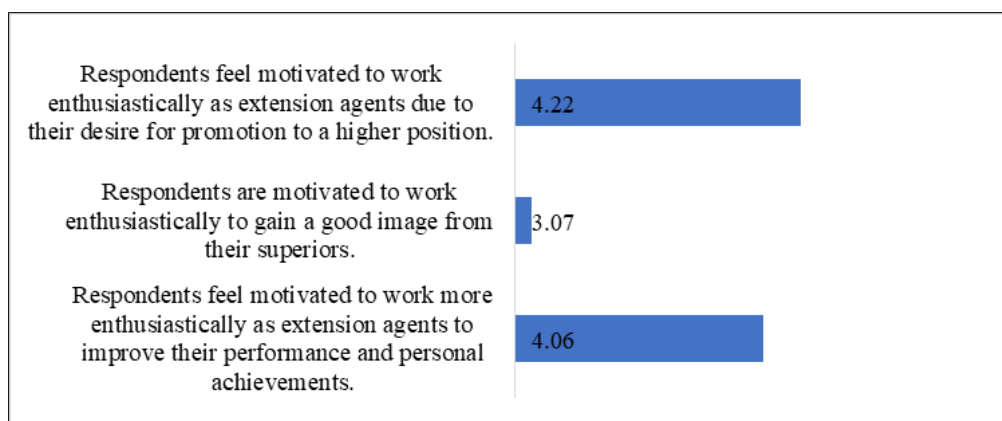
The findings on the need for achievement motivation among agricultural extension agents in West Bandung Regency indicate that respondents' evaluations fall into the "good" category. This data suggests that respondents possess a need for achievement motivation in performing their duties, which drives them to utilize Cyber Extension as a means to achieve their goals. Respondents are motivated by a desire to fulfill their responsibilities, improve performance achievements, and enhance their quality and capabilities as agricultural extension agents. The highest rating was observed for the item related to the desire to improve results and achieve maximum accomplishments. This indicates

that respondents are driven to meet predetermined work targets, supported by Cyber Extension, whether the motivation originates from personal ambition or from the agricultural extension institutions assigning their tasks.



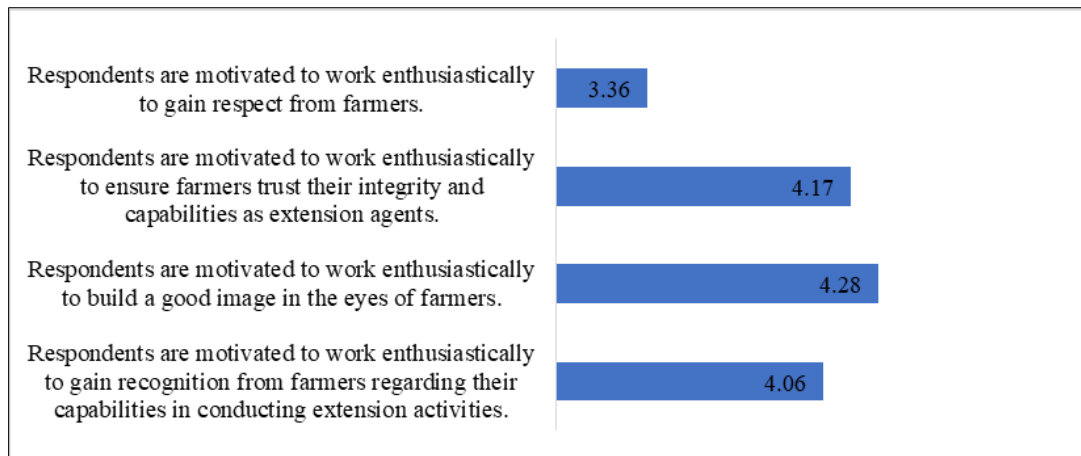
**Figure 2** Motivation for the Need for Achievement Among Agricultural Extension Agents in West Bandung Regency

The findings regarding the need for power indicate that, overall, the need for power falls into the "good" category. This suggests that Cyber Extension contributes positively to fulfilling the need for power. The results indicate that respondents desire power in their roles as agricultural extension agents in West Bandung Regency. The item "motivated to work enthusiastically as an extension agent due to a desire for promotion to a higher position" received an average rating of 4.22, placing it in the "very good" category. This perception demonstrates that respondents hope their actions will impact their job status to secure promotions. This implies that achieving such aspirations is inseparable from various activities undertaken, including the use of Cyber Extension. Generally, promotions to higher positions are perceived not only to involve greater responsibilities but also to grant more authority. On the other hand, the item "working enthusiastically to gain a good image from superiors" received the lowest average rating, falling into the "fairly good" category. The low rating suggests that respondents view this as an inappropriate motivation. Therefore, activities, including the use of Cyber Extension to support their work, are not carried out for this purpose.



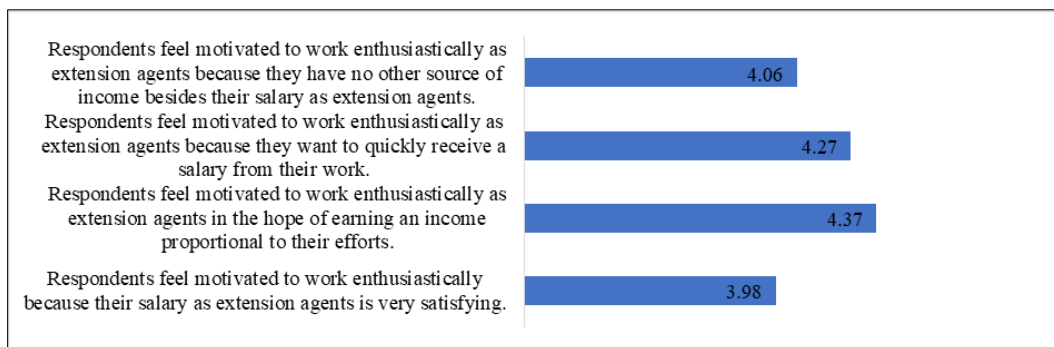
**Figure 3** Motivation for the Need for Power Among Agricultural Extension Agents in West Bandung Regency

The evaluation results for the need for recognition remain in the "good" category. The item "motivated to work enthusiastically to gain a good image in the eyes of farmers" received the highest average score of 4.28. Conversely, the item with the lowest average score was "motivated to work enthusiastically to gain respect from farmers." Recognition is essential to encourage efforts and behaviors aligned with organizational expectations, fostering harmony between employees' work and organizational goals. However, gaining respect from farmers is not the primary objective for extension agents in fulfilling their responsibilities, as reflected in the lower average score for this item.



**Figure 4** Motivation for the Need for Recognition Among Agricultural Extension Agents in West Bandung Regency

The findings regarding the need for income indicate that, overall, respondents' perceptions of the need for income fall into the "good" category. The item "respondents feel motivated to work enthusiastically as extension agents due to the expectation of earning an income proportional to their efforts" received the highest average score, placing it in the "very good" category. Income, as a form of financial recognition for work, is naturally expected to align with the level of effort put into performing tasks. Conversely, the item "respondents feel motivated to work enthusiastically because their salary as an extension agent is very satisfying" received the lowest average score. This indicates that the income earned by extension agents is still perceived as inadequate and unsatisfactory. This raises concerns about the weak motivation of extension agents to use Cyber Extension in their work, as efforts made are often aligned with the perceived rewards received. According to Daud et al. (2022), some agricultural extension agents still earn below the city/regency minimum wage (UMK), with incomes ranging from Rp. 2,100,000 to Rp. 2,700,000.

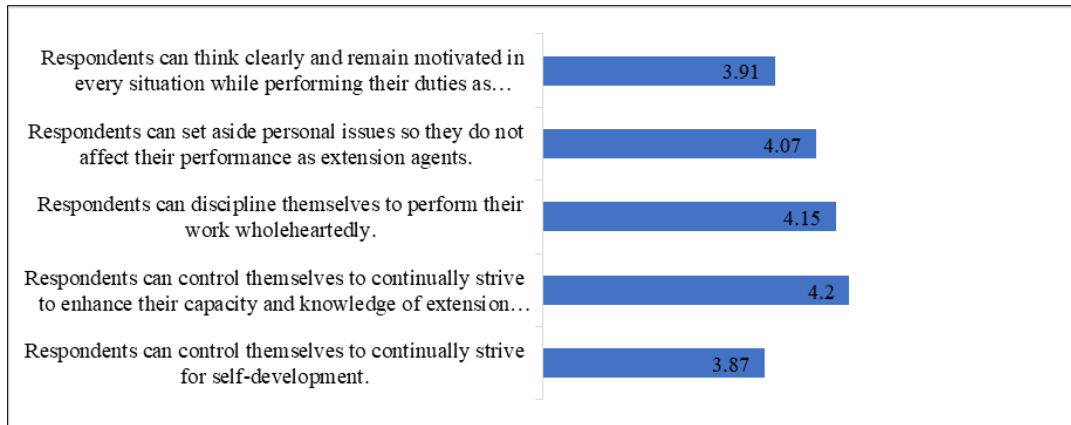


**Figure 5** Motivation for the Need for Income Among Agricultural Extension Agents in West Bandung Regency

#### 4.2. Independence of Extension Agents

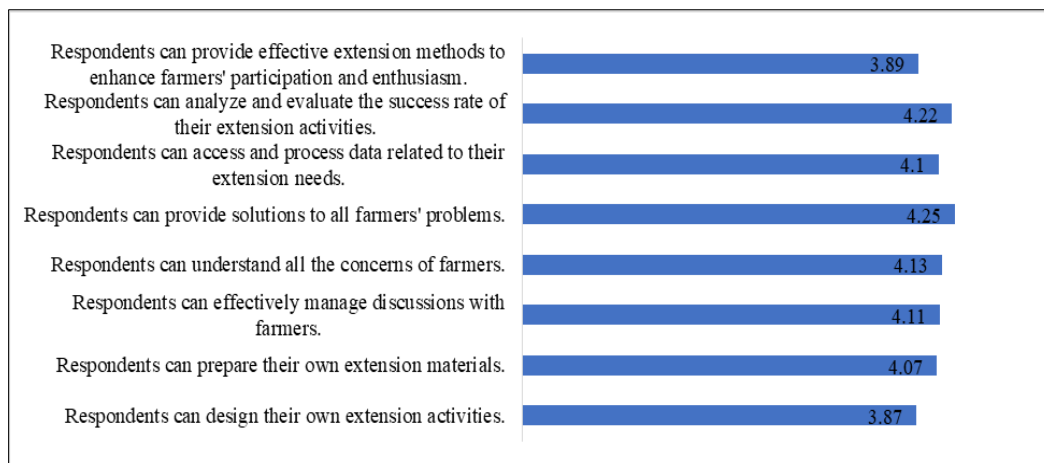
An independent agricultural extension agent can optimally utilize natural resources and Cyber Extension to support their work. Optimal performance is achieved by planning the quality and quantity of tasks, motivating extension agents to use tools like Cyber Extension to meet work targets. Independence in extension agents consists of intellectual, social, emotional, and economic aspects. Data on emotional independence reveal that all measured items fall into the "good" category. The item "respondents can control themselves to continuously strive to enhance their capacity and knowledge of extension materials" received the highest average score of 4.20. This indicates that respondents are capable of self-regulation in their efforts to improve their knowledge capacity on extension materials.





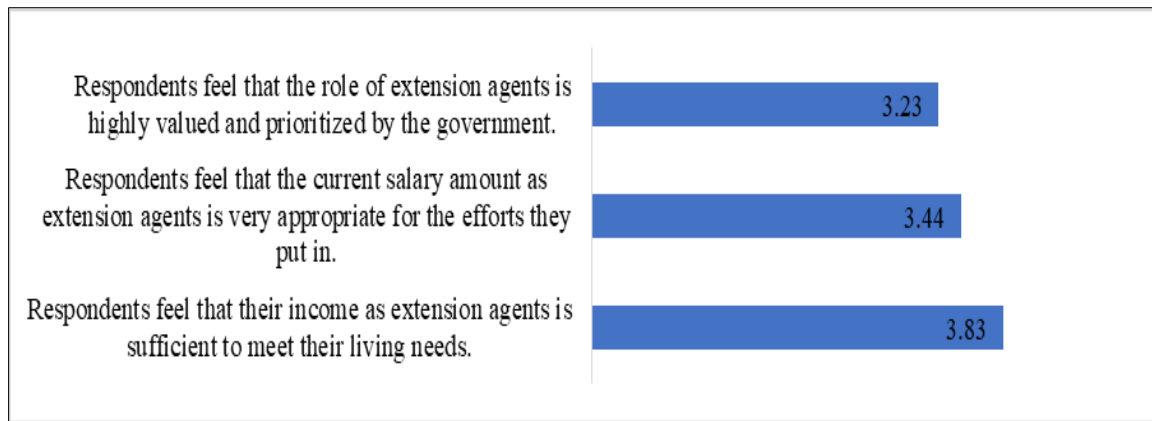
**Figure 6** Emotional Independence of Agricultural Extension Agents in West Bandung Regency

The intellectual independence of respondents is categorized as good. This indicates that the respondents in this study possess strong logical, rational, and analytical abilities. Additionally, it suggests that the extension agents demonstrate sound judgment and rationality in utilizing Cyber Extension for their work needs. Intellectual capability encompasses analytical skills, logical reasoning, and rationality. Agricultural extension agents are often faced with various challenges among farmers. Therefore, these abilities are essential for effectively performing their duties and addressing the issues faced by farmers.



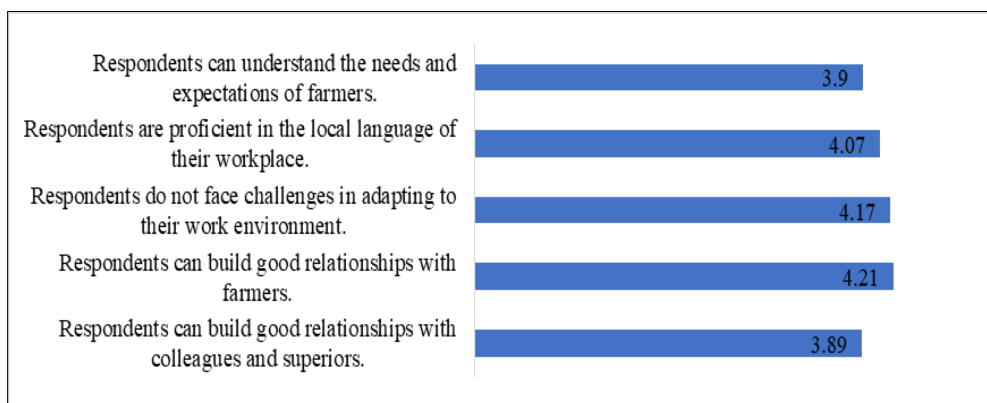
**Figure 7** Intellectual Independence of Agricultural Extension Agents in West Bandung Regency

The results on economic independence indicate that, overall, the respondents' economic independence falls into the "good" category. This suggests that respondents in this study feel the state provides adequate attention, their salaries are proportional to the efforts required in performing their duties, and their income as extension agents is sufficient to meet their needs. The utilization of Cyber Extension is expected to further enhance this independence by providing more efficient access to information and improving productivity. Economic independence refers to an individual's ability to manage their own finances without relying on others (Desmita, 2014).



**Figure 8** Economic Independence of Agricultural Extension Agents in West Bandung Regency

The results for social independence were measured using five question items. The item that received the highest average score was "respondents can build good relationships with farmers," with a score of 4.21. A strong relationship between agricultural extension agents and farmers is essential to foster effective collaboration in addressing various challenges in the field. To achieve this, extension agents need to possess strong social skills in building communication and trust with farmers.



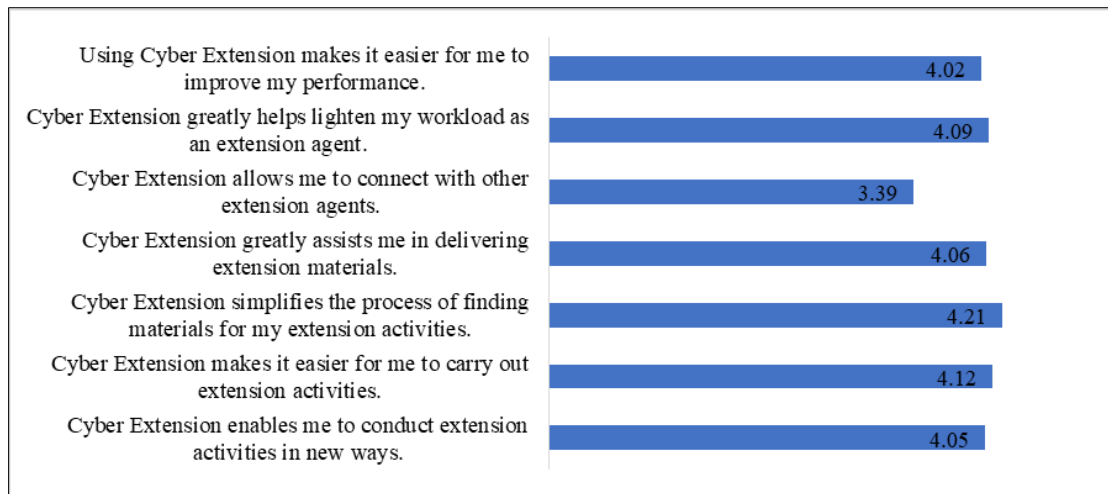
**Figure 9** Social Independence of Agricultural Extension Agents in West Bandung Regency

#### 4.3. Perceptions of Agricultural Extension Agents on the Use of Cyber Extension

The perception of agricultural extension agents in West Bandung Regency regarding Cyber Extension was measured using the Technology Acceptance Model (TAM). TAM is believed to predict user acceptance of technology based on the influence of five factors: perceived usefulness, perceived ease of use, attitude toward using, intention to use, and actual system usage (Davis, 1989).

#### 4.4. Perceived of Usefulness

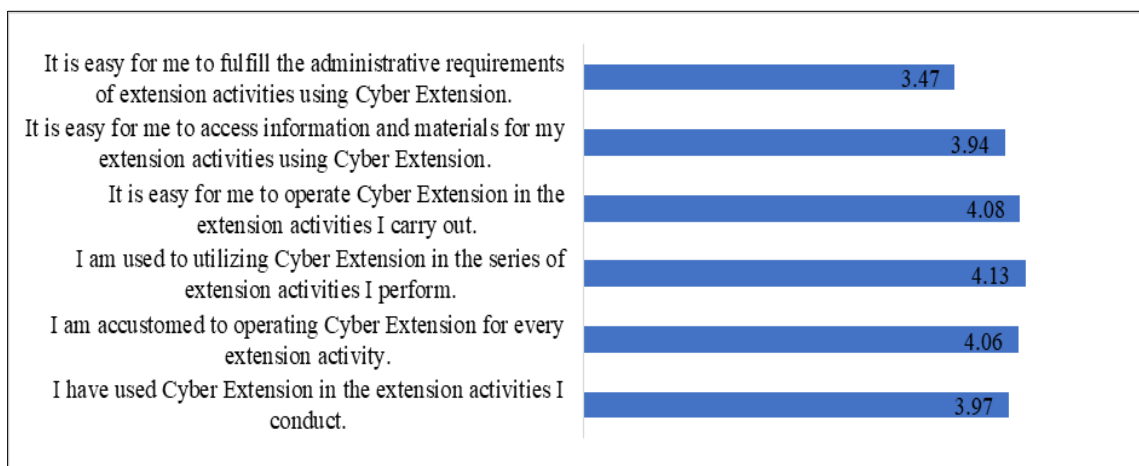
Perceived usefulness in the TAM model, as examined by Davis (1989), explains that new information systems are accepted by end-users because they accelerate tasks, enhance performance, improve effectiveness, boost productivity, and provide ease of use and utility. In this study, Cyber Extension was evaluated as a tool that facilitates work, lightens workloads, connects extension agents, delivers materials, retrieves information, and enables new methods in agricultural extension. The findings indicate that the perceived usefulness of Cyber Extension in West Bandung Regency falls into the "good" category. It supports the optimization of extension activities, enhances the performance of extension agents, and accelerates the resolution of farmers' issues with continuously updated information (Davis, 1989).



**Figure 10** Perceived Usefulness of Agricultural Extension Agents in West Bandung Regency Toward Cyber Extension

#### 4.5. Perceived of Ease to Use

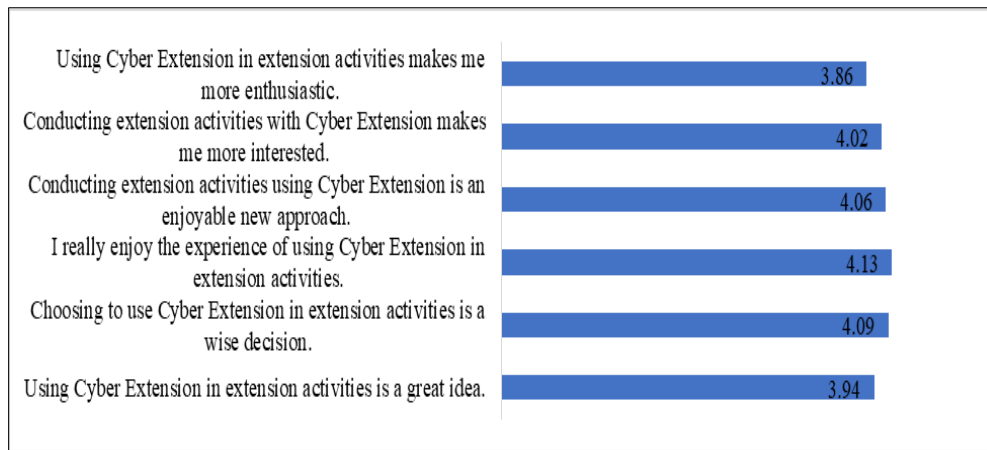
Perceived ease of use reflects the belief that technology can be easily understood and used to assist in work, without obstacles in its application (Davis, 1989; Agustian et al., 2014). This perception is measured by indicators such as ease of learning, flexibility, ease of becoming skilled, as well as clarity and control in its usage (Davis, 1989). Research findings indicate that the perceived ease of use of Cyber Extension in West Bandung Regency falls into the "good" category. Agricultural extension agents reported familiarity with and frequent utilization of the system in extension activities. Cyber Extension facilitates access to information, preparation of materials, and provision of solutions for farmers, thereby enhancing the effectiveness of extension services.



**Figure 11** Perceived Ease of Use of Agricultural Extension Agents in West Bandung Regency Toward Cyber Extension

#### 4.6. Attitude Toward Using

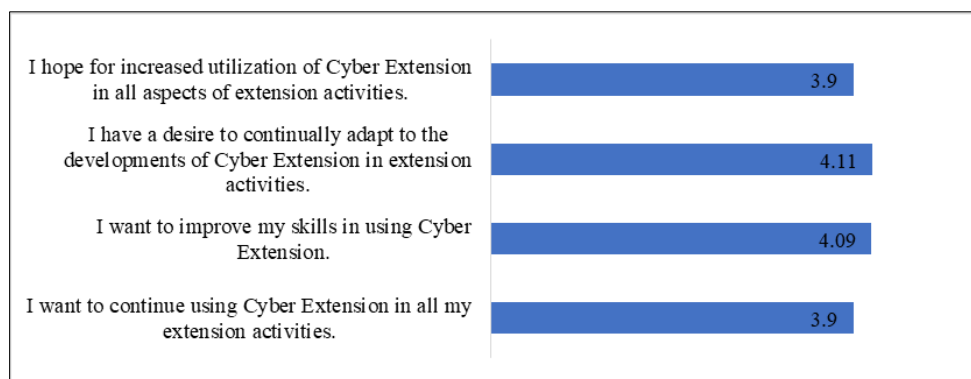
Attitude toward using Cyber Extension in the TAM framework reflects acceptance or rejection of technology in the workplace, influenced by cognitive, affective, and behavioral aspects (Davis, 1993; Noviarni, 2014). This study reveals that the attitude of agricultural extension agents in West Bandung Regency toward Cyber Extension falls into the "good" category, with high acceptance of this innovation. The extension agents reported feeling more enthusiastic, interested, and considered the use of Cyber Extension a wise decision and an enjoyable new approach to extension activities, positively impacting their performance. This attitude reflects the agents' trust in the benefits and ease of the technology, making Cyber Extension a necessity in their extension activities.



**Figure 12** Attitude Toward Using Cyber Extension by Agricultural Extension Agents in West Bandung Regency

**4.7. Intention to Use**

Intention to use technology is defined as the user's desire to use or reuse a technology that is perceived as beneficial and satisfying. In this study, the intention to use Cyber Extension was measured through expectations of its increased use in extension activities, the willingness to continue adapting to this technology, the desire to improve its usage skills, and its application in all extension activities. The findings show that the intention of agricultural extension agents in West Bandung Regency to use Cyber Extension falls into the "good" category, based on their positive previous experiences and belief in its benefits. Technology usage is influenced by its perceived usefulness and intensity of use, where a positive attitude toward innovation drives its sustainable use (Rahmawati, 2019). The agricultural extension agents in West Bandung Regency demonstrate a positive attitude and trust in Cyber Extension, motivating them to continue using it in the future as it is perceived to facilitate and enhance the effectiveness of their extension activities.



**Figure 13** Behavior to Continue Using Cyber Extension by Agricultural Extension Agents in West Bandung Regency

**4.8. Factors Influencing Agricultural Extension Agents' Perceptions of Cyber Extension**

*4.8.1. The Simultaneous Influence of Personal Characteristics, Motivation, and Independence on Agricultural Extension Agents' Perceptions*

**Table 2** Results of Testing the Simultaneous Effect of Independent Variables on the Dependent Variable

ANOVAa						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21502604315.629	3	7167534771.876	45.759	.000b
	Residual	19109500966.085	122	156635253.820		
	Total	40612105281.714	125			

a. Dependent Variable: Perception of Extension Agents b. Predictors: (Constant), Independence, Characteristics, Motivation

The influence of personal characteristics, motivation, and independence on extension agents' perceptions of Cyber Extension was tested simultaneously using an F-test with IBM SPSS. The results showed an F-value of 45.759 with a significance level of  $0.000 < 0.05$ , indicating that all independent variables collectively have a significant effect on the dependent variable. Thus, improving personal characteristics, motivation, and independence of extension agents will enhance their perceptions of Cyber Extension. This aligns with Harahap's (2023) findings, which demonstrated that these factors significantly influence extension agents' perceptions. Personal characteristics were measured through indicators such as age, formal and non-formal education, work experience, and accessibility to Cyber Extension, all of which positively impacted perceptions.

Motivation and independence are also critical factors influencing extension agents' perceptions. High motivation drives individuals to achieve, gain recognition, and meet their needs, ultimately enhancing their perception of technologies such as Cyber Extension. Furthermore, independence encourages extension agents to think and act according to norms, reduce dependency, and achieve optimal performance. Independent extension agents are better able to adapt to circumstances and utilize Cyber Extension effectively, thereby improving their perception of this technology.

**Table 3** Results of the Determination Test of Independent Variables on the Dependent Variable

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.728 <sup>a</sup>	.529	.518	12,515.401

a. Predictors: (Constant), Independence, Characteristics, Motivation

The test results yielded an R Square value of 0.529. This indicates that the independent variables collectively explain 52.90% of the variation in the dependent variable. A smaller  $R^2$  value implies a weaker relationship between the independent and dependent variables, while a larger  $R^2$  value indicates a stronger relationship (Sugiyono, 2012). The nature of the correlation further determines the direction of the relationship. Based on the above perspective, it can be concluded that the correlation in this study falls into the category of a strong relationship.

#### 4.8.2. The Partial Influence of Personal Characteristics, Motivation, and Independence on Agricultural Extension Agents' Perceptions

**Table 4** Results of the t-Test for Independent Variables on the Dependent Variable

Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5753.309	10344.837		.556	.579
	Characteristics	-.159	.669	-.015	-.238	.813
	Motivation	.753	.147	.413	5.106	.000
	Independence	.553	.114	.392	4.854	.000

a. Dependent Variable: Perception of Extension Agents

Based on the test results, it was found that the personal characteristics variable had a t-value of -0.238 with a significance level of 0.813, the motivation variable had a t-value of 5.106 with a significance level of 0.000, and the independence variable had a t-value of 4.854 with a significance level of 0.000. It can be concluded that, partially, the personal characteristics variable does not significantly influence the perceptions of agricultural extension agents. In contrast, the motivation and independence variables partially have a significant influence on the perceptions of agricultural extension agents.

#### 4.8.3. The Influence of Personal Characteristics on Agricultural Extension Agents' Perceptions

The t-test results in this study show that the personal characteristics variable has a t-value of -0.238 and a significance level of 0.813. Based on these results, it can be concluded that the personal characteristics variable does not have a significant influence on agricultural extension agents' perceptions of Cyber Extension. Characteristics such as age,

formal education, non-formal education, work experience, and accessibility to Cyber Extension do not significantly affect the perceptions of agricultural extension agents in West Bandung Regency regarding Cyber Extension.

#### *4.8.4. The Influence of Motivation on Agricultural Extension Agents' Perceptions*

The partial influence of motivation on agricultural extension agents' perceptions was tested using a t-test with the assistance of IBM SPSS software. The t-test is used to assess the partial effect of independent variables on the dependent variable (Ghozali, 2018). The results of this study show that the motivation variable has a t-value of 5.106 and a significance level of 0.000. Since the significance level of motivation is  $0.000 < 0.05$ , it can be concluded that the motivation variable has a significant influence on agricultural extension agents' perceptions of Cyber Extension.

In this study, motivation was measured through four indicators: the need for achievement, power, recognition, and income. Motivation, both intrinsic and extrinsic, is a driving force that determines an individual's persistence and enthusiasm in activities, influencing the quality of their behavior (Bahua, 2018). Among agricultural extension agents in West Bandung Regency, motivation plays a significant role in shaping their perceptions of Cyber Extension, driven by the belief that this technology can meet their needs and provide the expected satisfaction.

#### *4.8.5. The Influence of Extension Agents' Independence on Agricultural Extension Agents' Perceptions*

The test results indicate that the independence of extension agents significantly influences the perceptions of agricultural extension agents in West Bandung Regency regarding Cyber Extension. This statement is supported by the test results, where independence had a t-value of 4.854 and a significance level of  $0.000 < 0.05$ . Therefore, it can be concluded that emotional, intellectual, economic, and social capabilities significantly affect the perceptions of agricultural extension agents in West Bandung Regency regarding Cyber Extension.

The independence of extension agents is essential for solving farmers' problems, including the ability to effectively utilize natural resources, express opinions freely and confidently, explore personal potential, and take responsibility for decisions made (Wijaya et al., 2015). Independent extension agents must possess initiative, strong motivation, the ability to creatively choose alternatives, the capacity to build partnerships, collaborate, and avoid reliance on external assistance. This independence enables extension agents to play an optimal role within the community.

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## **5. Conclusion**

The perceptions of agricultural extension agents in West Bandung Regency indicate that Cyber Extension plays an important role in supporting extension activities. Extension agents understand, accept, and are interested in continuing to use this innovation to optimize extension services. Their primary motivation is achievement, driven by a desire to fulfill responsibilities, improve performance, and enhance self-quality. The independence of extension agents is evaluated as good across emotional, intellectual, economic, and social dimensions. Simultaneously, personal characteristics, motivation, and independence significantly influence extension agents' perceptions of Cyber Extension. However, partially, only motivation and independence have a significant influence.

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## **Compliance with ethical standards**

### *Disclosure of conflict of interest*

No conflict of interest to be disclosed.

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