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Unravelling the determinants of organic paddy farming continuance intention in Indonesia under the SOR framework with the inclusion of the hedonic motive

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Abstract

The expansion of organic paddy cultivation as an environmental friendly practices among farmers is apparent; however, studies on its continuance intention during the post-adoption phase remain limited. This research on the intention to continue in organic paddy farming integrated elements from the Expectation Confirmation Model (ECM) and Technology Continuance Theory (TCT), situated within the Stimulus-Organism-Response (SOR) framework. Data were gathered from 345 organic paddy farmers and evaluated with Partial Least Square-Structural Equation Modelling (PLS-SEM). The results demonstrated that market factor, as stimuli, had a direct effect on perceived benefit and enjoyment but did not affect satisfaction. In addition, organisational support gave a significant impact on all organism aspects. While subjective norm affected satisfaction and perceived enjoyment, it did not substantially affect perceived benefit, suggesting that farmers should choose sustained advantages over succumbing to social pressures. Ultimately, the intention to continue was positively influenced by all constructs in the organism area, with perceived enjoyment as the hedonic motive surpassing satisfaction and perceived benefit. The effect sizes of the model's relationships ranged from small to medium. Furthermore, this study also revealed that environmental concern significantly moderated perceived enjoyment and continuance intention. The results underscore the imperative for policymakers to formulate strategies that maintain organic paddy farming, taking into account both external and internal factors.

Keywords Continuance intention, Paddy, Post-adoption, Organic farming

1 Introduction

Intensive agricultural practices implemented without an appropriate land management system can result in environmental problems [1]. In Indonesia, the intensive use of pesticides in rice production began in 2002 [2] due to the long-term impact of the Green Revolution program [3]. To address the situation, organic paddy cultivation is



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designated to address environmental issues and is believed to make a significant contribution to improving farmers' welfare [4–6]. A massive expansion of organic agriculture is underway worldwide. Nonetheless, the expansion of organic farming, particularly rice cultivation in Indonesia, has been comparatively sluggish despite the initiation of various organic farming initiatives, including 'Go Organic,' 1,000 Organic Villages, Genta Organic, and the UPLAND program, over the past few decades. In the future, organic farming will be incorporated into Indonesia's EMAS 2045 program, a national target aimed at the centennial of Indonesian independence [7]. In origin, organic farming is a grassroots movement driven by religious organisations, advocated nationwide for sustainable farming practices, demonstrating farmers' initiative and environmental awareness [8]. The shift in attitude occurred when organic paddy farming was introduced into the government program in 2002. The market factor and green imaging are considered as fundamental concepts of organic paddy agriculture, diverging from forthright environmental considerations [9]. Later, the premium price of organic rice has been identified as the primary motivating factor for early adopters [4, 10–12]. Nowadays, hedonic motives among organic farmers, from self-determination theory [13, 14], is being an interesting area for exploration and appearing in the form of enjoyment, happiness, altruism, and warm glow [15–18]. It was also emphasised that the hedonic motive, as an intrinsic motivation, is a valuable factor in the acceptance of agricultural innovations [19, 20].

In Indonesia, despite various government initiatives targeting organic paddy cultivation, the organic paddy area to total paddy area was only 0.032%. This highlights the imperative for increased acceptance and ongoing dedication to organic paddy farming [21]. In contrast with the contribution of organic paddy farming toward the environment and economic situation [6, 22], in the general situation, farmers have opted to deregister from organic certification due to a multitude of factors, encompassing financial, technical, social, and cultural challenges [23–26], representing that the adoption stage is not the final league. However, current academic research predominantly focussed on and stopped at organic farming adoption [27–31]. The post-adoption phase, a concept based on Diffusion of Innovations (DOI) theory that offers a different conception of acceptance or adoption, has received little attention, leaving the question of how to maintain organic paddy practices after implementation [32].

Recently, post-adoptions have been popular in the domain of information technology [33–35], but have had limited application in agriculture, especially in initiatives such as organic paddy farming. In the agricultural domain, post-adoption was evaluated in coconut [36], agricultural technology [37], and crop residue retention [38]. The use of pre-acceptance models, such as the Technology Acceptance Model (TAM) or the Theory of Planned Behaviour (TPB), for post-adoption cases in previous literature was also criticised by Bhattacharjee [39] as inappropriate. In origin, the Expectation Confirmation Model (ECM) and Technology Continuance Theory (TCT) were introduced by Bhattacharjee [39] and Liao [40], respectively, to capture the post-adoption stage of technology adoption in the context of information technology (IT), using the satisfaction variable as the main contributor. However, its application in the agriculture domain remains restrained. Furthermore, highlighting the various variables closely related to organic paddy farming, including hedonic motives, requires a comprehensive and appropriate framework to capture them. To solve the case, the Stimuli-Organism-Response

(SOR) framework is claimed to be adaptable, capable of capturing all predicted determinants due to its flexibility in incorporating multidimensional aspects into the model [41]. Furthermore, extending ECM and other basic theories beyond the pre-acceptance model is predicted to yield strong explanatory power [42]. The extended ECM-TCT under the SOR framework in various models showed the reliability of the model to portray the continuance intention [43–45].

This study aims to identify the key factors influencing farmers' intention to continue organic paddy farming practices, including perceived enjoyment as a hedonic motive, as well as other external and internal factors. The DOI navigates the position of continuance intention of organic paddy farming in the diffusion and innovation model and its importance to be examined. However, the stage of post-adoption, as a distinct concept with pre-acceptance, still needs the appropriate model to capture the continuance intention. The presence of ECM-TCT model with its satisfaction variable and its capacity to evaluate the performance of adopted innovation, solves the debate. Considering the wide range of factors (e.g. market factor, subjective norm) related to organic paddy farming, an adaptable framework is essential. In this research, SOR framework was deployed to conceptualize the continuance intention of organic paddy farming model due to its adaptability. Additionally, environmental concern, given its prominent role in the development of organic paddy practices, will be evaluated as a moderator to assess its contribution to the relationship between the organism and the SOR response area. Thus, this study is among the first to explore post-adoption within this framework in the agricultural domain, specifically organic paddy.

2 Theoretical background

2.1 The continuance intention concept

Continuance intention (CI) can be found in Roger's Diffusion of Innovation (DOI) model. Innovation is sometimes defined as an unprecedented invention; yet, in reality, the objectivity of "newness" is not dependent on the timing of its creation. An individual may identify an object as novel and subsequently assess their reaction to it. Organic agriculture was an innovative concept for farmers, as it deviated from their conventional agricultural methods. To disseminate the innovation, organic farming follows the five stages: (1) knowledge, (2) persuasion, (3) choice, (4) implementation, and (5) confirmation [46]. Rogers' adoption stages indicate that organic agriculture should not cease at the implementation phase; instead, the confirmation step requires further exploration and elaboration. At every phase of the diffusion process, individuals function as information seekers and assessors. Rejection occurs before the adoption process, whereas the decision to terminate or continue is made during the confirmation phase or in the post-adoption stage [46]. The DOI theory confirmed that an innovation, including organic paddy farming, does not stop at the adoption stage; the post-adoption stage should follow. Theoretically, the model for pre-adoption and post adoption should be different, due to its different concept. The use of post-adoption model to cover the post-adoption stage is required. However, we need to select the appropriate model and build a conceptual framework that captures the organic farming's multidimensional aspect most effectively.

2.2 Expectation confirmation model (ECM) and technology continuance theory (TCT)

The Expectation-Confirmation Model (ECM) by Bhattacherjee [39] is based on the Expectation-Confirmation Theory (ECT), which serves as the anchor for the repurchase intention model [47]. ECM initially functioned within the Information System (IS) domain to support the context following its initial adoption. Because both decisions (1) follow an original decision (acceptance or purchase), (2) are impacted by the initial usage (of IS or product) experience, and (3) can result in an ex-post reversal of the initial decision, IS users' continuity intention and continuing activities intention are equivalent [38, 39]. This model posits that satisfaction arises from the interplay between expectations and confirmations, as asserted by ECM. Furthermore, the alignment between users' expectations and actual performance is reflected in their satisfaction.

Attitude is inherently linked to satisfaction, and addressing them together is likely to be more effective, as attitude is a broad concept during initial use or acceptance [39]. Nevertheless, attitude plays a limited role in the acceptance of technology. Individuals may not harbour a favourable disposition towards a particular technology; nonetheless, they continue to engage with it owing to its advantages [48]. However, the separation between satisfaction and attitude is explored by Liao [40] with Technology Continuance Theory (TCT). TAM, ECM, and ECT constructed TCT; the elements of TCT combined those models and theories. Finally, TCT, as a post-adoption theory, combines TAM, the post-acceptance model, and the cognitive model and has demonstrated greater explanatory power than TAM itself [49]. Recent research utilising TCT indicates that perceived ease of use has an insignificant effect on attitude. Other variables, such as perceived usefulness and satisfaction, are predicted to play a more significant role in the continuance intention model. In the post-adoption phase, users typically become familiar with the technology and demonstrate skill as they gain experience [50–53]. The presence of ECM-ECT cut the problematic use of pre-acceptance model in post-adoption area. The future research agenda suggests that the presence of moderator variables may yield new insights [54].

However, the extended model of continuance intention is still needed to provide a strong explanation, particularly when applied in non-IS contexts, such as organic paddy farming. Theoretical contexts, such as stimulus–response-based, are predicted to provide a better extended model of ECM [42]. Based on previous literature, the Stimulus–Organism–Response concept has strong explanatory power for continuance intention [44, 55, 56]. In addition, given the nature of organic paddy farming practices, the ETC and ECM models are suitable for examining their intention to continue organic paddy farming. Given the definition and role, satisfaction with ECM-ECT is predicted to be a good indicator of organic paddy farming performance. However, multidimensional factors related to organic paddy farming are also important to involve, highlighting the need for a comprehensive framework.

2.3 The stimuli-organism-response (SOR) framework

In the Stimuli–Organism–Response (SOR) framework, stimuli (S) affect the organism (O) or individual emotional system, leading to user behaviour as the response (R) [57]. There are no predetermined standards for including or excluding stimulus, organism, and response elements, allowing the framework to be adaptable across a broad spectrum of concepts including organic paddy farming. According to Mehrabian and Russell

[41], the physical or social environment, which includes interpersonal stimuli, consists of various stimulus elements. Environmental psychology centres on understanding how individuals respond to their surroundings. Environmental conditions are often complex, shaped by multiple attributes and continual change, and they can therefore influence emotional experience. Within the SOR framework, the organism represents internal states, including affective responses such as mood and arousal, alongside other individual characteristics. These internal states, commonly reflected in feelings of arousal and pleasure, shape behavioural responses, including an individual's decision to approach or avoid a given situation. Higher levels of pleasure are typically associated with greater satisfaction. Importantly, stimuli do not uniformly elicit emotional reactions; their effects may be negligible, negative, or positive depending on the context and the individual [58]. The SOR framework increases the likelihood that specific variables in a specific case are included in a model [41], suggesting the possibility of including several emphasised factors in organic paddy farming practices, including perceived enjoyment as a hedonic motive, as it is widely discussed among organic paddy farmers. Furthermore, environmental measures for organic paddy farmers can be integrated into the model. The existence of various specific dimensions related to the market and demand for organic products [59], organisational support from both farmers' groups and the government [5, 60, 61] and the presence of social influence could be posited as stimuli. The advantages of organic practices, along with the sense of fulfilment and pleasure derived from these methods, as elucidated in prior research [32, 36, 62] built into the organism.

3 Hypothesis development

3.1 Market factor (MF)

Market factor describes the reinstatement of organic paddy market access and producers-buyers networks [63]. Farmers' decision to adopt organic farming during the adoption phase is shaped by anticipated economic conditions, particularly the heightened global demand for organic goods [64]. It is believed that reduced production costs and strong demand strengthen farmers' advantage [6, 65]. The literature also supports the notion that market factors affect the perceived benefits and acceptance of organic farming [66]. Furthermore, the connection and relationship that farmers had with purchasers shaped their satisfaction because they enhanced the possibility of higher profits [67, 68]. Other research showed that an easily accessible organic products marketing process gave farmers enjoyment [15, 16]. Market factor as the stimulus is predicted to contribute to the organism aspect, so that, in summary, we put forth:

H1a *Market factor significantly and positively influences the perceived benefit of organic paddy farming.*

H1b *Market factor significantly and positively influences organic paddy farming satisfaction.*

H1c *Market factor significantly and positively influences organic paddy farming perceived enjoyment.*

3.1.1 Organisational support (OS)

Organisational support is conceptualised as facilitating conditions, as presented by Venkatesh [69] to characterise the technical or non-technical facilities that support the implementation of an innovation. In previous literature, the conducive conditions provided by organisational support affected perceived benefits [70–72] and satisfaction, suggesting that a heightened sense of organisational support engenders a sense of being backed [73–75]. Furthermore, organisational support increased people's happiness because they felt that their surroundings commended them [76, 77]. As we highlighted, organic farmers in Indonesia join farmers' groups and cooperatives that facilitate the certification procedure or subsidised inputs. Simply, organisations and organic farmers had a close relationship, specifically in Indonesia. Incorporating organisational support into the model is essential, as organic farming is an integral component of the selected management system, similar to technological information. Based on the prior research, we proposed:

H2a *Organisational support significantly and positively influences the perceived benefit of organic paddy farming.*

H2b *Organisational support significantly and positively influences organic paddy farming satisfaction.*

H2c *Organisational support significantly and positively influences organic paddy farming perceived enjoyment.*

3.1.2 Subjective norm (SN)

Subjective norm is defined as the social influence, as an external situation, that drives an individual to either partake or abstain from a specific conduct [78]. The literature indicates that subjective norms also positively influence perceptions of an innovation's usefulness [79–81]. Subjective norms can manifest as societal recommendations, leading to a sense of satisfaction in meeting societal expectations [82, 83]. Further, subjective norm brings a joyful feeling [79, 84]. In organic paddy farming, farmers adopted organic farming when their families or relatives in a farmers' group did the same. This was because farmers felt more confident about learning and practising organic farming after seeing their family members adopt it [31, 85]. Furthermore, the organic farming group certification is a common scheme in countries, making communal influence difficult to ignore [86, 87]. In conclusion, we have formulated the hypothesis:

H3a *Subjective norm significantly and positively influences the perceived benefit of organic paddy farming.*

H3b *Subjective norm significantly and positively influences organic paddy farming satisfaction.*

H3c *Subjective norm significantly and positively influences organic paddy farming perceived enjoyment.*

3.1.3 Perceived benefit (PB)

The term "perceived benefit" refers to the economic or non-economic impact derived from agricultural activities as assessed by farmers [88]. Perceived benefit reflects a comprehensive context of perceived usefulness in order to capture all of the connotations that are associated with a technology or notion [42]. Organic paddy farming was perceived as beneficial for its environmental and economic contributions [4, 9, 22]. Perceived advantages or value positively influence satisfaction, suggesting that greater perceived usefulness enhances overall satisfaction [89–91]. Concurrently, the favourable effects of an idea or program sustained adopters' commitment by strengthening their intention to continue the activities [92–94]. The following hypotheses are specified:

H4 *Perceived benefit significantly and positively affects satisfaction with organic paddy farming.*

H5 *Perceived benefit significantly and positively affects continuance intention on organic paddy farming.*

3.1.4 Perceived enjoyment (PE)

In organic agriculture, enjoyment seems to be a unique characteristic that distinguishes organic farmers. Enjoyment is a crucial psychological concept that encompasses both eudaimonic and hedonic dimensions of positive emotions, each contributing to happiness [95]. Organic farmers claim to have a deeper relationship with the soil, developed through participatory cultivation and a comprehensive understanding of nature. Farmers who grow organically adhere to ethical ideals, carefully contemplating the harmonious relationship between humans and nature, which influences their happiness [15, 96]. According to this study's findings, the term "perceived enjoyment" is chosen to represent a hedonic drive that contributes to the fulfilment of an idea [97–99].

Furthermore, the intention to continue will be influenced by this search for happiness [100–102]. Individuals commit to enjoy the task with positive hedonic sentiments, such as comfort, easy, effortless, fun, and pleasure, and with eudaimonic sentiments, such as joy, attaining, elevating, satisfying, and significant [103]. We propose that:

H6 *Perceived enjoyment significantly and positively affects satisfaction with organic paddy farming.*

H7 *Perceived enjoyment significantly and positively affects farmers' continuance intention towards organic paddy farming.*

3.1.5 Satisfaction (SAT)

Although the hedonic motive also intersected with satisfaction [20, 104], the indicators of satisfaction in this research reflected more utilitarian aspects, indicating the overall evaluation of organic paddy farming performance. About 43% of the studies identified satisfaction and perceived usefulness as key antecedents of continuous usage, significantly affecting continuance intention from 2000 to 2014 [40, 105]. We also proposed that satisfaction influences continuance intention toward organic paddy farming to evaluate the farmers' experience during practice. In SOR, satisfaction falls under the stimuli [41]. Numerous studies have been conducted in agriculture and environmental

sustainability, addressing aspects of satisfaction [36]; [106]; [25]; [107]; [38]. We hypothesise that:

H8 *Satisfaction in organic paddy farming significantly and positively influences organic paddy farming continuance intention.*

3.2 Environmental concern (EC)

Environmental concern is defined as a positive attitude toward the environment, a commitment to protecting it as much as possible, and even providing it with benefits [108]. The environmental motive is a primary driver of Indonesia's sustainable food system in its early stages, underscoring the importance of including it in the model [109]. Furthermore, environmental concern is an appropriate way to demonstrate sustainable behaviour [110]. In the context of organic farming, Ashari [111] found that environmental awareness was evident in both developing and developed countries, alongside economic factors. Conversely, Indonesia's situation demonstrated that environmental reasons were prioritised over economic considerations [112]. As observed by Ashari [27] both semi-organic and conventional farmers had a notable mean score for environmental concern, which, in turn, affected their attitudes. They indicate that environmental concern extends beyond individuals involved in organic farming. In contrast, Ziberman [113] found that elevated environmental consciousness did not correspond to a similarly high environmental performance index in a developing country, suggesting the variable's relevance to the model. This research identified environmental concern as a moderator, given its importance in shaping the initial phase of organic agriculture approaches and its variable relevance across previous studies.

Environmental concern has also been examined as a moderating variable in e-government contexts, where it can strengthen users' intention to utilise e-government systems [114]. Furthermore, environmental concern enhanced the relationship between trust and purchase intention, serving as an interactive factor alongside image, experience, revisit intention, knowledge, and attitude [115–117]. Moreover, happiness exhibited a positive correlation with one's sense of connectedness to the natural world [118]. Other research stated that individuals exhibiting pro-environmental behaviour may be more prevalent among those who are satisfied [119]. Limited studies have examined environmental concern as a moderator; however, research on ongoing intention in digital contexts has shown that environmental concern moderates the relationship between satisfaction and continuance intention [120]. The hypotheses are:

H9a *Environmental concern strengthens the relationship between perceived enjoyment and continuance intention.*

H9b *Environmental concern strengthens the relationship between satisfaction and continuance intention.*

H9c *Environmental concern strengthens the relationship between perceived benefit and continuance intention.*

4 Methods

4.1 Study area

The research was conducted in Magelang Regency, Central Java, Indonesia, which is the largest organic paddy farming area, covering 1672.61 hectares (secondary data from the Ministry of Agriculture, 2022, and the Organic Certification Body, 2023). In 2021, the UPLAND Project, centred on the organic paddy region, targeted Magelang to expand its organic paddy area to 2000 hectares by 2024, positioning the city as a potential growth area for organic paddy farming.

4.2 Data collection, conceptual framework, and questionnaire development

The total number of certified organic paddy farmers in Magelang in 2023 is 6325, based on the secondary data from the Organic Certification Body. Primary data collection was conducted using a sample of 345 organic paddy farmers in 2025. The number of samples was deemed sufficient for the model per the G*Power formula and categorised as representative based on Krejcie [121]. Brady et al. [59] posited that the second year of organic farming practices is crucial in deciding whether to continue with or return to conventional farming methods. Considering Brady's result, inclusion criteria were applied with a minimum of two years of experience in organic paddy farming and still practising organic paddy farming during the data collection (see the respondents' "organic paddy farming experience" variable in Table 2). Based on the cooperatives database of organic paddy farmers, the farmers were filtered using the inclusion criteria. The filtered farmers were randomly chosen as the respondents. To ensure that the farmers met the inclusion criteria, we reconfirmed them during data collection.

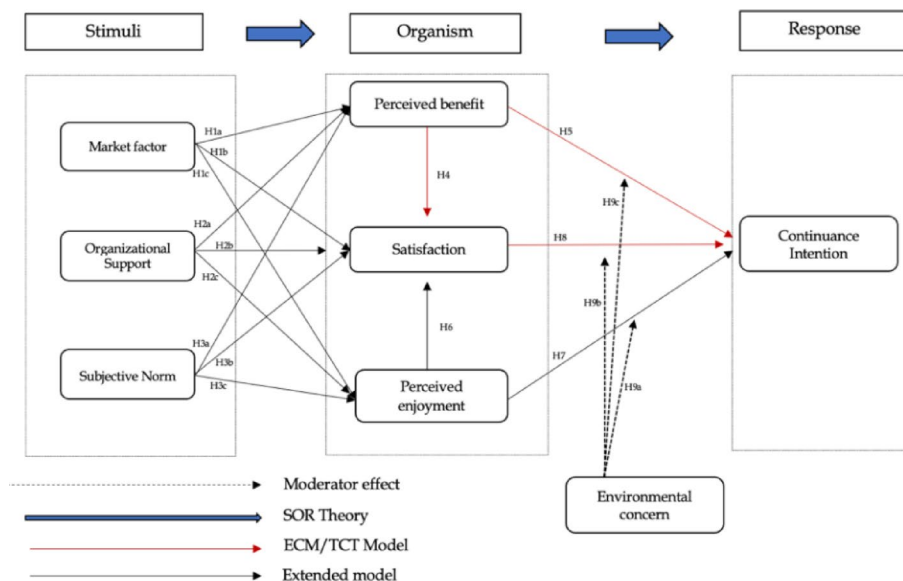
Data collection was split into 2 rounds; the first collected 189 respondents, and the second collected 156. Non-response bias was tested by comparing the respondents characteristics (e.g. age and farm size). The results of *t*-test showed that the characteristics did not differ by rounds. The inexistence of non-response bias implies that the sample respondents represented the population [122, 123]. Data were gathered through structured interviews using a questionnaire. A five-point Likert scale, ranging from strong disagreement to strong agreement, was anticipated to be easily comprehensible. The questionnaire items were adapted from the previous literature (Table 1), while the conceptual structure of this study is illustrated in Fig. 1. To obtain the requirement of average variance extracted (AVE), we removed some items in indicator [124] including 3 items from market factor, 2 items from organisational support, 5 items from subjective norm, 4 items from perceived benefit, 1 item from satisfaction, 2 items from perceived enjoyment, 1 item from environmental concern, and 4 items from continuance intention. Table 1 presents the valid and reliable item questionnaire after removal process. The research applied the SOR framework, incorporating market factor, organisational support, and subjective norm within the area of stimuli. Perceived benefit, satisfaction, and perceived enjoyment echoed the organism area, while continuance intention was placed as the response. To detect the Common Method Bias/CMB [125], we used the indicators of the marker variable from Attitude Toward the Color Blue: An Ideal Marker variable, including (1) Blue is a beautiful colour, (2) Blue is a pleasant colour, (3) Blue is a nice colour, and (4) I like the colour blue [126].

Table 1 Variables and questionnaire items

Constructs and their items		Adapted from	Loadings	VIF
Market factor (MF)				
MF1	The direction of my business has become clearer since my paddy fields have been organically certified	[32, 63]	0.678	1.276
MF2	I have a better relationship with my buyers since my paddy fields have been organically certified		0.713	1.365
MF3	I have the opportunity to gain a wider market share because of organic paddy farming		0.802	1.663
MF4	I have the opportunity to reach a more profitable market through organic paddy farming		0.815	1.738
Organisational Support (OS)				
OS1	The organisation provides training for organic paddy farming	[32, 63, 127]	0.744	1.435
OS2	The organisation has policies that regulate the provision of organic inputs		0.696	1.357
OS3	The existence of the organisation makes organic paddy market access easier		0.732	1.471
OS4	The organisation conveys to farmers that there is the latest technology related to organic paddy farming		0.757	1.521
OS5	To sustain the organic paddy farming, the organisation always attempts to get support from various external stakeholders		0.624	1.332
Subjective Norm (SN)				
SN1	My farmer friends are willing to continue organic paddy farming, and I should do the same	[32, 63, 128]	0.737	1.256
SN2	Most people I consider important influence my decision to continue organic paddy farming		0.735	1.254
SN3	I consider the local leader's opinion on continuing organic paddy farming		0.776	1.168
Perceived Benefit (PB)				
PB1	Practising organic paddy farming in accordance with standards increases productivity	[10, 32, 36, 63]	0.717	1.295
PB2	With organic certification on my product, I can get a stable, premium price		0.791	1.662
PB3	Organic paddy farming income contributes to increasing my total household income		0.768	1.635
PB4	Certified organic paddy farming is generally more profitable than conventional farming		0.721	1.354
Satisfaction (SAT)				
SAT1	In general, I am satisfied with the performance of the organic paddy farming business	[36, 38, 129]	0.816	2.398
SAT2	I am satisfied with the organic paddy farming training provided		0.755	2.133
SAT3	I am satisfied with the organic paddy farming information provided		0.725	2.012
SAT4	I am satisfied with the existence of organic paddy buyers facilitated by the organisation		0.723	1.641
SAT5	I feel satisfied with the price of organic paddy		0.767	1.935
SAT6	Organic paddy farming yield is exactly what I am expecting		0.791	2.274
SAT7	I feel satisfied because I fulfil my relatives' and friends' expectations to keep organic paddy farming		0.718	1.592
Perceived Enjoyment (PE)				
PE1	I enjoy practising organic paddy farming	[17, 130, 131]	0.714	1.483
PE2	I feel that organic paddy farming matches my philosophy of life		0.729	1.720
PE3	Organic paddy farming gives me pleasure		0.833	3.519
PE4	Organic paddy farming gives me fun		0.825	3.395
PE5	Organic paddy farming is in accordance with my desirable way of life		0.708	1.610
Environmental Concern (EC)				

Table 1 (continued)

Constructs and their items		Adapted from	Loadings	VIF
EC1	I am passionately engaged in environmental protection issues	[132–134]	0.782	1.483
EC2	I often think about or consider how environmental quality in Indonesia can be improved		0.683	1.288
EC3	The situation of the environment affects my health		0.660	1.982
EC4	The situation of the environment affects many people in my country		0.667	1.978
EC5	I am willing to sacrifice to protect the environment		0.769	1.543
Continuance Intention (CI)				
CI1	I have the intention to continue practising organic paddy farming in the future	[36, 38]	0.687	1.495
CI2	I have the intention to recommend organic paddy farming to my relatives		0.632	1.895
CI3	I am going to encourage other farmers to continue organic paddy farming		0.749	1.933
CI4	I am willing to share my best practices in organic paddy farming with other farmers		0.758	1.978
CI5	I am willing to share my positive experiences in organic paddy farming with other farmers		0.739	1.980
CI6	Organic paddy farming will be one of my habitual activities in farming practices		0.733	1.430
CI7	I hope that if one day my successors inherit my land, they will continue to do organic paddy farming		0.664	1.383

**Fig. 1** Conceptual framework of the determining factors of continuance intention towards organic paddy farming. Source Authors, 2025

4.3 Data analysis

Descriptive analysis was used to capture the socioeconomic characteristics of the respondents, including gender, age, education, role in farmers' group, farm size, experience in organic paddy farming, and organic renewal status. Partial Least Square-Structural Equation Modeling (PLS-SEM) followed descriptive analysis for processing the data by examining the relationships among the factors within the framework. The data were analysed using SmartPLS 4, the most recent software for Structural Equation Modelling (SEM). In PLS-SEM, the investigation of multiple relationships works under

two models: the measurement and the structural. The measurement model assesses several aspects, including validity and reliability, while the structural model evaluates the relationships among the constructs. Reflective measurement was employed in the model analysis, indicating that internal consistency, convergent validity, and discriminant validity were assessed during the model measurement phase. For the model effect size (f^2), suggested values of 0.02, 0.15, and 0.35 represent small, medium, and substantial, respectively [135]. In the moderation effect, the formula is as follows [136]:

$$f^2 = \frac{R^2_{included\ moderator} - R^2_{excluded\ moderator}}{1 - R^2_{included\ moderator}}$$

According to the constitution, the effect size for moderation (f^2) is classified into 0.005, 0.01, and 0.025, for small, medium, and large effects, respectively [135, 137].

5 Results

5.1 Respondents profile

Table 2 indicates that more than half of organic paddy farmers are male and aged 50 or older, highlighting the prevalence of gender role gaps and the older demographic in the Indonesian agricultural sector. The result supports the literature that the "young farmer problem" is escalating in numerous countries [138–140]. Younger farmers tend to show a stronger propensity to adopt ecologically sustainable practices. However, they also face more pronounced societal expectations and pressures than their older

Table 2 Respondents' characteristics

Variable	Status	Frequency (people)	Percentage (%)
Gender	Male	294	85.22
	Female	51	14.78
Age (years)	below 30	8	2.32
	31–40	39	11.30
	41–50	85	24.64
	51–60	109	31.59
	above 60	104	30.14
Education	No formal education	6	1.74
	Primary	118	34.20
	Junior High School	77	22.32
	Senior High School	119	34.49
	Tertiary education	25	7.25
Role in the farmers' group	Committee	97	28.12
	Member	248	71.88
Farm size (ha)	< 0.5	266	77.10
	≥ 0.5	79	22.90
Organic paddy farming experience (years)	2–3	74	21.45
	4–6	152	44.06
	7–9	74	21.45
	> 9	45	13.04
Renewal of organic certification	Yes	273	79.13
	No	72	20.87
Frequency of renewal of organic certification	0*	72	20.87
	1	126	36.52
	2	99	28.69
	≥ 3	48	13.91

*Farmers are in the 3rd year of organic paddy farming, but have never renewed the organic certification

counterparts [141], making this a latent and global problem. Regarding educational characteristics, Hasanah [142] reported that 92% of crop farmers in Indonesia had only completed elementary education. In contrast, among organic paddy farmers, 64% of respondents had graduated from secondary school or higher, suggesting they were relatively well educated. Although education should be an effective strategy for enhancing agricultural output and overall agricultural advancement [143, 144], in practice, formal education often does not include instruction in organic farming practices. Organic farming training remains the main non-formal tool guiding farmers' decisions to adopt organic practices [30]. In Indonesia, organic producers commonly participate in cooperatives, associations, or farmers' groups to strengthen their access to training, obtain subsidised inputs, and manage the procedural demands of organic certification. Certification requires renewal every three years, and group-based certification schemes typically reduce compliance costs for individual farmers. The role of farmers' organisations is therefore pivotal, particularly as cooperative membership continues to increase across many developing contexts. These organisations support labour empowerment, improve farm management and production practices, and enhance members' bargaining power in agricultural markets [145]. In this study, 28.12% of farmers served as committee members within the farmers' association, assuming responsibility for coordinating activities and liaising with extension officers.

Related to farm size, over half (77.10%) of farmers operated on less than 5,000 m², indicating that organic farmers predominantly consist of smallholders. Farm size is often associated with technical efficiency, as larger holdings tend to achieve higher efficiency levels. However, improving production efficiency remains a persistent challenge for many Indonesian farmers. Collaborative farming arrangements may help address this constraint by enabling shared resources and economies of scale, although they can also introduce more complex coordination and management demands [146, 147]. In the realm of organic farming, the collaborative management of tasks associated with organic certification is often perceived as intricate, costly, and labour-intensive [5, 148]. Nonetheless, a significant majority of respondents had practised organic paddy farming for 4–6 years. It renewed their organic certification (79.13%), indicating that the farmers possess sufficient experience and understanding of the procedures involved. Moreover, a substantial proportion of farmers (36.52%) had previously renewed their organic certification, indicating a degree of procedural familiarity and practical expertise. Overall, respondents' adequate experience in organic paddy cultivation provides a robust basis for evaluating organic farming performance.

5.2 Model measurement and hypothesis testing

Two stages of data analysis were conducted, including the evaluation of the measurement and structural models to test the hypothesis [149]. The outer loadings in this study ranged from 0.624 to 0.825 (Table 1), indicating that all included items demonstrated validity. The variance inflation factor (VIF) is also reported to assess multicollinearity. Severe multicollinearity elevates the standard error [150, 151]. Collinearity is indicated by a Variance Inflation Factor (VIF) of 5 or higher, considered uncritical in the range of 3 to 5, and absent when the VIF is below 3 [135]. Table 1, which presents the loading and VIF values, shows the test results for the questionnaire item, indicating that the instrument is trustworthy.

Table 3 Discriminant validity (HTMT Ratio)

	CI	MF	EC	SN	OS	PB	PE	SAT
CI								
MF	0.647							
EC	0.394	0.277						
SN	0.292	0.359	0.209					
OS	0.685	0.793	0.127	0.311				
PB	0.713	0.772	0.393	0.298	0.704			
PE	0.754	0.631	0.411	0.394	0.559	0.739		
SAT	0.629	0.660	0.259	0.432	0.772	0.784	0.618	

MF, market factor; OS, organizational support; SN, subjective norm; PB, perceived benefit; PE, perceived enjoyment; SAT, satisfaction; CI, continuance intention

Table 4 Measurements model results

	CI	MF	OS	SN	PB	SAT	PE	EC
R ²	0.504				0.392	0.559	0.304	
Q ² predict	0.362				0.374	0.445	0.283	
Composite reliability (CR)	0.877	0.840	0.837	0.793	0.837	0.904	0.875	0.838
Cronbach's alpha (CA)	0.836	0.746	0.757	0.614	0.740	0.876	0.820	0.766
Averaged variance extracted (AVE)	0.505	0.569	0.507	0.562	0.562	0.573	0.584	0.510

The HTMT test (Table 3) is utilised to assess discriminant validity, with values required to be below 0.85 [152]. The HTMT scores ranged from 0.292 to 0.784, indicating the questionnaire's validity. Table 4 assesses the construct's reliability and validity. Reliability is shown by Cronbach's Alpha (CA), Composite Reliability (CR), outer loadings, and average variance extracted (AVE). In this study, Cronbach's Alpha ranged from 0.614 to 0.876. According to the literature, CA is reliable at a threshold of 0.6 [153], indicating that all constructs are reliable. Composite reliability (CR) addresses the limitations of Cronbach's alpha (CA) by providing a compensatory measure. A composite reliability of 0.7–0.9 is deemed acceptable for the study [135, 136] suggesting that the CR lies between 0.793 and 0.904. This research evaluates convergent validity using outer loadings and Average Variance Extracted (AVE), with the criterion that AVE must be 0.5 or greater. For the outer loading (Table 1), ideal outer loading is ≥ 0.708 but when $AVE \geq 0.5$, that item with the outer loading of more than 0.4 can be retained [136]. AVE values ranged from 0.505 to 0.584. However, we have dropped some items from the indicators of the constructs in the initial questionnaire to achieve a better, more reliable, and more valid construct. Predictive relevance is measured with Q^2 , and coefficient determination is measured with R^2 (Table 3). The model is predictive when the Q^2 of the endogenous variable is >0 , and R^2 measures the predictive power [136]. Table 3 shows that $Q^2 > 0$ indicates that the model is predictive, with R^2 for the continuance intention construct of 0.504, categorised as moderate. Regarding Common Method Bias (CMB), there was no bias problem in the model, as evidenced by the -0.6% to 0.1% (i.e., less than 10%) change in path coefficients with and without the marker variable [154, 155]. The absence of a CMB indicated no bivariate relationship with inflation [126].

Structural Equation Modelling (SEM) is a statistical instrument utilised to elucidate the relationships or causal connections among variables. Partial Least Squares Structural Equation Modelling (PLS-SEM) was employed to investigate the intricate model of continuation intention regarding organic paddy farming. In the next stage, the measurement model was utilised to evaluate the relationship among the indicators. The relationship is

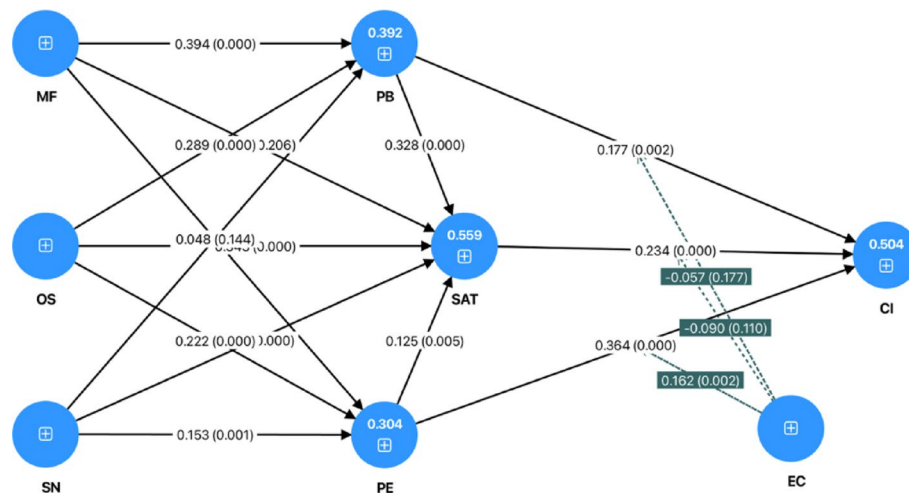


Fig. 2 Result for PLS-SEM

Table 5 Hypotheses testing

Hypothesis	Relationship	Path coefficient	P value	Decision	f ²	Effect size
H1a	MF—> PB	0.394	0.000	Supported	0.159	Medium
H1b	MF—> SAT	0.043	0.411	Not Supported	0.002	None
H1c	MF—> PE	0.326	0.000	Supported	0.095	Small
H2a	OS—> PB	0.289	0.000	Supported	0.087	Small
H2b	OS—> SAT	0.343	0.000	Supported	0.154	Medium
H2c	OS—> PE	0.222	0.000	Supported	0.045	Small
H3a	SN—> PB	0.048	0.144	Not Supported	0.004	None
H3b	SN—> SAT	0.140	0.000	Supported	0.040	Small
H3c	SN—> PE	0.153	0.001	Supported	0.032	Small
H4	PB—> SAT	0.328	0.000	Supported	0.129	Small
H5	PB—> CI	0.177	0.004	Supported	0.032	Small
H6	PE—> SAT	0.125	0.005	Supported	0.022	Small
H7	PE—> CI	0.364	0.000	Supported	0.157	Medium
H8	SAT—> CI	0.234	0.001	Supported	0.057	Small

MF, market factor; OS, organizational support; SN, subjective norm; PB, perceived benefit; PE, perceived enjoyment; SAT, satisfaction; CI, continuance intention

highlighted in Fig. 2 and Table 5. We found that all hypotheses were confirmed except H1b and H3a. In H1b, we did not find relationship between market factor (MF) and satisfaction (SAT). In H3a, the subjective norm (SN) did not influence perceived benefit (PB). The effect sizes for supported hypotheses ranged from small to medium. All construct relationships showed a positive correlation. The coefficient ranged from 0.140 to 0.394.

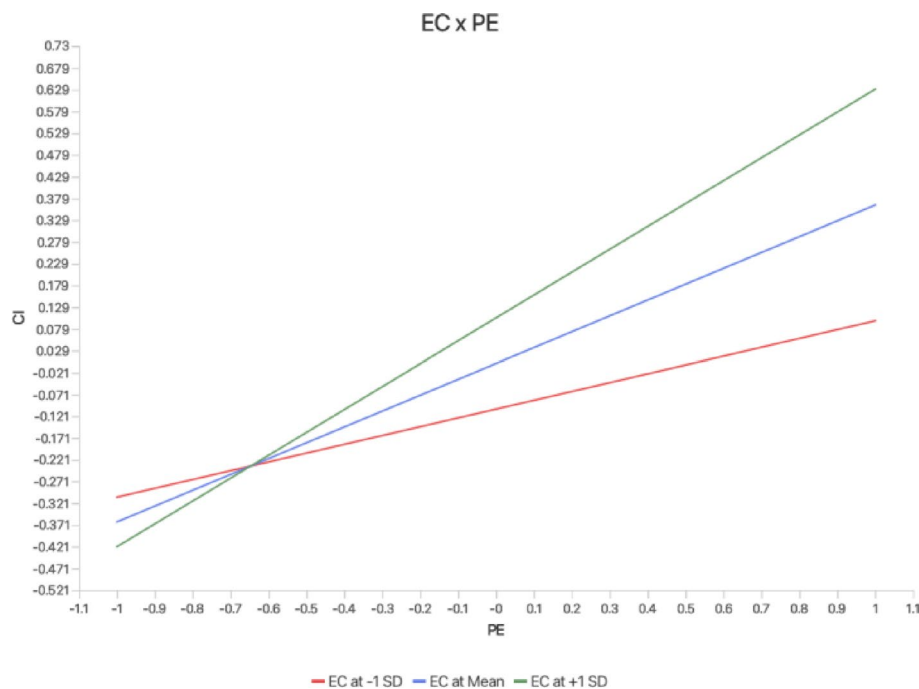
A number of studies have indicated a positive correlation between perceived enjoyment (PE) and continuance (CI) intention; however, other research has presented findings that contradict this assertion [156–158]. Some scholars also reported no correlation between perceived usefulness (benefit) and continuance intention [129, 159, 160]. Additionally, a weak association was discovered between PE and CI [129, 161, 162]. The inconsistencies or weak relationships between two variables necessitates consideration of a moderator's role. Environmental concern (EC) was incorporated as a moderator in the model, as organic farmers generally possess a greater understanding of the long-term sustainability of the environment. Moreover, environmental consciousness is a

Table 6 Moderation effect

Hypothesis	Interaction	Path coefficient	P value	Decision	f ²	Effect size*
H9a	EC × PE → CI	0.162	0.002	Supported	0.050	Large
H9b	EC × SAT → CI	−0.090	0.110	Not Supported	0	None
H9c	EC × PB → CI	−0.057	0.177	Not Supported	0	None

EC, environmental concern

*Classification for moderator based on Kenny and Hair et al.[135, 137]

**Fig. 3** Plot for the moderator effect of environmental concern between perceived enjoyment and continuance intention. Source Authors, 2025

significant factor in the popularity of organic farming [163, 164]. Table 6 and Fig. 3 illustrate the moderating effect of environmental concern (EC) on the relationships among perceived enjoyment (PE), satisfaction (SAT), perceived benefit (PB), and continuance intention (CI). The result showed that EC only moderated PE and CI with its significant and positive effect.

6 Discussion

6.1 The determinants of organic paddy farming continuance intention

Given its environmental benefits, continuing organic paddy farming practices is crucial. Understanding the determinants of continuance intention will inform the development of policies and practices to sustain organic paddy farming. The extended ECM-TCT under the SOR framework, the explanatory reached 50.9%, exceeding the use of the TAM model (39.7%) in continuance intention of organic coconut farming [36] and the regression model (22.17%) in continuing farm activities [165]. Further, the research examined the direct relationships among the model's multidimensional constructs.

The first hypothesis (H1a) revealed a positive influence of the market factor (MF) as the first part of the stimuli area on perceived benefit (PB). A medium effect was also found between the MF and PB, with the most significant coefficient observed (H1a),

indicating the market factor's important role in shaping the perception of organic paddy farming advantages. The farmers perceived that organic paddy offered benefits such as broadened market share, premium prices, and a good relationship with buyers [6, 64, 166]. The result also confirmed that the MF positively affected perceived enjoyment (PE), indicating that an improved market environment enhances farmers' perceptions of happiness with organic farming, as supported by Permadi and Winarti [167]. Contrary to expectations, the direct influence of the market factor on satisfaction (SAT) was negligible (H1b). In contrast, Ma et al. [168] demonstrated that farmers' access to markets significantly influences their satisfaction. However, Padilla et al. [63] corroborated the conclusion that market parameters did not correlate with satisfaction, attributing this to inefficient communication between consumers and farmers.

Magesa et al. [169] found that the capacity to sell in various markets, access different markets, and facilitate the marketing of farm production would not significantly affect farmers' satisfaction when interaction between farmers and the market is limited, and the middlemen play a predominant role. To support the result, Azima et al. concluded that the marketing process influences satisfaction when farmers engage in direct marketing [170]. In Indonesia, cooperatives purchased organic paddy products and served as middlemen for farmers, making it impossible for farmers to access the organic market independently. Organic rice packages with an organic logo were managed under the cooperatives. To sell directly, farmers sold their organic products without the organic certification logo and at prices equivalent to those of conventional products. It is expected that when organic paddy farmers have the direct access with the buyers, the market factor affects satisfaction. However, in Magelang context, the cooperatives played as the middlemen.

The second construct in the stimuli area was organisational support (OS), which exerted a positive and significant influence on PB (H2a), SAT (H2b), and PE (H2c). In Indonesia's organic agriculture, organisations provide training through extension officers, financial subsidies, and marketing facilities. Assistance from organisations such as the government, farmers' groups, or cooperatives enhances farmers' performance [171] including benefits such as production, income, and premium pricing. Organisational support is verified to improve farmers' satisfaction, with a medium effect, indicating the importance of organisations in shaping farmers' confirmation of their positive evaluation on organic paddy farming. Currently, the government facilitates training through extension officers while cooperatives purchase organic paddy from farmers and sell it to consumers. The relationship between OS and PE suggests that organisational support mitigates the stress associated with marketing complexity, thereby helping individuals overcome challenges in practising organic farming [172–174]. The findings also underscore the importance of the synergetic role of farmers and organisations within a comprehensive managerial model. Furthermore, aligning the understanding of government departments' and agencies' objectives regarding organic farming will inform relevant policies [5].

The subsequent findings from the stimuli element indicated that subjective norm (SN) affected SAT and PE (H3b, H3c), but did not affect PB (H3a). Positive relation between SN and SAT, indicating that meeting societal standards through the practice of organic farming increased the positive sentiment of farmers' evaluation toward organic paddy farming performance [175, 176]. In addition, the positive relationship between SN and

PE indicated that an individual's enjoyment was relatively dependent on their peers' decisions [177–179]. The presence of organic farmers in a village and the intensity of communication among them could enhance farmers' organic knowledge and management [180]. It was not a surprising result, as organic paddy farmers in Indonesia had a close relationship with other farmers within the farmer group. In organic farming, although the final decision to adopt organic paddy farming is personal, farmer group pressure is influential. Conversely, SN did not affect PB (H3a), as farmers assessed the advantages of organic farming based on their own experiences. It is anticipated that initially, peers and local leader may influence farmers; however, over time, they do not merely accept others' opinions without conducting their own evaluations [181–183]. Furthermore, perceived benefit is a cognitive belief that was influenced more by market factor. Further, the following decision about organic paddy farming as a voluntary action, appeared to be an individual choice, based on their personal evaluation of the benefits of organic paddy [23, 184]. Jermisittiparsert et al. [185] noted that the inconsistency in the relationship between subjective norm and perceived usefulness has been observed in numerous studies, attributed this to insufficient attention to the relationship, and implied that further research is invited to clarify the direction of the relationship.

In further observation, the relationship between perceived benefit (PB) and continuance intention (CI) was established (H5), indicating that both technical and economic productivity contributed to sustained commitment over time [158, 186]. Undeniably, the benefit stuck the adopter into a specific adopted innovation, ignoring the innovation's complexity [39]. The path also exhibited how the organism aspect affected the response under the SOR. In addition, this research revealed interactions among intra-organismal aspects. The result also emphasised that, under the SOR framework, an emotional relationship was possible within a human's psychological state [187–189]. Farmers who recognise the advantages of organic paddy farming are likely to experience higher levels of long-term contentment, as reflected in H4 [190, 191]. Additionally, as supported by previous literature, PE positively impacts SAT (H6), as noted by Akter et al. [99] and Pereira et al. [156]. The fun and philosophical match feeling of being organic paddy farmers seemed to fulfil their expected performance of organic paddy farming and organisations. In a broader context, hedonic enjoyment can extend to eudaimonia, which pertains to engaging in meaningful activities [13]; indeed, both hedonic and eudaimonic contributions contribute to satisfaction [192].

Furthermore, perceived enjoyment (PE), as a hedonic motivation, affected CI (H7) [131, 193, 194]. Having a fun activity that match with farmers' life philosophy seems to increase continuance intention. While perceived enjoyment is often found in gamification domain [130, 156, 195], perceived enjoyment in agricultural practice undeniably exists. Given their impact, perceived enjoyment exerts a medium influence on continuance intention, underscoring the importance of the hedonic motive in the post-adoption model of the agricultural domain. In contrast, SAT and PB yield a small effect. Venkatesh et al. [104] argued that the hedonic motive, particularly enjoyment, is a pivotal factor in shaping behavioural intention. The importance of hedonic incentives in continuance intention within the agriculture sector suggests the possibility of an alternate hedonic construct that provides comparable contributions. Finally, the satisfaction derived from organic paddy farming had a significant impact on the intention to retain in this practice (H8) with a small effect [34, 196, 197]. However, the relatively weak relationship between

SAT and PE can be strengthened by introducing a moderator [198, 199]. From the overall findings, things that should be emphasised are that all organism aspects are directly related to the response of continuance intention, proving that organism elements are indeed prominent in eliciting a response.

6.2 Moderation effect of environmental concern

The introduction of the moderator into the SOR framework in this research offers a new perspective on how to strengthen the relationship between the elements of organism and response. The study was supported by the literature, which revealed the needs of moderators in the relationship between SOR elements [200, 201]. The finding that environmental concern was a substantial moderator of the association between PE and CI (H9a) in Table 6 suggested that this association will be stronger in the context of environmental awareness [202, 203]. The unsupported result of a moderation effect of environmental concern in H9b and H9c indicates that the relationship between SAT-CI and PB-CI is stable under the SOR framework.

Figure 3 illustrates the moderating effect of environmental concern (EC) on the relationship between perceived enjoyment and continuance intention. The hedonic motif on perceived enjoyment is also anticipated to play a significant role in the utilisation of a utilitarian innovation, such as satisfaction [204]. The situation was supported by David et al. [18] who revealed that the psychological condition of farmers may be characterised by anxiety stemming from their farming workload. The initial relationship between PE and CI was positive, as indicated by the positive slope. The varying levels of environmental concern significantly influence the relationship between perceived enjoyment and the continuation of organic paddy farming. A greater focus on environmental concerns strengthened the relationship between perceived enjoyment and continuance intention. A heightened connection between environmental concern (EC) and perceived enjoyment (PE) was associated with a larger intention to continue. Brigance et al. [17] supported that becoming organic farmers is perceived as having greater value and prestige, which contributes to the intention to continue in this practice. Although the farmers' shifting attitude occurs [9], developing the environmental attitude is still the important variable to maintain organic paddy farming.

7 Conclusion and implications

7.1 Conclusion

Regarding this, in the DOI theory, the post-adoption stage still presents the possibility of stepping back from the adopted innovation. Prior research deployed the pre-acceptance model for post adoption model, however, an extended ECM-ECT was conceptualized under the SOR framework to analyse the determinants of continuance intention. Perceived enjoyment came as the meaningful construct in organic paddy continuance intention model emphasising that hedonic motive, which was previously popular around the information technology, was also present in agricultural domain. The findings underscored the inclusion of hedonic motive in continuance intention in agricultural domain is indeed relevant. Furthermore, a moderator namely environmental concern was confirmed to strengthen the relationship between perceived enjoyment and continuance intention. This insight highlighted that amidst the massive economic motive of being organic paddy farmers, environmental concern still performed. It was an important

note for the government to not only improving the economic situation of organic paddy farming but also developing the environmental awareness among farmers.

7.2 Implications

This study addressed a gap in the literature by constructing the framework to evaluate the post-adoption stage of organic paddy farming, a stage which was still limited investigated. Theoretically, this research contributes to advancing the appropriate use of continuance intention model in post-adoption using extended ECM-ECT under the conceptualization of SOR framework in agricultural domain. This extended continuance intention model under the SOR showed a good explanatory power compared to other models. The introduction satisfaction construct as the evaluator of organic farming performance distinguished properly the post-adoption model from the pre-acceptance model. This research also suggested the government to maintain the organic paddy farming using policies. In the short and medium term, strengthen the organisational involvement in organic farming practices, such as maintaining premium prices, providing subsidies for organic paddy practices, and providing organic certification financing, may increase farmers' satisfaction with practising organic paddy farming. In the long term, formulating the policy related to export market will potentially increase the market share of organic paddy farming. In practical, farmers' inclusion in the marketing process might improve their understanding of business conditions and engagement. Green farmers' acknowledgement is also a way to show the public the contribution of organic paddy farming to social aspects. Again, considering the farmers' enjoyment of what they are practising will be essential to improve the organic paddy continuance intention.

8 Limitations and future research

Intention research, while not a flawless predictor of actual behaviour, serves as a crucial initial framework for forecasting behaviour, as established by Fishbein and Ajzen [205]. On the other hand, the intention does not always correspond to the behaviour that really occurs. The researchers must meticulously differentiate between willingness or intention and actual behaviour [206]. In addition, the research focused on intention, which may lead to a discrepancy between intention and actual behaviour in practice. Including intrinsic motive [207] or integrating multidimensional factors such as the introduction of advance technology [110] in the model of continuance intention is predicted to narrow the gap; however, the necessity of investigating actual behaviour remains essential. The massive penetration of digital tool such as the use of mobile-based farm record that help the farmers to report their activities during the organic certification would be interesting antecedent for continuance intention. Furthermore, the availability of accessible agriculture precision product (e.g. nanobubble fertilizer incorporated with artificial intelligent to release the precise soil nutrition) is essential to be explored related to its impact toward organic paddy continuance intention. Longitudinal research on organic paddy farming to explore farmers actual behaviour is needed to address remaining gaps and to clarify their underlying drivers. In addition, because the data were collected from a single setting, namely Magelang Regency, caution is required when generalising the findings to other regions of Indonesia. Future studies should therefore replicate this analysis across diverse contexts and production environments. Nonetheless, the non-response bias assessment in this research suggests that the sample was broadly

representative of the target population. Furthermore, since this research relied on the quantitative method only, some insights might not be captured properly. It is recommended to use mixed method (qualitative-quantitative).

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Author contributions

A.N. preparing questionnaire, data collection and analysis, drafted the manuscript; N.M.N preparing questionnaire, directed the research, drafted the manuscript; N.H.K preparing questionnaire, drafted the manuscript; A.H.I.A.H preparing questionnaire, drafted the manuscript; I.I. data collection supervisory, drafted the questionnaire. All authors provided the feedback and critical comments to the manuscript.

Data availability

The datasets generated during and/or analysed during the current study are available from the corresponding author (NMN) upon reasonable request.

Declarations

Ethics approval

This study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of Universitas Gadjah Mada, Indonesia, under the number KE/UGM/024/EC/2025.

Consent to participate

Written informed consent was obtained from all subjects before the study.

Consent to publish

Not applicable.

Clinical trial number

Not applicable.

Competing interests

The authors declare no competing interests.

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