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Assessing technology readiness for digital financial reporting in green commodity MSMEs: evidence from madiun using TRI framework

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ABSTRACT

This study aims to analyze the level of technology adoption readiness in financial reporting among green commodity Micro, Small, and Medium Enterprises in the Madiun region. These enterprises, including essential oil producers and small-scale farmers, face a range of barriers to digital transformation, such as limited technological literacy, inadequate digital infrastructure, and organizational inertia. To address these challenges, a quantitative research design was employed using a structured questionnaire comprising 16 items adapted from the Technology Readiness Index (TRI). The four core dimensions-Optimism, Innovativeness, Discomfort, and Insecurity-served as the analytical framework for measuring individual readiness. A total of 43 respondents participated in the study, representing various actors in the green commodity value chain. The data were analyzed using multiple linear regression facilitated by SPSS software. Findings reveal that all four TRI dimensions significantly influence the readiness to adopt technology-based financial reporting systems. These results underscore the pivotal role of user perceptions and psychological readiness in the broader context of Micro, Small, and Medium Enterprises digitalization. The study contributes theoretically by expanding the discourse on technology adoption in rural and environmentally sustainable business contexts, and offers practical implications for local governments, NGOs, and development agencies. Specifically, the findings highlight the urgency of targeted interventions that enhance user readiness as a foundational step in enabling inclusive and effective digital transformation within green commodity sectors.

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1. INTRODUCTION

The global transition towards digitalization has penetrated almost all sectors, including agriculture and rural-based enterprises (Talukder et al., 2025). As countries strive to enhance productivity, sustainability, and competitiveness, the adoption of appropriate technologies has become a

fundamental requirement (Assaye et al., 2024). In the context of developing countries, particularly in rural areas, technology adoption is not merely a matter of availability but more about the readiness of the users to absorb and implement technological changes (Kumara et al., 2025). This is especially relevant for micro, small, and medium enterprises (MSMEs) engaged in green commodities-products that are environmentally friendly, sustainable, and hold strategic value in the global green economy (Gupta et al., 2022). Green commodities, such as patchouli and essential oil products, have become increasingly important in regions like Madiun, Indonesia. These commodities offer not only economic opportunities for smallholder farmers and Micro, Small, and Medium Enterprises but also environmental benefits, as they promote biodiversity and sustainable land use. Despite their potential, many green commodity producers in Madiun still rely on traditional methods of farming, processing, and marketing. The limited integration of digital technologies in these processes hinders scalability, efficiency, and access to broader markets.

Understanding technology adoption readiness is essential for developing targeted policies and interventions (Awa, 2016). Unlike general adoption models that focus on user behavior post-adoption, readiness assessments aim to evaluate preconditions-what makes individuals or organizations capable and willing to engage in technological transformation (Patil et al., 2024). A readiness index framework enables a structured analysis of multiple aspects of preparedness, such as individual mindset, financial capability, organizational infrastructure, and external support systems (Hasheem et al., 2022). Such an approach allows researchers and policymakers to pinpoint specific gaps and design tailored capacity-building programs (Lu & Liu, 2025).

The Readiness Index Framework adopted in this study builds upon previous models like the Technology Readiness Index (TRI) developed by Parasuraman (2000), which highlights psychological readiness through optimism, innovativeness, discomfort, and insecurity (Kaushik & Agrawal, 2021). However, for Micro, Small, and Medium Enterprises involved in green commodities, a more contextual and multidimensional framework is required-one that includes technical knowledge, digital access, business readiness, institutional environment, and market awareness (Tripathi & Gupta, 2021). The uniqueness of rural MSMEs lies in their intertwined relationship with local culture, resources, and informal networks, which must also be considered when assessing their readiness to adopt new technologies (Aba & Esztergár-Kiss, 2024). Several studies have emphasized the importance of digital transformation for agricultural development. Digital tools such as mobile apps for weather forecasting, e-commerce platforms for direct marketing, and traceability systems for organic certification have shown significant promise in improving the performance of green commodity chains. Nevertheless, the mere introduction of these technologies without assessing local readiness may lead to low adoption rates, wasted resources, and unsustainable implementation. Readiness assessment thus becomes a strategic step prior to any intervention or technological introduction (Herrera-Acevedo & Sierra-Porta, 2025).

Several prior studies have demonstrated that the key constructs within the Technology Readiness Index (TRI)—namely optimism, innovativeness, and insecurity-significantly influence technology adoption within organizational settings (Al-Shari & Lokhande, 2023). Optimism, which reflects a positive belief in the benefits of technology, and innovativeness, indicating a proactive attitude toward adopting new technologies, have consistently been identified as strong drivers of digital transformation in organizations (Aba & Esztergár-Kiss, 2024). Furthermore, while insecurity represents skepticism or distrust toward technology, some research has found that it can indirectly influence adoption decisions by prompting more cautious and deliberate evaluations of new systems. In certain contexts, this careful scrutiny can facilitate more thoughtful and structured technology adoption processes.

However, the variable discomfort has shown mixed or insignificant effects in several studies. Discomfort, defined as the perceived lack of control or feeling overwhelmed by technology, is often mitigated in organizational environments where training, technical support, and structured onboarding are present. As a result, its impact on actual technology adoption decisions tends to be minimal or statistically insignificant (Kaushik & Agrawal, 2021). Optimism, innovativeness, and insecurity have been widely recognized as influential factors in organizational technology adoption, discomfort does not consistently exhibit a significant effect-highlighting the role of contextual and institutional factors in moderating user readiness and experience (Damba et al., 2024; Liu et al., 2025).

In the case of Madiun, green commodity MSMEs face various challenges ranging from limited digital literacy and lack of financial resources to inadequate institutional support and weak infrastructure. Although national programs have sought to digitize agricultural value chains, local implementation often falls short due to insufficient groundwork in understanding local contexts. A systematic assessment of technology adoption readiness can help bridge this gap. This research aims to assess the level of readiness among green commodity MSMEs in Madiun using a modified Readiness Index Framework. The study will explore key readiness dimensions including technological knowledge, access to digital infrastructure, financial preparedness, organizational motivation, and external support mechanisms. By employing both quantitative data collection methods, this study seeks to provide a comprehensive understanding of the enabling and inhibiting factors affecting technology adoption in this sector.

The findings are expected to contribute to both theory and practice. Theoretically, this research enriches the literature on technology adoption in rural and green economic contexts by integrating behavioral and structural perspectives. Practically, the study offers evidence-based recommendations for local governments, NGOs, and development agencies to craft more effective programs aimed at accelerating digital transformation in green commodity enterprises. In conclusion, as Indonesia strives to develop sustainable agricultural models and promote inclusive digitalization, understanding the readiness of local MSMEs to adopt technology is no longer optional-it is a necessity. Through this study, we hope to shed light on how readiness assessments can serve as a foundation for meaningful technological change, particularly in environmentally sustainable sectors like green commodities.

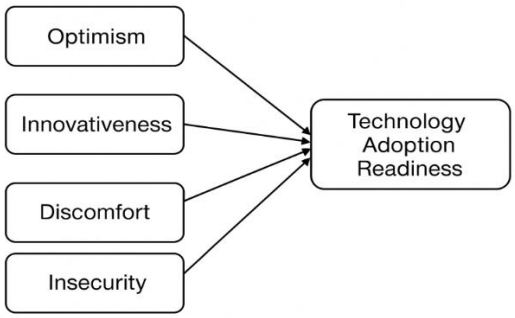

Figure 1. Conceptual Framework

2. METHOD

This study employs a quantitative approach using a survey design, in which data are collected from a sample drawn from a defined population. Primary data were gathered through questionnaires distributed to participants involved in green commodity activities in the Madiun region. The questionnaire was developed based on the Readiness Index Framework theory. The research subjects consisted of 43 members of farmer groups engaged in green commodity sectors. Data analysis techniques included validity and reliability tests to ensure the accuracy and consistency of the questionnaire indicators, and regression analysis. The final instrument comprised 16 questionnaire items Kaushik & Agrawal, (2021) which has been adapted to the research topic (Table 1).

Table 1 Questionnaire Readiness Index Framework

Indicator	Items
Optimism	OP1: I believe technology enhances the quality of financial reporting.
	OP2: Technology allows for greater flexibility and mobility in work.
	OP3: Using technology makes accounting tasks more efficient and innovative.
	OP4: Technology improves control and oversight in accounting processes.
Innovativeness	INN1: I actively seek to learn new technologies related to financial accounting.
	INN2: I usually adopt the latest accounting technologies before others do.
	INN3: I don't rely on others to help me understand new technologies for financial reporting.
	INN4: I consistently stay updated with the newest financial reporting technologies.
Discomfort	DIS1: Technical support for technology is often inadequate when I need help.
	DIS2: The support services provided for technology are not easy to use.

	DIS3: Technology tools feel unfamiliar and not aligned with traditional accounting work. DIS4: There is a lack of user-friendly guidance for preparing manual financial statements.
Insecurity	INS1: Accountants rely too heavily on financial reporting technologies. INS2: Excessive use of technology can distract accountants and negatively affect them. INS3: Technology reduces human interaction between accountants and stakeholders, weakening their communication abilities. INS4: Financial reporting technology feels unreliable and less trustworthy, especially since it can't be used offline.

3. RESULTS AND DISCUSSION

This study aims to examine technology adoption readiness in the green commodity sector through the lens of the Readiness Index Framework, utilizing quantitative data collected via a 16-item questionnaire. The analysis methods employed include validity testing, reliability testing, and multiple linear regression analysis. The results of the tests are presented as follows:

3.1 Validity test

To determine whether the research instrument meets the standards of validity, a validity test was conducted. In this study, Pearson's product-moment correlation technique was used at a 5% significance level. According to Ghozali (2015), an item is considered valid if the calculated correlation coefficient (r count) exceeds the critical value of the correlation table (r table). The results showed that all questionnaire items met the validity criteria, with r count values exceeding r table values at the 5% significance level. With 43 respondents, the r table value at the 5% level of significance is 0.2940. All calculated r values in this study exceeded 0.2940, indicating that all 16 questionnaire items are valid and meet the statistical validity requirements, as verified using SPSS software.

3.2 Reliability test

This study employed a reliability test using Cronbach's Alpha coefficient. The criterion for reliability is that the Alpha value should exceed 0.05. The results of the reliability test show that the Alpha value is 0.879, which is greater than 0.05, indicating that the questionnaire items used in this study are reliable and internally consistent. The results of the reliability test are presented in Table 3.1 as follows:

Table 2. Results of Cronbach's Alpha Reliability Test

Test	Value	Description
Cronbach's Alpha	0.879	Reliable

3.3 Multiple Linear Regression Test

Hypothesis testing in this study was performed using multiple linear regression analysis. Based on the regression results obtained from a sample of 43 respondents, the findings are presented as follows:

Table 3. Results of Multiple Linear Regression Analysis

Variable	t-Statistic	Prob.
OP1	0.67730	0.0279
OP2	-0.933342	0.0549
OP3	0.902636	0.0443
OP4	0.523948	0.0003
INN1	-0.337774	0.0025
INN2	0.1352388	0.0953
INN3	0.143633	0.0000
INN4	-1.264136	0.0001
DIS1	2.573993	0.0140
DIS2	-0.079767	0.9446
DIS3	1.657429	0.0033
DIS4	-0.799370	0.0287
INS1	-1.074672	0.0082
INS2	-2.172193	0.0383
INS3	1.891029	0.0463

INS4	0.987730	0.0005
C	2.191792	0.0402
R-squared		0.845023
Adjusted R-squared		0.780450
F-statistic		10.12615
Prob(F-statistic)		0.000000

This study aimed to examine the influence of the four dimensions of the Technology Readiness Index (TRI)-namely Optimism, Innovativeness, Discomfort, and Insecurity-on the readiness of green commodity MSMEs in Madiun to adopt digital financial reporting technologies. The results of the multiple linear regression analysis demonstrate that the overall model is statistically significant, with an R-squared value of 0.845 and a probability of the F-statistic equal to 0.000, indicating that approximately 84.5% of the variation in technology adoption readiness can be explained by the TRI dimensions. This highlights the substantial role of psychological factors in supporting the success of digital transformation efforts within green-oriented MSMEs.

The optimism dimension generally shows a positive contribution to readiness. This finding is consistent with previous research Kaushik & Agrawal, (2021) which suggests that optimism significantly influences an organization's readiness to adopt technology. Three of its four indicators (OP1, OP3, and OP4) have statistically significant positive effects ($p < 0.05$), suggesting that all of optimism positive beliefs about the usefulness of technology-such as increased efficiency or productivity-enhance MSMEs' readiness to adopt digital solutions. Interestingly, OP2 exhibits a negative, marginally significant effect, possibly reflecting latent doubts or uncertainties among some respondents.

The innovativeness dimension presents mixed results. This finding is consistent with previous research Damba et al., (2024) which suggests that innovativeness significantly influences an organization's readiness to adopt technology. While INN3 significantly and positively affects readiness-indicating that individuals who are confident in trying new technologies are more prepared to adopt them-both INN1 and INN4 have significant negative effects. This suggests that a willingness to innovate does not always translate into actual adoption readiness, particularly if it is not supported by appropriate capabilities or organizational resources.

The discomfort dimension, several indicators demonstrate that negative perceptions about technology complexity can act as a barrier to adoption. Discomfort variables DIS1, DIS3, and DIS4 all show significant negative effects, indicating that feelings of anxiety or incompetence when using digital tools can lower an MSME’s level of readiness. DIS2 is statistically insignificant, implying that not all discomfort-related concerns are uniformly experienced across respondents. This finding is consistent with previous Shonhe, (2025) research which suggests that discomfort significantly influences an organization's readiness to adopt technology.

Regarding Insecurity, the findings are nuanced. This finding is consistent with previous Kaushik & Agrawal, (2021) research which suggests that discomfort significantly influences an organization's readiness to adopt technology. Indicators INS1 and INS2 have significant negative effects, revealing that trust-related concerns-such as doubts about system reliability or data security-still hinder technology acceptance (Kumara et al., 2025). However, INS3 and INS4 show significant positive effects, suggesting that in certain contexts, users may develop greater trust in technology over time, particularly when they receive adequate training or have positive usage experiences (Gupta et al., 2022).

Overall, these findings reinforce the notion that technology adoption readiness is not solely determined by infrastructure or financial capacity, but is deeply influenced by user perceptions, attitudes, and emotional responses. Therefore, efforts to promote digital transformation among green commodity MSMEs must go beyond technical interventions. Programs should incorporate behavioral support mechanisms such as digital literacy training, confidence-building strategies, trust-enhancing communication, and continuous technical assistance. Such efforts are essential for fostering an inclusive and sustainable technology adoption ecosystem, especially in environmentally driven sectors at the local level.

4. CONCLUSION

The multiple linear regression analysis reveals that the Technology Readiness Index dimensions-Optimism (OP), Innovativeness (INN), Discomfort (DIS), and Insecurity (INS)-have varying degrees of influence on the readiness of green commodity MSMEs in Madiun to adopt digital financial reporting technologies. The overall model demonstrates a strong explanatory power, with an R-squared of 0.845 and a statistically significant F-statistic ($p < 0.001$), indicating that the model accounts for approximately 84.5% of the variance in technology adoption readiness. Specifically, several individual indicators within each dimension show statistically significant effects ($p < 0.05$). For instance, OP1, OP3, and OP4 positively contribute to readiness, while OP2 displays a slightly negative yet marginally significant effect. Within the Innovativeness dimension, INN3 positively and significantly affects readiness, while INN1 and INN4 have significant negative coefficients, suggesting potential resistance or overconfidence-related drawbacks.

Discomfort category, DIS1 and DIS3 show a strong negative correlation with adoption readiness, indicating that feelings of unease and complexity reduce technological engagement, whereas DIS4 has a significantly negative impact. For Insecurity, INS1, INS2, and INS3 all exhibit statistically significant influence, with both negative and positive directions, reflecting nuanced user concerns over trust and reliability of technology. These findings emphasize the importance of addressing not only infrastructural and access-related issues but also user perceptions and emotional responses to technology. Enhancing optimism and innovativeness, while reducing discomfort and insecurity, are key to fostering greater readiness for digital transformation. As such, policy interventions and training programs tailored to the psychological readiness of MSME actors will be critical for successful and inclusive technology adoption in the green commodity sector.

This study has several limitations that should be acknowledged. First, the research is limited to green commodity MSMEs located in the Madiun region, which may not fully represent MSMEs in other regions with different characteristics or levels of technological infrastructure. Second, the use of a cross-sectional survey restricts the ability to observe changes in technology readiness over time. Third, the study primarily relies on self-reported data, which may be subject to social desirability bias or misreporting. Finally, the study only adopts the Technology Readiness Index (TRI) framework, which may not capture organizational or environmental factors influencing technology adoption. Future research could expand the geographical scope to include MSMEs in other regions or provinces, enabling comparative studies and generalization of findings. Longitudinal research is also recommended to observe shifts in technology readiness over time. Additionally, incorporating other theoretical models, such as the Technology-Organization-Environment (TOE) framework or Unified Theory of Acceptance and Use of Technology (UTAUT), may provide a more holistic understanding of adoption behavior. Future studies could also explore the role of financial literacy, government support, or digital training programs in enhancing readiness for digital financial reporting among MSMEs.

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