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RESEARCH PAPER

Technology Adoption in Home Industry

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ABSTRACT

This study aims to analyze the Technology Acceptance Model, which describes home industries' usage behavior of computer machine embroidery as outcomes predicted by perceived ease of use and usefulness. In several countries, home industries that accept technology well contribute to better management in achieving organizational goals. This study used primary data collected from the household embroidery industry in Indonesia through the distribution of one hundred and sixty-eight questionnaires. The collected data were analyzed using path analysis techniques to describe and test models of direct and indirect relationships between research accepting technology well and intervention by behavioral intentions. The study results show that computer self-efficacy as an external variable influenced the perceived ease of using machine embroidery computers in the home industry in Indonesia. The behavior of acceptance and use of machine embroidery computers as a technology to improve the production process is by the extension of the Technology acceptance Model (TAM3) theory. For future research, the research model that has passed the test can be applied in different industrial sectors.

KEYWORDS: *Behavioral intention; Perceived ease of use; Perceived usefulness; TAM3; Usage behavior.*

1. Introduction

User's acceptance and use of technology bring immediate and long-term benefits through increased performance, financial efficiency, time, and convenience. The concept of usage intention discusses the level and method of users in utilizing technology. The process underlying technology acceptance, behavior prediction, and the successful application of technology is the primary goal of the TAM (Technology Acceptance Model). TAM postulates that user behavioral intention has predicted technology acceptance, which in turn is determined by the perceived usefulness of technology in performing tasks and perceived ease of use[1]. The TAM3 theory extension explains that technology acceptance in individuals is controlled by behavioral intention, perceived usefulness, perceived ease of use, and other external predictors[2].

External variables, assumed as predictors of perceived ease of use and perceived usefulness of financial technology of Indonesian SMEs in previous studies, are the education level of entrepreneurs, company age, and company size[3]. The average educational level of business owners who accept and use technology is high school. The average age of companies ready to take and use technology is one to two years. The average company size that is ready to accept and use technology has a maximum asset value of twenty million rupiahs. Based on the results of data analysis, external variables only affect perceived usefulness. Therefore, this research aims at testing other external variables as predictors of perceived ease of use in the TAM3 theory extension. Computer self-efficacy is the external variable[4]. Computer self-efficacy refers to the degree to which an individual believes he can do a particular job or use a computer.

From Table 1, the most significant number of micro, small, and medium enterprises in Indonesia that adopt technology is the embroidery home industry. The technology used

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in the embroidery home industry is computer machine embroidery. The home industry is a type of small-scale business activity with the characteristics of products that are not easily changed. Home industries in several countries, such as Indonesia, help boost the country's economy. During the Covid-19 pandemic, consumer anxiety for basic needs was significantly stronger for domestic products[5].

Tab. 1. Technology adoption in indonesian[6].

No	Home Industry	Unit
1	Embroidery	2.806
2	Processed foods	2.117
3	Woodcrafts	598
4	Metal processing	323
5	Nonmetallic excavations	885

Table 1 shows that there have been changes in consumers' mindsets and lifestyles in using domestic products. Consequently, home industries must utilize technology to make the production process faster and easier to meet consumer demand. The use of technology is a significant factor for home industries in solving these demands[7]. The use of technology is the most optimal resource for the production process[8]. Not only affecting the production process but technology adoption in home industries can also affect production organization, production techniques, and workforce reduction[9],[10].

2. Literature Review

2.1. Technology acceptance model 3 (TAM3)

The Technology Acceptance Model is generic and has been used to study a variety of technology acceptance. TAM3 has significantly proven to explain the use and intention of information systems[2]. Information systems are a resource optimally used in the production process to improve production results[11]. Figure 1 is a research model used by the researchers to describe external variables as predictors of technology use behavior.

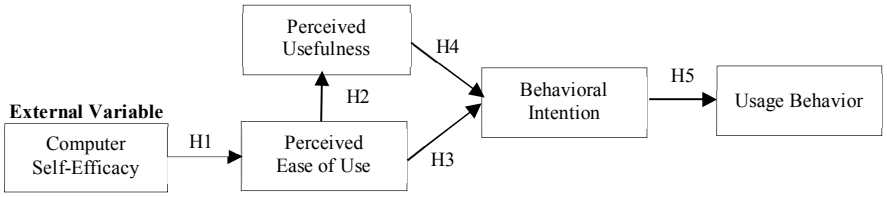

Fig. 1. TAM3 of home industry on machine embroidery computer hypothesized model[2],[3],[4],[12].

2.2. Computer self-efficacy

Computer self-efficacy is the individual confidence level in their ability to perform specific tasks or jobs using computer devices[13]. Therefore, individuals who feel they can use computer technology will be more likely to use the system. In this study, computer self-efficacy refers to a company owner's belief about his ability to use machine embroidery computers provided by home industries. In previous research, computer self-efficacy affected perceived ease of use by 50.1%[4]. Based on these arguments, the authors propose the research hypothesis as follows:

H1: Computer self-efficacy influences the perceived ease of use of machine embroidery computers.

The indicators used to measure computer self-efficacy as a research variable are a magnitude, strength, dan generalizability[14]. Magnitude refers to a person's capability in correctly using computers, while strength relates to confidence in the ability of the individual to perform computerized. Generalizability refers to the ability to use different software packages and systems for individuals use.

2.3. Perceived ease of use and perceived usefulness

Perceived ease of use is the degree to which a person believes that using a particular system would be free of effort[15]. Perceived ease of use can be explained by one's viewpoints of a smaller amount of effort needed when operating a particular system. In this study, perceived ease of use is the owner's acceptance of a production

system which the ease of use of a machine embroidery computer can measure. The indicator used to measure perceived ease of use as a research variable is the ease of study, work on the desired job with ease, ease of increasing user skills, and ease to use or operation[16]. In previous research, perceived ease of use affected perceived usefulness by 32%[3]. Based on these arguments, the researchers proposed the research hypothesis as follows:

H2: Perceived ease of use influences the perceived usefulness of machine embroidery computers.

Perceived usefulness is the degree to which a person believes using a particular system would enhance job performance[2]. Perceived usefulness is the extent to which a person believes using information technology will improve their job performance. In this study, perceived usefulness is the acceptance of a company owner towards a production system that a machine embroidery computer can measure. If positioned as a research variable, perceived usefulness can be measured by making the job easier and more helpful, increasing productivity, improving effectivity, and developing job performance[16]. In addition to influencing perceived usefulness, perceived ease of use affects behavioral intention by 40.2%[12]. Based on these arguments, the researchers proposed the research hypothesis as follows:

H3: Perceived ease of use influences the behavioral intention of machine embroidery computers.

2.4. Behavioral intention and usage behavior

Behavioral intention refers to a person's subjective probability that he will perform some behavior[17]. In this study, behavioral intention is the intention of the company owner to use a machine embroidery computer. As a research variable, behavioral intention can be measured using indicators of desire to use, always try to use, and sustainable use in the future[17]. In previous studies, behavioral intention was influenced by perceived usefulness by 59.1%[4]. Based on these arguments, the researchers proposed the research hypothesis as follows:

H4: Perceived usefulness influences the behavioral intention of machine embroidery computers.

In the TAM3 theory extension, usage behavior is the dependent variable with a predictor of behavioral intention[2]. In this study, usage behavior is company owners' use of machine embroidery computers. Theoretically, usage behavior is the actual use of the system or technology[18]. Then, indicators used to measure user behavior are the frequency of technology use, the tendency to use technology as long as needed, the habit of using technology, and involvement[17]. Based on these arguments, the authors propose the research hypothesis as follows:

H5: Behavioral intention influences the usage behavior of machine embroidery computers.

3. Methodology/Materials

This research was a causal study at a 95% confidence interval. This design allows researchers to collect data and build data structures to understand the causation of research variables[19]. Causal research aims to: 1) understand the independent and dependent variables, 2) determine the nature of the relationship between variables, and 3) test the hypothesis of a causal relationship between variables.

A causal research design uses a survey to collect data from the sample through a questionnaire consisting of structured questions[19]. The questionnaire, as data collection, provides a series of questions or written statements for respondents to answer. The questionnaire as the instrument used was distributed to respondents via email as many as five hundred respondents, but one hundred and sixty-eight respondents returned. This number still meets the criteria of respondents in quantitative research with a range of thirty to five hundred[20]. The population in this study were the owners of the embroidery home industry in Indonesia, with specific criteria: 1) the company's business is a maximum of two years, and 2) using a machine embroidery computer.

Data analysis techniques in this quantitative research used statistical analysis. Verifiable data analysis was used to test hypotheses and focused on disclosing the behavior of research variables. The data analysis technique used to determine correlative relationships in this study was path analysis to provide an analysis of the main objective of estimating the direct and indirect effects of external variables on the behavior of using a machine embroidery computer. The program used to perform path analysis was SmartPLS 3.2.9. The measurement scale used was the interval, enabling researchers to perform arithmetic calculations on data collected from respondents[19]. The measurement had no real zero value. The attitude measure commonly used in business research is the Likert scale. The Likert scale is a scale that requires respondents to

provide responses to what extent they agree or disagree with an object that is perceived, namely strongly agree, agree, neutral, disagree, and strongly disagree.

4. Results and Findings

An indicator is valid if it has a loading factor above 0.5 against the intended constructs[21]. All the indicators have loading factor values above 0.5. Therefore, the indicators used in this study are valid or have met convergence validity. Furthermore, the reflective indicators also needed to be tested by cross-loading discriminant validity, with the following results:

Tab. 2. Loading factor

	Usage Behavior	Computer Self-Efficacy	Perceived ease of use	Perceived usefulness	Behavioral Intention
UB1	0,783	0,652	0,689	0,686	0,656
UB2	0,772	0,776	0,650	0,681	0,643
UB3	0,771	0,784	0,773	0,769	0,657
UB4	0,653	0,774	0,770	0,761	0,668
CSE1	0,683	0,670	0,775	0,748	0,621
CSE2	0,653	0,670	0,765	0,774	0,807
CSE3	0,671	0,660	0,685	0,754	0,807
PEOU1	0,647	0,641	0,675	0,795	0,894
PEOU2	0,661	0,794	0,681	0,688	0,883
PEOU3	0,660	0,661	0,687	0,638	0,882
PEOU4	0,673	0,791	0,665	0,628	0,764
PU1	0,656	0,666	0,683	0,629	0,794
PU2	0,685	0,664	0,684	0,634	0,764
PU3	0,682	0,653	0,701	0,644	0,782
PU4	0,652	0,662	0,673	0,621	0,758
PU5	0,652	0,668	0,678	0,650	0,772
BI1	0,657	0,671	0,794	0,635	0,771
BI2	0,662	0,652	0,797	0,664	0,784
BI3	0,668	0,679	0,793	0,661	0,767

Source: Processed Data

An indicator is valid if it contains the highest loading factor of the targeted construct loading factors compared to other constructs. Discriminant validity evaluation was conducted in two stages, obtaining the value of cross-loadings and comparing the value of the square of the correlation and the AVE construct value or construct correlated is higher with its construct compared to other constructs. The cross-loading output is shown in Table 2, in which the loading factor of each indicator for the construct is higher than others. Another method to perform discriminant validity was to observe the value of the square root of the AVE to the recommended values above 0.5. Table 3 shows the study AVE values.

Tab. 3. Reliability and validity

	Cronbach's Alpha	rho_A	Composite Reliability	AVE
Usage Behavior	0,752	0,753	0,805	0,674
Computer Self-Efficacy	0,756	0,756	0,808	0,689
Perceived Ease of Use	0,894	0,894	0,822	0,667
Perceived Usefulness	0,819	0,819	0,839	0,646
Behavioral Intention	0,702	0,702	0,804	0,732

Source: Processed Data

Table 3 shows that the AVE value of all the variables was above 0.5, with the lowest value of 0,646 for the perceived usefulness construct. Reliability testing was conducted to obtain the value of the block of composite reliability indicators measuring the construct. Composite reliability results are pretty reliable if their value is above 0.3, but these will be more satisfactory if

they exceed 0.7. Furthermore, reliability testing was confirmed by Cronbach's Alpha. The resulting output values were above 0.3, so they were reliable. In this study, all the constructs had Cronbach's Alpha and composite reliability values above 0.7, meaning they were reliable.

Five direct hypotheses were developed to test the significance level. SmartPLS 3.2.9 bootstrapping function is used to generate the t-statistic for all paths. Based on the evaluation of the path coefficient as shown in Table 4, the relationship found was t-values $\geq$ 1.96, hence significant at 0.05 level of significance.

Tab. 4. Path coefficient (mean, STDEV, t-statistics, p-value)

	Original Sample	Mean	STDEV	T Statistics	P Value
CSE -> PEOU	0,401	0,388	0,023	13,771	0,000
PEOU -> PU	0,277	0,289	0,022	10,807	0,000
PEOU -> BI	0,227	0,227	0,032	6,813	0,000
PU -> BI	0,260	0,261	0,024	9,492	0,000
BI -> UB	0,480	0,489	0,032	12,696	0,000

Source: Processed Data

The structural model assessed the relationship between the independent and dependent variables according to this analysis's measurement model and validity (Table 4). It confirmed that computer self-efficacy influenced the perceived ease of use of machine embroidery computers (T-Statistics = 13.771, P-Value = 0.000). Thus, H1 was supported. Home industry owners must be confident in using machine embroidery computers. In this study, computer self-efficacy is a company owner's belief about his ability to use machine embroidery computers provided by home industries. Although the effect of computer self-efficacy is lower on perceived ease of use in this industry, the data show similarities with previous TAM3 theory extension research[4] .

This study confirmed that perceived ease of use influences the usefulness of machine embroidery computers (T-Statistics = 10.807, P-Value = 0.000). Thus, H2 was supported. Home industry owners accept machine embroidery computers as technology to facilitate embroidery production. Although the effect of perceived usefulness is lower in this industry, the data show similarities with the results of previous TAM3 theory extension studies[3]. This study confirmed that perceived ease of use influenced behavioral intention to use machine embroidery computers (T-Statistics = 6.813, P-Value = 0.000). Thus, H3 was supported. Home industry owners positively perceive the ease of the production process due to using machine embroidery computers. Even though the behavioral intention is lower in this technology, the data show similarities with the results of previous TAM3 theory extension studies[12]. This study confirmed that perceived usefulness influenced behavioral intention to use machine embroidery computers (T-Statistics = 9.492, P-Value = 0.000). Thus, H4 was supported. Home industry owners positively perceive the usefulness of the production process due to the use of machine embroidery computers. Even though the behavioral intention is lower in this technology, the data show similarities with the results of previous TAM3 theory extension studies[4]. This study confirmed that perceived usefulness influenced behavioral intention to use machine embroidery computers (T-Statistics = 9.492, P-Value = 0.000). Thus, H4 is supported. Home industry owners positively perceive the usefulness of the production process due to the use of machine embroidery computers. Even though the behavioral intention is lower in this technology, the data show similarities with the results of previous TAM3 theory extension studies[19]. This study confirmed the behavioral intention to use machine embroidery computers (T-Statistics = 12.696, P-Value = 0.000). Thus, H5 is supported. Home industry owners in Indonesia have accepted and used machine embroidery computers to improve the quality of their production processes. The data show similarities with the results of previous TAM3 theory extension studies[18].

5. Conclusion

The acceptance and use of machine embroidery technology in home industries in Indonesia by business owners have shown an increase in the quality and quantity of the production process. Home industries that use machine embroidery computers can meet annual production targets to meet market demand. The total score of the business owner's computer self-efficacy was 715. This result illustrates the production process's magnitude, strength, and generalizability. Individuals with high self-efficacy will see themselves accomplishing complex tasks.

In contrast, those with low self-efficacy will see themselves as only able to execute simple forms of the behavior. Not only would individuals with high computer self-efficacy perceive themselves as able to accomplish more complex tasks (high magnitude), but they would display greater confidence about their ability to perform each of those behaviors successfully. Individuals with high computer self-efficacy generalizability would expect to use different software packages and computer systems competently. In contrast, those with low computer self-efficacy generalizability would perceive their capabilities as limited to software packages or computer systems.

Perceived usefulness obtained an average score of 826 points, including in the excellent category. This result shows that business owners consider that using machine embroidery computers provides tremendous benefits in the production process. The research results found the lowest statement, namely "Procurement of machine embroidery computers requires a considerable cost," of 819 points. It indicates that using a machine embroidery computer requires quite a large amount of capital because the price of the machine is relatively high, making business owners try harder to be able to obtain and use this technology. Perceived ease of use earned an average of 825 points, including the excellent category. It shows that the respondent's assessment of the use of machine embroidery computers is excellent. Business owners consider machine embroidery computers are beneficial to support the production process. The lowest score was "Machine embroidery computer technology is easy to apply or use by anyone," which was 818 points. This result indicates that only individuals who have studied this technology can operate a machine embroidery computer. Behavioral intention to use machine embroidery computers obtained an average score of 826 points, including in the excellent category. The lowest statement is "Interested in finding more information about machine embroidery computers," which earned 824 points. This response indicates that respondents have an open strategy and accept the existence of machine embroidery computers. In this case, the business owner assesses the importance of using the machine to find information regarding this matter, which in the end, the business owner evaluates and thinks that supporting the business needs the computer machine.

Overall, the level of usage behavior of machine embroidery computers in the household industry in Indonesia was still at a lower level when compared to the level of acceptance and use of technology by other industries. Computer self-efficacy requires integration with technical skills in traditional machine embroidery. Even though they can operate computers in general, individuals are not necessarily able to use machine embroidery computers. Thus, the authors suggest conducting further research to analyze differences in the usage behavior of computer-based production machines in various industries.

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