

The Use of Information Technology in The Marketing of Agricultural Products With The UTAUT Approach

Puji Rahayu¹, Kusnandar¹, Erlyna Wida Riptanti^{1*}, and Isti Khomah¹

¹ Department of Agribusiness, Faculty of Agriculture, University of Sebelas Maret, Surakarta, Indonesia.

***Corresponding author; e-mail: erlynawida@staff.uns.ac.id**

ABSTRACT

The fast advancement of information technology is reported to have a profound impact on various aspects of the community, including the agriculture sector. On the other hand, the millennial generation who are sensitive to technological advances are reportedly less interested in agriculture. Apart from that, millennial farmers also have not optimized the use of information technology to market their agricultural products. Hence, the purpose of this study is to investigate the factors that encourage millennial farmers in Central Java to use of information technology in marketing agricultural products using a Unified Theory of Acceptance and Use of Technology (UTAUT) approach. The location and samples were purposively determined in Central Java. A total of 120 millennial farmers were included in the sample population, and data analysis was conducted using the Structural Equation Modeling-Partial Least Square (SEM-PLS) method. The findings indicated that behavior intention to use information technology were influenced by performance expectancy, effort expectancy, and facilitating conditions, then behavior intention would influence use behavior. Based on these findings, motivation and self-confidence need to be instilled to accelerate the adoption of innovation and technology towards modern agriculture. This research will be useful for the government in creating a program or policy.

Keywords: Information technology, Millennial farmers, Structural equation modeling.

INTRODUCTION

Agriculture holds a significant position within Indonesian society and is deeply ingrained in the lives of the people (Rozaki, 2020). According to the BPS (2021), among the 131,050,523 workers aged ≥ 15 , a total of 28.33% are employed in the forestry, fisheries, and agriculture sectors. However, a concerning trend has appeared because the younger generation exhibits a declining interest in pursuing a career in agriculture (Widiyanti et al., 2020; Riptanti et al., 2022). A recent report has also shown that the number of farmers aged 15 to 39 in the

38 agricultural, forestry, and fisheries sectors has decreased by 10.07% between 2017 and 2021
39 (BPS, 2022a). The low adoption of technology has been reported to be one of the prominent
40 factors contributing to this decline (Effendy et al., 2022).

41 The reluctance of young people, including those with agricultural education, to pursue a
42 career in the sector, has adverse effects on agricultural and agro-industrial enterprises, the labor
43 market, and regional development (Bednařiková et al., 2016). Therefore, it is important to
44 address this declining interest to prevent future shortages of farmers, which can negatively
45 impact various aspects of life. On the other hand, the millennial generation is a generation that
46 is aware of technology. This should be an opportunity for Indonesia, which in 2022 will have a
47 millennial population of 88,268,937 people or 32% of Indonesia's population (BPS, 2022a).
48 The Indonesian government, through the Ministry of Agriculture, has taken steps to accelerate
49 farmer regeneration by implementing the millennial farmer program throughout the country.
50 This initiative serves as a ray of hope for the younger generation, showing the potential for them
51 to become successful in the sector (Kusnandar et al., 2023). It also aims to facilitate the younger
52 generation's interest in working in the agricultural sector (Riptanti et al., 2022). The term
53 "millennial farmer" has been introduced to sustain the Indonesian agricultural system and
54 expedite the adoption of information technology in the field (Harisudin et al., 2023). Millennial
55 farmers are hoped to play a pivotal role as catalysts for change because they adapt to a
56 technology-driven world with readily available information (Hasibuan & Nasution, 2022).

57 The internet and global connectivity hold tremendous potential in accelerating the
58 livelihoods of farmers through technological innovations. However, many of them are yet to
59 fully capitalize on these opportunities (Diaz et al., 2021). For example, there remains a
60 considerable number of older farmers in Indonesia who prefer to sell their products to
61 middlemen to quickly obtain funds to meet their family's needs (Haryoso et al., 2020). Mgale
62 & Yunxian (2020) also stated that in traditional marketing channels, farmers often relied on
63 middlemen or village collectors to sell their product. Although these middlemen provide access
64 to the market (Truong & Sidique, 2022), the prices offered are often significantly lower
65 compared to the real market prices (Utomo et al., 2022).

66 Millennial farmers, who possess forward-thinking characteristics and great curiosity, are
67 actively utilizing information technology, particularly social media, to enhance their
68 agricultural businesses (Khaerunnisa et al., 2022). Based on the purpose of internet use in
69 Indonesia, 74.02% of internet use aims to access social media and 4.63% is for selling goods
70 or services (BPS, 2022b). This approach offers an alternative for marketing agricultural
71 products by addressing limitations in the sales process and enhancing effectiveness and

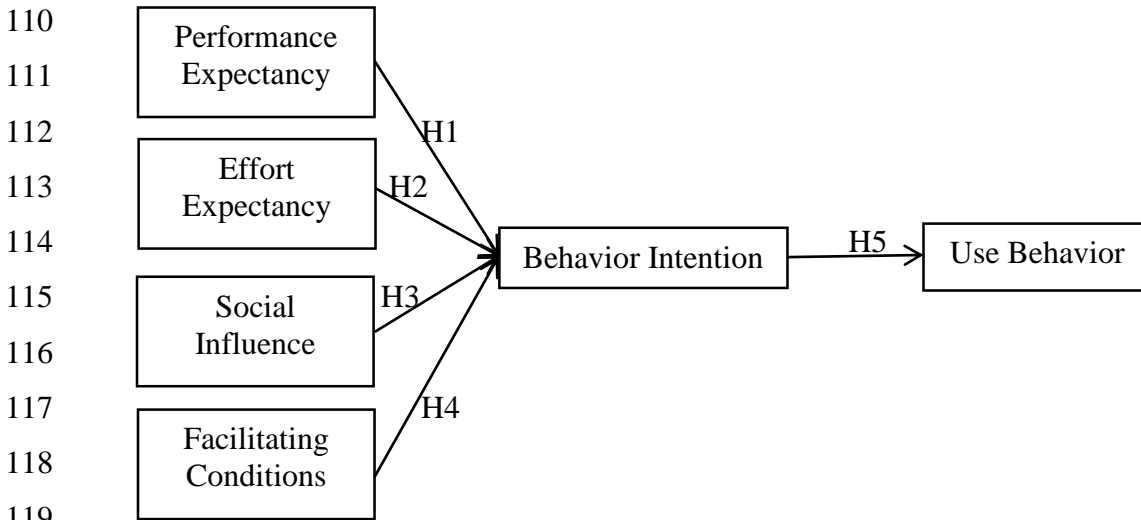
72 efficiency (Widiyanti et al., 2022). The problem is that in 2023 only 42.23% of millennial
73 farmers will use information technology for their business activities (Katadata, 2023).

74 Central Java is a region with significant agricultural potential, as evidenced by the presence
75 of a workforce under the age of 40, commonly referred to as millennials, in the agriculture,
76 forestry, and fisheries sectors. Previous reports showed that they accounted for 7.19% of the
77 total workforce in 2021 (BPS Central Java, 2021). Millennial farmers in Central Java operate
78 in various subsectors, such as horticulture, plantations, food, fisheries and animal husbandry.
79 The substantial number of millennial farmers is expected to bring agricultural success in the
80 future due to their higher propensity for adopting innovative technologies than older groups
81 (Effendy et al., 2022). However, internet use by residents of Central Java whose main business
82 fields are agriculture, fisheries and forestry has only reached 10.18% of the total population
83 (BPS, 2022b).

84 Various factors influence the adoption of information technology especially social media
85 and ecommerce among millennial farmers in Central Java. The Unified Theory of Acceptance
86 and Use of Technology (UTAUT), created by Venkatesh et al. (2003), is one contemporary
87 theory that describe a technology acceptance model. The model comprises multiple constructs,
88 including 1) performance expectancy, which gauges an individual's belief in the ability to use
89 ICT to improve their performance; 2) effort expectancy, which evaluates an individual's
90 perception of the ease of using information technology; 3) social influence, which pertains to
91 the support received from others regarding the use of information technology; 4) facilitating
92 conditions, which encompass factors such as infrastructure and equipment availability as well
93 as the ability to use ICT (Scur et al., 2023). Previous studies demonstrated the influential role
94 of constructs such as effort expectancy, performance expectancy, and social influence in
95 shaping behavior intention while the presence of facilitating conditions and behavior intention
96 can affect use behavior (Venkatesh et al., 2016). Han et al., (2022) using these determinants
97 found that all direct relationships between variables were significant. However, Widodo et al.
98 (2019), Abdullah et al. (2020), Maita et al. (2022), and Scur et al. (2023) found that facilitating
99 conditions had a significant effect on behavior intention. This result in inconsistent with Esawe
100 (2022) that facilitating conditions variable did not significantly influence behavior intention.
101 Based on these findings, future reports are advised to focus on the influence of facilitating
102 conditions on behavior intention.

103 The novelty of this study is attributed to the incorporation of the facilitating conditions
104 variable in the UTAUT approach, which is directly associated with behavior intention. In
105 addition, no previous research has examined the use of information technology in marketing

106 agricultural products by millennial farmers in Central Java. Therefore, the purpose of this study
 107 is to investigate the factors affecting the use of information technology in marketing agricultural
 108 products by millennial farmers in Central Java using the UTAUT model approach. This research
 109 model is depicted in the following figure.



120 **Figure 1.** Research model.

121 The research hypothesis in Figure 1 is:

122 1. The relationship between behavioral intentions to use information technology and
 123 performance expectancy

124 The study results of Horas et al. (2023) show that performance expectancy have a positive
 125 influence on intentions to use information technology. Chua et al. (2018) in their research
 126 showed similar results. Users who can find more value and innovation from a technology
 127 application will be willing to purchase and continue using the technology.

128 H1: It is suspected that performance expectancy have a positive effect on behavioral
 129 intentions to use information technology.

130 2. The relationship between behavioral intentions to use information technology and effort
 131 expectancy

132 The study results of Hung et al. (2019) show that effort expectancy have a significant effect
 133 on intention to use information technology. This is also supported by research from Chao
 134 (2019) which shows that effort expectancy have a positive effect on behavioral intentions in
 135 using mobile learning.

136 H2: It is suspected that effort expectancy have a positive effect on behavioral intentions to
 137 use information technology.

138 3. The relationship between behavioral intentions to use information technology and social
 139 influence

140 The study results of Hwang & Mulyana (2022) show that social influence variables have a
141 positive influence on the intention to use information technology. This is also in line with
142 research by Abed (2018) which shows that social influence has a positive relationship with
143 behavioral intentions to use e-commerce.

144 H3: It is suspected that social influence has a positive effect on behavioral intentions to use
145 information technology.

146 4. Relationship between information technology use behavior and facility conditions

147 The study results of Putri dan Suardikha (2020) show that facilitating condition variables
148 influence the use of e-money. This is supported by Diniyah (2021) who stated that the
149 condition of the facilities has a positive effect on the waqif's intention to give waqf through
150 the waqf crowdfunding platform.

151 H4: It is suspected that facility conditions have a positive effect on intentions to use
152 information technology.

153 5. The relationship between use behavior and behavior intention to use information technology

154 The study results of Abbad (2021) show that the behavioral intention variable has a
155 significant effect on Moodle use behavior. This is supported by Kadim dan Sunardi (2023)
156 who stated that behavioral intention has a positive effect on the use behavior of users of the
157 Jabodetabek QRIS payment tool.

158 H5: It is suspected that behavior intention has a positive influence on information technology
159 use behavior.

160

161 MATERIALS AND METHODS

162 This was a quantitative study, which used a descriptive-correlational method (Sarcheshmeh
163 et al., 2018). Central Java province was purposively selected as the study location, taking into
164 account 10 regencies with the highest number of millennial farmer ambassadors based on the
165 Decree of the Minister of Agriculture No. 434/KPTS/SM 020/M/8/2021. These regencies
166 included Magelang, Sukoharjo, Klaten, Wonosobo, Tegal, Purbalingga, Temanggung,
167 Semarang, Purworejo, and Banyumas. Primary data were gathered through interviews utilizing
168 a questionnaire that included respondent identities and attitude statements measured on a Likert
169 scale. Meanwhile, secondary data were obtained from relevant agencies, such as the Central
170 Statistics Agency and the Ministry of Agriculture.

171 The research was conducted in 2022 after the Covid-19 pandemic. The samples were
172 determined purposively, with criteria that the millennial farmers resided in Central Java, aged
173 between 19 and 39 years, and had been engaged in agricultural activities in the fields of food

174 crops, horticulture, animal husbandry, fisheries, and plantations for a minimum of 2 years. The
 175 aim is to ensure that respondents are truly experienced farmers so they can make decisions
 176 regarding the use of information technology based on that experience. Another criterion is that
 177 respondents have used information technology, especially social media, in the last 3 months for
 178 communication, seeking information, or promoting and selling agricultural products. The
 179 sampling in each regency was conducted proportionally. The sample size was decided by
 180 allotting 5-10 respondents for each parameter (indicator) of the variables under examination
 181 (Kadim & Sunardi, 2021). The minimum size was 95 respondents, but we chose to include a
 182 total of 120 respondents to obtain more representative and robust data. Table 1 presents the
 183 latent variables and corresponding indicators used in the study. Indicator measurement uses a
 184 Likert scale from 1-5.

185 **Table 1.** Latent variables and indicators in the model.

Variable	Indicator	Code
Performance Expectancy (PE)	1. Perceived usefulness	PE1
	2. Job-fit	PE2
	3. Extrinsic motivation	PE3
	4. Outcome expectation	PE4
	5. Relative advantage	PE5
Effort Expectancy (EE)	1. Perceived ease of use	EE1
	2. Ease of use	EE2
	3. Complexity	EE3
Social Influence (SI)	1. Subjective norm	SI1
	2. Social factor	SI2
	3. Image	SI3
Facilitating Conditions (FC)	1. Facilitating condition	FC1
	2. Perceived behavioral control	FC2
	3. Compatibility	FC3
Behavior Intention (BI)	1. Desire	BI1
	2. Intention	BI2
	3. Plan	BI3
Use Behavior (UB)	1. Intensity	UB1
	2. Behavior to be automatic	UB2
	3. Addiction	UB3

186 Source: Vankatesh et al. (2003); Han et al. (2022); Maita et al. (2022); Esawe (2022); Scur (2023).
 187

188 The reliability and validity test results of the questionnaire administered to 30 millennial
 189 farmers revealed a loading factor of UB3 < 0.7, indicating that UB3 statement could not be used
 190 further in the study. An AVE (Average Variance Extracted) value of > 0.5 indicated the validity
 191 of the questionnaire (Chen et al., 2023). Furthermore, Cronbach's alpha (CA) of > 0.6 and
 192 composite reliability (CR) value of > 0.7 were considered the cut-off values (Al-Sharafi et al.,
 193 2023). These findings demonstrated that all variables were reliable, providing consistent and
 194 stable answers, and could be used for data collection. The collected data were then analyzed
 195 using SEM-PLS (Structural Equation Modeling-Partial Least Squares) with the assistance of
 196 SmartPLS version 3.0 software, includes measurement model analysis, structural model

197 **analysis, and hypothesis testing** (Farida & Sutopo, 2023). The study model was formulated as
 198 follows:

199 $BI = \gamma_1 PE + \gamma_2 EE + \gamma_3 SI + \gamma_4 FC + \epsilon_1 \dots\dots (1)$

200 $UB = \beta_1 BI + \epsilon_1 \dots\dots\dots(2)$

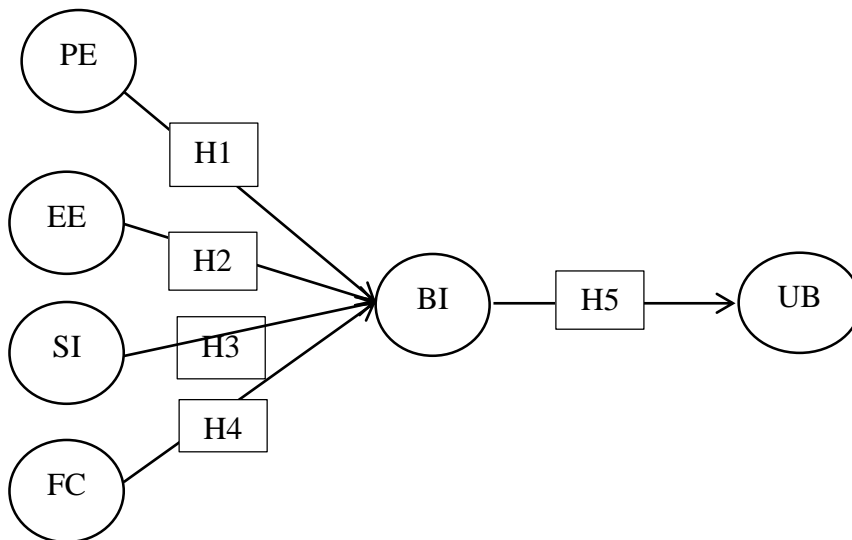
201 The relationship between exogenous and endogenous variables was examined by testing
 202 the hypotheses below:

203 $BI = \beta_1 PE + \epsilon_1 \dots\dots\dots(3)$

204 Hypothesis 1 (H1): Performance expectancy positively and significant influences behavior
 205 intention.

206 $BI = \beta_2 EE + \epsilon_2 \dots\dots\dots(4)$

207



208

209

210

211

212

213

214

215

216

217 **Figure 2.** Study model.

218 Hypothesis 2 (H2): Effort expectancy positively and significant influences behavior intention.

219 $BI = \beta_3 SI + \epsilon_3 \dots\dots\dots(5)$

220 Hypothesis 3 (H3): Social influence positively and significant influences behavior intention.

221 $BI = \beta_4 FC + \epsilon_4 \dots\dots\dots(6)$

222 Hypothesis 4 (H4): Facilitating conditions positively and significant influence behavior
 223 intention.

224 $UB = \beta_5 BI + \epsilon \dots\dots\dots(7)$

225 Hypothesis 5 (H5): Behavior intention positively influences use behavior.

226 The H1, H2, H3, H4, and H5 were tested using a bootstrapping method, where $H_0: \beta_i =$
 227 0 and $H_i: \beta_i \neq 0$. Furthermore, the hypothesis was deemed accepted when the t-statistic value
 228 was > 1.96 as well as the p-value was < 0.05 .

229 **RESULTS**

230 **Respondent Characteristics**

231 Respondents can be classified into several categories. In this research, characteristic
 232 respondents were grouped based on gender, age, education level, business field, turnover,
 233 marketing methods and marketing reach, see Table 2. The respondents had an average age of
 234 31 years and an education duration of 13 years.

235 **Table 2.** Respondent characteristics.

Description	Quantity (Person)	Percentage (%)
Gender		
Man	110	91.67
Woman	10	8.33
Age (Years)		
20-24	18	15.00
25-29	39	32.25
30-34	27	22.50
35-39	36	30.00
Education		
Elementary School	8	6.67
Junior High School	5	4.17
Senior High School	53	44.17
Diploma	7	5.83
Bachelor	43	35.83
Master	4	3.30
Business field		
Production	99	82.50
Processing	9	7.50
Marketing	1	0.83
Production and Processing	10	8.30
Production and Marketing	1	0.83
Omzet (Million IDR)		
Omzet ≤ 5	45	37.50
5 < Omzet ≤ 10	31	25.83
10 < Omzet ≤ 15	12	10.00
15 < Omzet ≤ 20	8	6.67
20 < Omzet ≤ 25	5	4.17
25 ≤ Omzet	19	15.83
Use of ICT		
WhatsApp	120	100.00
Facebook	35	29.16
Instagram	24	20.00
Youtube	4	3.33
Website	2	1.67
Shopee	5	4.16
Tokopedia	5	4.16
Purpose of using ICT		
Communication and get information	35	29.16
Marketing agricultural product	85	70.83
Marketing method		
Online	85	70.83
Offline	35	29.16
Marketing area		
Local	37	30.83
Regional	50	41.67
National	30	25.00
International	3	2.50

236 Source: Processed Primary Data, 2023.

237 These results suggested that the respondents were relatively young and had a significant
 238 opportunity to embrace new technologies (Olufunmilola et al., 2017). The results also

239 demonstrated that the samples had a high level of education, as they had completed high school.
240 Gebresilassie and Bekele (2015) stated that farmers with a higher level of formal education
241 tended to analyze information and adopt technology faster compared to those without
242 education.

243 Some respondents were involved in multiple business fields and subsectors. They were
244 active in the horticulture, plantation, food crops, livestock, fisheries, horticulture, and livestock,
245 horticulture and plantation, horticulture, food crops, and plantation, fisheries, livestock, and
246 food crops, and fisheries and food crops subsectors, respectively. The participants engaged in
247 the processing of various items, including palm sugar, fertilizer, coffee powder, mocaf flour,
248 bread, banana chips, and salted eggs. Furthermore, those who engaged in marketing were sellers
249 of agricultural products and others in both production and processing were farmers and
250 livestock keepers who processed their products into semi-finished and finished goods. For
251 example, roasted coffee, chili powder, crystal guava *jenang* (jam-like snack), shredded tobacco,
252 satay, and milk were some of the goods produced. The respondents involved in both production
253 and marketing cultivated ornamental plants and had livestock feed stalls.

254 The participants in this study had been running their businesses for more than 5 years with
255 an average monthly turnover of IDR 25 million. This indicated that millennial farmers tended
256 to have a strong customer base (Adeyanju et al., 2023). This finding was inconsistent with
257 Thephavanh, et al. (2023), where 52.7% of young farmers had been running their businesses
258 for less than 4 years. Furthermore, they utilized information technology, such as social media
259 (WhatsApp, Instagram, Facebook), websites, and YouTube to market their agricultural
260 products. Durant et al. (2023) also revealed that 42% of farmers experienced an increase in
261 online marketing and sales during the pandemic.

262

263 **Outer Model Test**

264 To ensure the validity and reliability of the instrument, a measurement model analysis was
265 conducted to confirm the suitability of the survey items in measuring the intended constructs
266 (Bakri et al., 2023). Convergent validity (CV) testing (Table 3) indicated that the model met
267 the criteria, as the loading factors were above 0.7, and the AVE (Average Variance Extracted)
268 values exceeded 0.5 (Dong et al., 2023a). These results suggest that all indicators effectively
269 represent the latent variables used in this study.

270

271

272

273

Table 3. Convergent validity test results.

Loading factor	PE	EE	SI	FC	BI	UB
PE1	0.752					
PE2	0.825					
PE3	0.806					
PE4	0.835					
PE5	0.802					
EE1		0.777				
EE2		0.866				
EE3		0.760				
SI1			0.802			
SI2			0.802			
SI3			0.788			
FC1				0.823		
FC2				0.820		
FC3				0.771		
BI1					0.870	
BI2					0.847	
BI3					0.791	
UB1						0.979
UB2						0.981
AVE	PE	EE	SI	FC	BI	UB
	0.648	0.644	0.636	0.648	0.700	0.961

274 Source: Processed Primary Data, 2023.

275 The discriminant validity test results in Table 4 showed that the model fulfilled the criteria.

276 The Fornell-Larcker criterion stated that a model had discriminant validity when the square root

277 of the Average Variance Extracted (AVE) for each variable surpassed the correlation coefficient

278 between rows and columns (Dong et al., 2023b).

279

Table 4. Discriminant validity test results.

Fornell-Larcker	PE	EE	SI	FC	BI	UB
PE	0.805					
EE	0.507	0.802				
SI	0.573	0.587	0.798			
FC	0.195	0.344	0.388	0.805		
BI	0.536	0.536	0.485	0.363	0.836	
UB	0.271	0.390	0.479	0.295	0.501	0.980
Cross Loading	PE	EE	SI	FC	BI	UB
PE1	0.752	0.492	0.581	0.216	0.418	0.361
PE2	0.825	0.367	0.331	0.054	0.413	0.129
PE3	0.806	0.395	0.461	0.180	0.485	0.257
PE4	0.835	0.344	0.497	0.178	0.475	0.227
PE5	0.802	0.466	0.422	0.149	0.332	0.080
EE1	0.379	0.777	0.440	0.370	0.379	0.208
EE2	0.435	0.866	0.559	0.279	0.498	0.475
EE3	0.404	0.760	0.397	0.188	0.400	0.214
SI1	0.406	0.539	0.802	0.313	0.435	0.467
SI2	0.411	0.416	0.802	0.282	0.360	0.300
SI3	0.567	0.435	0.788	0.333	0.354	0.362
FC1	0.244	0.393	0.398	0.823	0.378	0.283
FC2	0.096	0.185	0.254	0.820	0.258	0.209
FC3	0.040	0.146	0.202	0.771	0.136	0.175
BI1	0.427	0.444	0.369	0.287	0.870	0.485
BI2	0.499	0.450	0.524	0.360	0.847	0.479
BI3	0.412	0.457	0.293	0.251	0.791	0.256
UB1	0.269	0.393	0.472	0.272	0.481	0.979
UB2	0.263	0.371	0.466	0.305	0.500	0.981

280 Source: Processed Primary Data, 2023.

281 The reliability test results in Table 5 showed that each variable had a CA and CR value
 282 above 0.7. This indicated that all variables were deemed reliable and capable of providing stable
 283 and consistent responses (Zheng et al., 2023).

284 **Table 5. Model reliability test results.**

Variable	Cronbach Alpha	Composite Reliability
Performance Expectancy	0.864	0.902
Effort Expectancy	0.723	0.844
Social Influence	0.716	0.840
Facilitating Conditions	0.765	0.847
Behavior Intention	0.787	0.875
Use Behavior	0.959	0.980

285 Source: Processed Primary Data, 2023.

286
 287 **Inner Model Test**

288 The inner model test was performed to examine the relationship of latent variables. An R^2
 289 of 0.75 was considered substantial, 0.5 was moderate, 0.25 was weak, and 0.9 or higher
 290 indicated overfitting. A Q^2 value > 0 indicated predictive relevance, while a Q^2 value < 0
 291 showed no predictive relevance.

292 Furthermore, Q^2 values above 0, 0.25, and 0.50 denoted small, moderate, and large levels
 293 of predictive accuracy for the PLS path model, respectively (Hair et al., 2019). Table 5 showed
 294 that the variable behavior intention had an R^2 value of 0.417, which was in the moderate
 295 category, while its Q^2 value was 0.272, indicating moderate predictive relevance (Tan &
 296 Antonio, 2022). This shows that the variables performance expectancy, effort expectancy,
 297 social influence, and facilitating conditions together influence behavior intention by 41.7%,
 298 while the rest is influenced by variables not examined in the research. The variable use behavior
 299 had an R^2 value of 0.251, which was in the weak category, while its Q^2 value was 0.237,
 300 indicating small predictive relevance. This shows that the behavior intention variable influences
 301 use behavior by 23.7%, while the rest is influenced by variables not examined in the research.

302 **Table 6. Inner model test results.**

Variable	R^2	Q^2
Behavior Intention (BI)	0.417	0.272
Use Behavior (UB)	0.251	0.237

303 Source: Processed Primary Data, 2023.

304 **Hypothesis Test**

305 The hypothesis test was carried out using the bootstrapping method with a confidence
 306 level of 95%. The criteria for hypotheses included H_a was accepted and H_0 was rejected when
 307 the t-statistic value was > 1.96 and the p-value was below 0.05 (Fitri et al., 2021). H_a was
 308 rejected and H_0 was accepted when the t-statistic value was < 1.96 and the p-value was above
 309 0.05.

311

Table 7. Hypothesis test results.

Relationship	Path coefficient	t-Statistic	P-value
PE → BI	0.324	3.534	0.000***
EE → BI	0.267	2.861	0.004***
SI → BI	0.073	0.700	0.484 ^{ns}
FC → BI	0.180	2.253	0.025**
BI → UB	0.501	7.067	0.000***

312

Source: Processed Primary Data, 2023

313

Notes:

314

Ns: Insignificant

315

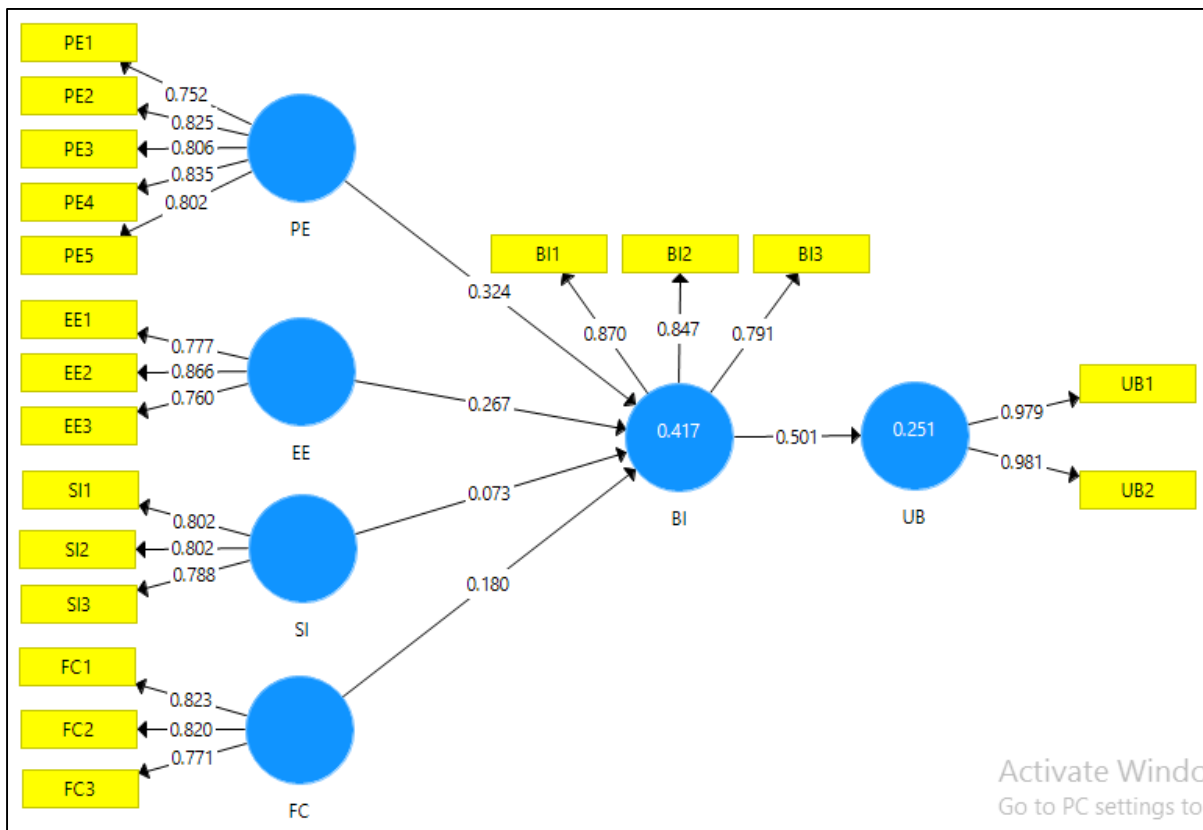
***: significant at $\alpha \leq 1\%$

316

** : significant at $\alpha \leq 5\%$

317

*: significant at $\alpha \leq 10\%$.



318

Figure 3. Hypothesis test result.

319

DISCUSSION

320

321

The result demonstrated that the respondents were relatively young and had a high level of education, as they had completed high school. They had a significant opportunity to embrace new technologies (Olufunmilola et al., 2017). Besides that, Gebresilassie & Bekele (2015) stated that farmers with a higher level of formal education tended to analyze information and adopt technology faster compared to those without education. Respondents were dominated by those who worked in the horticulture subsector, in contrast with Thephavanh et al. (2023), where 40.7% of the young farmer respondents were coffee producers (in the plantation subsector). The average income received by farmers is quite large indicated that millennial

322

323

324

325

326

327

328

329 farmers tended to have a strong customer base (Adeyanju et al., 2023). The large number of
330 farmers who use information technology to market their products is in line with Durant et al.
331 (2023) who stated that 42% of farmers experienced an increase in online marketing and sales
332 during the pandemic. **The results of this study are greater than the research of Durant et al.**
333 **(2023) of 70.83%.**

334 According to the test results, hypothesis 1 (H1) was accepted, indicating that performance
335 expectancy significant positively influenced behavior intention. Otter & Deutsch (2023)
336 similarly concluded that performance expectancy exerted a statistically significant positive
337 influence on behavior intention. Furthermore, farmers expected that the use of information
338 technology could be an effective solution for marketing their agricultural products (Hashem et
339 al., 2021). Advanced information technology was expected to serve as a means to expand
340 market reach, thereby increasing sales volume and market share. It was also expected to
341 enhance the experience and skills of farmers, as online marketing had become a promising
342 alternative (Khomah et al., 2021). This finding was consistent with Hassaro & Chailom (2023),
343 that online marketers gained satisfaction from the marketing process, leading to increased sales,
344 revenue, and profits through the acquisition of new customers.

345 Based on the test results, hypothesis (H2) was accepted, indicating that effort expectancy
346 had a significant positive influence on behavior intention. This finding was consistent with
347 Yuniarty et al. (2023) that business expectations significantly impacted behavior intention to
348 utilize web applications. The feeling of being freed from the effort or difficulty involved with
349 the use of technology often helped individuals to derive maximum benefits (Kamble et al.,
350 2019). Furthermore, the expectations of ease of use, supported by the absence of difficulties or
351 errors in its practical use could encourage individuals to continue using the technology.

352 Hypothesis 3 (H3) test results showed that social influence did not significant positively
353 influence behavior intention, indicating the rejection of H3. This finding was inconsistent with
354 Xie et al. (2022) that social influence significantly impacted behavior intention. According to
355 Erjavec & Manfreda (2022), social influence became a less relevant factor in the UTAUT model
356 due to social isolation caused by Covid-19, leading to reduced interaction with the closest social
357 circles.

358 Hypothesis 4 (H4) test results revealed that facilitating conditions had a significant positive
359 influence on behavior intention, indicating the acceptance of H4. This finding was consistent
360 with Gunawan et al. (2019) that facilitating conditions positively impacted the habit and desire
361 to use technology. This confirmed that the novelty of the study was acceptable because it
362 aligned with the conditions of millennial farmers in Central Java.

363 Hypothesis 5 (H5) test results showed that behavior intention had a significant positive
364 influence on use behavior, indicating the acceptance of H5. Based on the findings, farmers who
365 had the intention to use information technology to market their agricultural products were more
366 likely to achieve it. This was consistent with Alkhowaiter (2022) that intention had a strong
367 relationship with final behavior. The use of ICT by millennial farmers in their business
368 endeavors made them more determined to achieve their marketing goals.

369 The results indicated that the use of information technology on agricultural product
370 marketing could save time and energy for farmers. This research was conducted after the Covid-
371 19 pandemic. During the pandemic, various economic and social activities were restricted.
372 Farmers could easily promote and attract customers by creating product posts anytime and
373 anywhere. Information technology had provided an effective solution for many businesses
374 facing Covid-19 lockdowns, as technology had become the only means of communication
375 between business partners (Alalwan et al., 2021). Moreover, the use of technological
376 innovations could also cut out intermediaries in the marketing chain, enabling farmers to
377 directly sell their products to consumers. Information and Communication Technology (ICT)
378 for agricultural product marketing significantly helped in minimizing intermediaries, reducing
379 transaction costs, and identifying potential customers (Hoang, 2020). ICT was not only an
380 essential tool for smart agriculture, but also for strengthening communication among the
381 government, business owners, consumers, consultants, and farmers (Hashem et al., 2021).

382 Findings in the field state that information and communication technology has been used
383 in daily life, especially for business such as using WhatsApp and Facebook. Furthermore,
384 respondents utilized ICT in marketing their agricultural products (Durant et al., 2023). This
385 existing experience made farmers optimistic about their ability to use information technology
386 in selling their goods. According to Ulhaq et al. (2022), respondents who were confident about
387 learning new technology tended to believe that it was easier to use compared to those without
388 confidence. The social distancing policy during the pandemic encouraged the acceleration of
389 online marketing, which was easier to implement (Khomah et al., 2021).

390 This study revealed that millennial farmers already had experience in using information
391 technology in their daily lives, thereby providing motivation and optimism (Badsar & Karami,
392 2021). Furthermore, this was the driving force behind the millennial farmers' use of information
393 technology in marketing their agricultural products. The strong motivation made the
394 respondents resilient in their beliefs and difficult to influence. According to Chang et al. (2007),
395 experienced and confident individuals were found to be less susceptible to the influence of their

396 social environment. In the case of millennial farmers, their decisions to adopt information
397 technology for marketing purposes were not impacted by their social environment.

398 Based on the observation results, farmers who had facilities, knowledge, and skills were
399 more interested in adopting technology and were more active in marketing using ICT. This was
400 proven by their ability to create more structured content or posts compared to those with fewer
401 supportive facilities. According to Ndubuisi et al. (2022), facilities, such as reliable internet
402 access could facilitate task completion, knowledge and information acquisition, exchange, and
403 collaboration through online channels. Furthermore, respondents living in highland areas
404 experienced difficulties in getting internet signals, making it challenging to engage in online
405 marketing.

406 This study showed that millennial farmers need to be more aware of the benefits of online
407 marketing using information technology for the advancement of their businesses. Additionally,
408 it was expected that the government would develop policies or programs that promoted the
409 realization of this objective by taking into account the extent of influence of each variable. The
410 motivation and self-confidence of farmers need to be instilled to accelerate the adoption of
411 innovation and technology towards modern agriculture. The availability of supportive facilities
412 could also facilitate the implementation of innovation and technology, including the use of ICT
413 for online marketing.

414

415 **CONCLUSIONS**

416 In conclusion, behavior intention was directly impacted by performance expectancy, effort
417 expectancy, and facilitating conditions, while social influence had no influence. The results also
418 showed that behavior intention positively influenced use behavior. Expectations that served as
419 motivation for farmers and the availability of facilities could provide strong encouragement to
420 utilize information technology in their businesses. Based on the results, the government needs
421 to maximize information or success stories of farmers who have marketed using information
422 technology to encourage and motivate other farmers who have not used it. Apart from that, this
423 also needs to be done to maintain the enthusiasm of farmers who already use information
424 technology for marketing. This can be done by holding workshops and inviting motivators. The
425 government also needs to increase the provision of digital marketing training activities so that
426 farmers find it easy to operate applications for online marketing. Apart from that, it is necessary
427 to procure and improve the condition of facilities that support the implementation of digital
428 marketing. One thing that needs to be done is equal distribution of internet access. This is
429 necessary so that farmers in each region can more easily use technological information for

430 marketing activities so that the marketing system is more effective and can increase profits for
431 farmers.

432

433 **ACKNOWLEDGEMENTS**

434 Authors wish to thank the Rector Universitas Sebelas Maret for supporting this publication
435 research grant scheme 2024.

436

437 **REFERENCES**

- 438 1. Abdullah, N., Redzuan, F., & Daud, N. A. (2020). E-wallet: Factors influencing user
439 acceptance towards cashless society in Malaysia among public universities. *Indonesian*
440 *Journal of Electrical Engineering and Computer Science*, 20(1), 67–74.
441 <https://doi.org/10.11591/ijeecs.v20.i1.pp67-74>
- 442 2. Abed, S. (2018). An empirical examination of Instagram as an s-commerce channel.
443 *Journal of Advances in Management Research*, 15(2), 146–160.
444 <https://doi.org/10.1108/JAMR-05-2017-0057>
- 445 3. Adeyanju, D., Mburu, J., Gituro, W., Chumo, C., Mignouna, D., Ogunniyi, A., Akomolafe,
446 J. K., & Ejima, J. (2023). Assessing food security among young farmers in Africa :
447 evidence from Kenya , Nigeria , and Uganda. *Agricultural and Food Economics*.
448 <https://doi.org/10.1186/s40100-023-00246-x>
- 449 4. Al-Sharafi, M. A., Al-Emran, M., Arpaci, I., Iahad, N. A., AlQudah, A. A., Iranmanesh,
450 M., & Al-Qaysi, N. (2023). Generation Z use of artificial intelligence products and its
451 impact on environmental sustainability: A cross-cultural comparison. *Computers in Human*
452 *Behavior*, 143(February), 107708. <https://doi.org/10.1016/j.chb.2023.107708>
- 453 5. Alalwan, A. A., Baabdullah, A. M., Dwivedi, Y. K., Rana, N. P., Lal, B., & Raman, R.
454 (2021). Et-moone and marketing relationship governance : The effect of digital
455 transformation and ICT during the COVID-19 pandemic. *Industrial Marketing*
456 *Management*, 98(September), 241–254. <https://doi.org/10.1016/j.indmarman.2021.09.001>
- 457 6. Alkhowaiter, W. A. (2022). Use and behavioural intention of m-payment in GCC
458 countries: Extending meta-UTAUT with trust and Islamic religiosity. *Journal of*
459 *Innovation & Knowledge*, 7(4), 100240. <https://doi.org/10.1016/j.jik.2022.100240>
- 460 7. Badsar, M., & Karami, R. (2021). Understanding farmers' response to renewable energy:
461 An application of protection motivation theory. *Journal of Agricultural Science and*
462 *Technology*, 23(5), 987–1000.
- 463 8. Bakri, M. H., Abdul Aziz, N. A., Md Razak, M. I., Abdul Hamid, M. H., Md Nor, M. Z.,

- 464 & Iskandar Mirza, A. A. (2023). Acceptance Of Ddkoin Blockchain Using Utaut Model:
465 A Customer Perspective Approach. *Quality - Access to Success*, 24(192), 103–121.
466 <https://doi.org/10.47750/QAS/24.192.13>
- 467 9. Bednaříková, Z., Bavorová, M., & Ponkina, E. V. (2016). Migration motivation of
468 agriculturally educated rural youth: The case of Russian Siberia. *Journal of Rural Studies*,
469 45, 99–111. <https://doi.org/10.1016/j.jrurstud.2016.03.006>
- 470 10. BPS. (2021). *Keadaan Angkatan Kerja di Indonesia Agustus 2021*. Badan Pusat Statistik.
- 471 11. BPS. (2022a). *Jumlah Penduduk menurut Kelompok Umur dan Jenis Kelamin*.
- 472 12. BPS. (2022b). *Statistik Telekomunikasi di Indonesia*.
- 473 13. Chang, I. C., Hwang, H. G., Hung, W. F., & Li, Y. C. (2007). Physicians' acceptance of
474 pharmacokinetics-based clinical decision support systems. *Expert Systems with*
475 *Applications*, 33(2), 296–303.
- 476 14. Chao, C. M. (2019). Factors determining the behavioral intention to use mobile learning:
477 An application and extension of the UTAUT model. *Frontiers in Psychology*, 10(JULY),
478 1–14. <https://doi.org/10.3389/fpsyg.2019.01652>
- 479 15. Chen, L., Jia, J., & Wu, C. (2023). Factors influencing the behavioral intention to use
480 contactless financial services in the banking industry: An application and extension of
481 UTAUT model. *Frontiers in Psychology*, 14(March).
482 <https://doi.org/10.3389/fpsyg.2023.1096709>
- 483 16. Chua, P. Y., Rezaei, S., Gu, M. L., Oh, Y. M., & Jambulingam, M. (2018). Elucidating
484 social networking apps decisions: Performance expectancy, effort expectancy and social
485 influence. *Nankai Business Review International*, 9(2), 118–142.
486 <https://doi.org/10.1108/NBRI-01-2017-0003>
- 487 17. Diaz, A. C., Sasaki, N., Tsusaka, T. W., & Szabo, S. (2021). Factors affecting farmers'
488 willingness to adopt a mobile app in the marketing of bamboo products. *Resources,*
489 *Conservation and Recycling Advances*, 11, 200056.
490 <https://doi.org/10.1016/j.rcradv.2021.200056>
- 491 18. Dong, H., Zhang, Y., & Chen, T. (2023). A Study on Farmers' Participation in
492 Environmental Protection in the Context of Rural Revitalization: The Moderating Role of
493 Policy Environment. *International Journal of Environmental Research and Public Health*,
494 20(3). <https://doi.org/10.3390/ijerph20031768>
- 495 19. Dong, H., Zhang, Y., Chen, T., & Li, J. (2023). Acceptance Intention and Behavioral
496 Response to Soil-Testing Formula Fertilization Technology: An Empirical Study of
497 Agricultural Land in Shaanxi Province. *International Journal of Environmental Research*

- 498 *and Public Health*, 20(2). <https://doi.org/10.3390/ijerph20020951>
- 499 20. Durant, J. L., Asprooth, L., Galt, R. E., Pesci, S., Manser, G. M., & Pinz, N. (2023). *Farm*
500 *resilience during the COVID-19 pandemic : The case of California direct market farmers.*
501 204(September 2022). <https://doi.org/10.1016/j.agsy.2022.103532>
- 502 21. Ebrahimi Sarcheshmeh, E., Bijani, M., & Sadighi, H. (2018). Adoption behavior towards
503 the use of nuclear technology in agriculture: A causal analysis. *Technology in Society*,
504 55(June 2017), 175–182. <https://doi.org/10.1016/j.techsoc.2018.08.001>
- 505 22. Effendy, L., Widyaastuti, N., & Lastri, H. (2022). The Millennial Farmers' Interest in
506 Succeeding the Family Agriculture for Hydroponic Application in Garut District, West
507 Java Indonesia. *Universal Journal of Agricultural Research*, 10(3), 266–274.
508 <https://doi.org/10.13189/ujar.2022.100308>
- 509 23. Erjavec, J., & Manfreda, A. (2022). Journal of Retailing and Consumer Services Online
510 shopping adoption during COVID-19 and social isolation : Extending the UTAUT model
511 with herd behavior. *Journal of Retailing and Consumer Services*, 65(July 2021), 102867.
512 <https://doi.org/10.1016/j.jretconser.2021.102867>
- 513 24. Esawe, A. T. (2022). Understanding mobile e-wallet consumers' intentions and user
514 behavior. *Spanish Journal of Marketing - ESIC*, 26(3), 363–384.
515 <https://doi.org/10.1108/SJME-05-2022-0105>
- 516 25. Farida, I., & Sutopo, B. (2023). the Nexus Between Digital Innovation Technology and
517 Competitive Advantage: Mediated By Management Business Strategy. *Corporate*
518 *Governance and Organizational Behavior Review*, 7(1), 18–28.
519 <https://doi.org/10.22495/cgobrv7i1p2>
- 520 26. Fitri, R. L., Handaru, A. W., & Yohana, C. (2021). *The Effect of Recruitment , Selection ,*
521 *and Placement on Employee Performance.* 3(2), 90–97.
- 522 27. Gebresilassie, L., & Bekele, A. (2015). *Factors determining allocation of land for*
523 *improved wheat variety by smallholder farmers of northern.* 7(3), 105–112.
524 <https://doi.org/10.5897/JDAE2014.0621>
- 525 28. Gunawan, H., Sinaga, B. L., & Wp, S. P. (2019). ScienceDirect ScienceDirect Assessment
526 of the Readiness of Micro , Small and Medium Assessment of the Readiness of Micro ,
527 Small and Medium Enterprises in Using E-Money Using the Unified Theory of Enterprises
528 in Using E-Money Using the Unified Theory of Acceptance and Use of Technology (UTAUT)
529 UTAUT) Method Acceptance and Use of Technology (UTAUT) Method. *Procedia*
530 *Computer Science*, 161, 316–323. <https://doi.org/10.1016/j.procs.2019.11.129>
- 531 29. Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to

- 532 report the results of PLS-SEM. *European Business Review*, 31(1), 2–24.
533 <https://doi.org/10.1108/EBR-11-2018-0203>
- 534 30. Han, H., Xiong, J., & Zhao, K. (2022). Digital inclusion in social media marketing
535 adoption: the role of product suitability in the agriculture sector. *Information Systems and*
536 *E-Business Management*, 20(4), 657–683. <https://doi.org/10.1007/s10257-021-00522-7>
- 537 31. Harisudin, M., Kusnandar, Riptanti, E. W., Setyowati, N., & Khomah, I. (2023).
538 Determinants of the Internet of Things adoption by millennial farmers. *AIMS Agriculture*
539 *and Food*, 8(2), 329–342. <https://doi.org/10.3934/AGRFOOD.2023018>
- 540 32. Haryoso, A., Zuhud, E. A. M., Hikmat, A., Sunkar, A., & Darusman, D. (2020).
541 Ethnobotany of sugar palm (*Arenga pinnata*) in the sasak community, Kekait village, West
542 Nusa Tenggara, Indonesia. *Biodiversitas*, 21(1), 117–128.
543 <https://doi.org/10.13057/biodiv/d210116>
- 544 33. Hashem, N. M., Hassanein, E. M., Hocquette, J., Gonzalez-bulnes, A., Ahmed, F. A., Attia,
545 Y. A., & Asiry, K. A. (2021). *Agro-Livestock Farming System Sustainability during the*
546 *COVID-19 Era : A Cross-Sectional Study on the Role of Information and Communication*
547 *Technologies*.
- 548 34. Hasibuan, E. A., & Nasution, A. I. L. (2022). Analysis of Millennial Farmer Program in
549 North Sumatra Plantation Office. *Ekonomi, Manajemen, Akuntansi Dan Keuangan*, 3(3),
550 879–884.
- 551 35. Hassaro, K., & Chailom, P. (2023). *Motives of social media use for online marketing : A*
552 *uses and gratification approach*. 1(1).
- 553 36. Hoang, H. G. (2020). Determinants of the adoption of mobile phones for fruit marketing
554 by Vietnamese farmers. *World Development Perspectives*, 17(June 2019), 100178.
555 <https://doi.org/10.1016/j.wdp.2020.100178>
- 556 37. Hung, D. N., Tham, J., Azam, S. M. F., & Khatibi, A. A. (2019). An Empirical Analysis
557 of Perceived Transaction Convenience, Performance Expectancy, Effort Expectancy and
558 Behavior Intention to Mobile Payment of Cambodian Users. *International Journal of*
559 *Marketing Studies*, 11(4), 77. <https://doi.org/10.5539/ijms.v11n4p77>
- 560 38. Hwang, E. C., & Mulyana, E. W. (2022). Enrichment: Journal of Management Analysis of
561 factors influencing use behavior on e-commerce users in Batam City. *Enrichment: Journal*
562 *of Management*, 12(5).
- 563 39. Java, B. C. (2021). *Keadaan Angkatan Kerja Provinsi Jawa Tengah Agustus 2021*.
- 564 40. Kadim, A., & Sunardi, N. (2021). Financial Management System (QRIS) based on UTAUT
565 Model Approach in Jabodetabek. *International Journal of Artificial Intelligence Research*,

- 566 6(1). <https://doi.org/10.29099/ijair.v6i1.282>
- 567 41. Kamble, S., Gunasekaran, A., & Arha, H. (2019). Understanding the Blockchain
568 technology adoption in supply chains-Indian context. *International Journal of Production*
569 *Research*, 57(7), 2009–2033.
570 <https://doi.org/https://doi.org/10.1080/00207543.2018.1518610>
- 571 42. Katadata. (2023). *Banyak Petani Milenial Indonesia Belum Gunakan Teknologi Digital*.
- 572 43. Khaerunnisa, Nurmayulis, & Salampessy, Y. L. A. (2022). Attitude of young farmers to
573 on-farm business sustainability based on the behavior and success of seeking digital
574 information related to agriculture (case of Lebak Regency, Banten Province-Indonesia).
575 *IOP Conference Series: Earth and Environmental Science*, 978(1).
576 <https://doi.org/10.1088/1755-1315/978/1/012037>
- 577 44. Khomah, I., Setyowati, N., Harisudin, M., Adi, R. K., & Qonita, A. (2021). *The factors*
578 *contributing to the sustainability of agribusiness MSMEs in Sukoharjo Regency during the*
579 *Covid-19 pandemic The factors contributing to the sustainability of agribusiness MSMEs*
580 *in Sukoharjo Regency during the Covid-19 pandemic*. 0–6. [https://doi.org/10.1088/1755-](https://doi.org/10.1088/1755-1315/746/1/012013)
581 [1315/746/1/012013](https://doi.org/10.1088/1755-1315/746/1/012013)
- 582 45. Kusnandar, K., Harisudin, M., Riptanti, E. W., Khomah, I., Setyowati, N., & Qonita, R. A.
583 (2023). Prioritizing IoT adoption strategies in millennial farming: An analytical network
584 process approach. *Open Agriculture*, 8(1). <https://doi.org/10.1515/opag-2022-0179>
- 585 46. Maita, I., Saide, S., Putri, Y. G., Megawati, M., & Munzir, M. R. (2022). Information
586 system and behavioural intention: evaluating the user behaviour of financial information
587 system in the developing country of Indonesia. *Technology Analysis and Strategic*
588 *Management*, 34(5), 594–607. <https://doi.org/10.1080/09537325.2021.1915474>
- 589 47. Mgale, Y. J., & Yunxian, Y. (2020). Marketing efficiency and determinants of marketing
590 channel choice by rice farmers in rural Tanzania: Evidence from Mbeya region, Tanzania.
591 *Australian Journal of Agricultural and Resource Economics*, 64(4), 1239–1259.
592 <https://doi.org/10.1111/1467-8489.12380>
- 593 48. Ndubuisi, G., Otioma, C., Owusu, S., & Tetteh, G. K. (2022). ICTs quality and technical
594 efficiency: An empirical analysis. *Telecommunications Policy*, 46(10), 102439.
595 <https://doi.org/10.1016/j.telpol.2022.102439>
- 596 49. Olufunmilola, O. L., Bamire, S. A., & Ogunleye, A. S. (2017). *Factors Influencing Levels*
597 *and Intensity of Adoption of New Rice for Africa (Nerica) Among Rice Farmers in Ogun*.
598 2(3), 84–89. <https://doi.org/10.11648/j.ijae.20170203.15>
- 599 50. Otter, V., & Deutsch, M. (2023). Land Use Policy Did policy lose sight of the wood for the

- 600 trees? An UTAUT-based partial least squares estimation of farmers acceptance of
601 innovative sustainable land use systems. *Land Use Policy*, 126(November 2022), 106467.
602 <https://doi.org/10.1016/j.landusepol.2022.106467>
- 603 51. Riptanti, E. W., Harisudin, M., Kusnandar, Khomah, I., Setyowati, N., & Qonita, R. A.
604 (2022). Networking capabilities of millennial farmers in Central Java. *IOP Conference*
605 *Series: Earth and Environmental Science*, 1114(1). [https://doi.org/10.1088/1755-](https://doi.org/10.1088/1755-1315/1114/1/012103)
606 [1315/1114/1/012103](https://doi.org/10.1088/1755-1315/1114/1/012103)
- 607 52. Rozaki, Z. (2020). COVID-19, agriculture, and food security in Indonesia. In *Reviews in*
608 *Agricultural Science* (Vol. 8, pp. 243–261). https://doi.org/10.7831/ras.8.0_243
- 609 53. Scur, G., da Silva, A. V. D., Mattos, C. A., & Gonçalves, R. F. (2023). Analysis of IoT
610 adoption for vegetable crop cultivation: Multiple case studies. *Technological Forecasting*
611 *and Social Change*, 191(September 2021). <https://doi.org/10.1016/j.techfore.2023.122452>
- 612 54. Tan, R., & Antonio, F. (2022). *New insights on employee adaptive performance during the*
613 *COVID-19 pandemic : Empirical evidence from Indonesia* (Vol. 18, Issue 50).
- 614 55. Thephavanh, M., Neil, J., Philp, M., Nuberg, I., & Denton, M. (2023). *Perceptions of the*
615 *Institutional and Support Environment amongst Young Agricultural Entrepreneurs in*
616 *Laos*. 1–20.
- 617 56. Truong, K. H. V. T., & Sidique, S. F. (2022). Current Situation of Stakeholders’
618 Characteristics in Chu-Mango Supply Chain. *WIT Transactions on Ecology and the*
619 *Environment*, 260(2022), 341–353. <https://doi.org/10.2495/SC220281>
- 620 57. Ulhaq, I., Thi, N., Pham, A., Le, V., Pham, H., & Cong, T. (2022). *Factors influencing*
621 *intention to adopt ICT among intensive shrimp farmers*. 547(September 2021).
622 <https://doi.org/10.1016/j.aquaculture.2021.737407>
- 623 58. Utomo, A. H., Gumilang, M. A., & Ahmad, A. (2022). Agricultural Commodity Sales
624 Recommendation System for Farmers Based on Geographic Information Systems and
625 Price Forecasting Using Probabilistic Neural Network Algorithm. *IOP Conference Series:*
626 *Earth and Environmental Science*, 980(1). [https://doi.org/10.1088/1755-](https://doi.org/10.1088/1755-1315/980/1/012061)
627 [1315/980/1/012061](https://doi.org/10.1088/1755-1315/980/1/012061)
- 628 59. Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of
629 information technology: Toward a unified view. *MIS Quarterly*, 27(3), 425–478.
- 630 60. Venkatesh, V., Thong, J. Y. L., & Xu, X. (2016). Unified theory of acceptance and use of
631 technology: A synthesis and the road ahead. *Journal of the Association for Information*
632 *Systems*, 17(5), 328–376. <https://doi.org/10.17705/1jais.00428>
- 633 61. Widiyanti, E., Karsidi, R., Wijaya, M., & Utari, P. (2020). Identity gaps and negotiations

- 634 among layers of young farmers: Case study in Indonesia. *Open Agriculture*, 5(1), 361–374.
635 <https://doi.org/10.1515/opag-2020-0041>
- 636 62. Widiyanti, E., Utari, P., & Padmaningrum, D. (2022). Information flow among farmers in
637 the acceleration of agriculture 4.0. *IOP Conference Series: Earth and Environmental*
638 *Science*, 1114(1), 0–7. <https://doi.org/10.1088/1755-1315/1114/1/012015>
- 639 63. Widodo, M., Irawan, M. I., & Sukmono, R. A. (2019). Extending UTAUT2 to explore
640 digital wallet adoption in Indonesia. In *2019 International Conference on Information and*
641 *Communications Technology (ICOIACT)*, 878–883.
- 642 64. Xie, K., Zhu, Y., Ma, Y., Chen, Y., Chen, S., & Chen, Z. (2022). *Willingness of Tea*
643 *Farmers to Adopt Ecological Agriculture Techniques Based on the UTAUT Extended*
644 *Model*.
- 645 65. Yuniarty, Ngatindriatun, Sriwidadi, T., Wijaya, D. I., Desak, G. G. F. P., Sukmandhani, A.
646 A., Sari, N., & Marsintauli, F. (2023). *The effect of extended utaut model on community*
647 *service web application adoption*. 14(2), 201–209.
648 <https://doi.org/10.24507/icicelb.14.02.201>
- 649 66. Zheng, Q., Zhang, S., Liang, J., Chen, Y., & Ye, W. (2023). The Impact of Cultural
650 Memory and Cultural Identity in the Brand Value of Agricultural Heritage: A Moderated
651 Mediation Model. *Behavioral Sciences*, 13(2). <https://doi.org/10.3390/bs13020079>
652