

# A Research of Technology Adoption in Small and Medium-sized Enterprises in Yogyakarta

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**Abstract**—This study compares the impact of different size of SMEs and the age of SMEs on the technology adoption. This survey was conducted on the use of IT in SMEs in Yogyakarta, Indonesia. As a developing country, most of the Indonesian economy is dominated by SMEs. One factor that plays an important role in increasing the competitiveness of SMEs is information technology (IT) adoption. However, not all SMEs have similarities in their efforts to adopt IT. The theory underlying the process of adopting information technology is the Technology Acceptance Model (TAM). TAM have 3 main variables. There are Perceived Ease of Use, Perceived usefulness and Acceptance of IT. In this study analyzed differences in IT adoption based on the age of SMEs and the SME category (micro, small and medium). This study also examined differences based on competitive advantage. The results show that there are no significant differences in IT acceptance based on the age of SMEs and they have similarities in competitive advantage. The results of this study provide benefits for SMEs to evaluate their adoption of technology. In addition, this research is also beneficial for the government to develop SMEs in the region. **Keywords:** Adoption of IT, TAM, Competitive advantage, SMEs.

**Index Terms**—Adoption of IT, Competitive advantage, SMEs, TAM

## I. INTRODUCTION

The development of SMEs in Indonesia has recently increased sharply. This indicates the welfare of the community and the sustainability of the economy. SMEs contribute greatly to the country's economy. This development occurs in almost all regions in Indonesia. Especially in Yogyakarta which has a very rapid development of SMEs.

Based on data presented by the Central Bureau of Statistics (BPS), 90% - 95% of companies in Indonesia are classified as SMEs. The statistical information shows that Indonesian economy is supported by the existence of SMEs' activity (Nugrohoet.al, 2017). According to data released by McKensey and Company, a global management consulting agency in Indonesia, Indonesia's economy will be boosted by 10% through digital activities in 2025. Through a digital technology approach, the country has the opportunity to create 3.7 million new jobs, including job matching schemes and labor demand through online based platforms. Therefore, the government encourages the SMEs sector to use digital platforms in their business processes. However, not all SMEs immediately follow up on this. New emerging SMEs are usually dominated by young people who are very familiar with the digital world. Even since its inception, they

have used digital technology. While SMEs that have long been established are usually owned by old people who are not familiar with technology so they do not directly adopt the technology.

ICTs adoption by SMEs is influenced by many factors which have compelled SMEs to adopt ICTs for survival growth, sustainability and competitiveness (Ongori & Migiro, 2011). There are size, age of SMEs, the kind of business etc. So, in this study there will be a different test analysis of SMEs in adopting IT based on the size and age of SMEs. The study conducted by Sharma and Bhagwat, (2006) demonstrated that the flow of information in an organisation is the backbone of any business operational unit irrespective of its size. In addition, size of business is a matter that needs to be considered.

The variables used in this study refer to the TAM theory proposed by Davis (1989) which consists of perceived ease of use, perceived usefulness and IT acceptance. Besides that, it also added competitive advantage variables to understand their perceptions of IT adoption for competition.

## II. LITERATUR REVIEW

### A. Perceived Ease of Use

Perceived ease of use refer to the degree to which a person believes that using a particular system would be free of effort (Davis, 1989). An application perceived to be easier to use than another is more likely to be accepted by users.

### B. Perceived Usefulness

Perceived usefulness is defined here as the degree to which a person believes that using a particular system would enhance his or her job performance (Davis, 1989). Based on these definitions, it can be interpreted that the benefits of using computers can improve performance, as well as the work performance of people who use it.

### C. IT Acceptance

Pebruati et al. (2013) stated that individually and collectively the use of revenue can be explained from the variation in the use of a system because it is believed that the use of an IT-based system can develop individual performance or organizational performance.

### D. Competitive Advantage

The concept of competitive advantage lies at the heart of understanding a firm's performance in competitive markets; above average performance in the long-run can only be generated by creating a sustainable competitive advantage (Porter, 2004).

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III. RESEARCH METHOD

A. Data collection and Sampling

The questionnaire was distributed directly to 116 SME owners in Yogyakarta to get their response regarding IT adoption in their business. The data used is primary data. SMEs in this research will be categorized into micro, small and medium based on their assets and annual sales. The SME category is based on criteria in accordance with Indonesian Law No. 20 Year 2008. Micro businesses have a net asset of less than 50 million - and annual sales are less than 300 million years. Small businesses have net assets of more than 50 million and annual sales between 300 million - 2.5 billion per year, and medium businesses have net assets of 500 million - 10 billion / year and annual sales of 2.5 billion - 50 billion / year.

B. Variable Measurements

Perceived ease of use is measured through indicators, [1] ease to learn, [2] controllable, [3] clear and understable, [4] flexible, [5] improved skills, and [5]easy to use.

Perceived usefulness can be measured through indicators [1] work becomes faster, [2] useful, [3] increases productivity, [4] increases effectiveness, and [5] improves performance. Indicator of perceived ease of use and perceived usefulness modified from Davis (1989).

According to Natalia (2014), IT acceptance is measured by indicators [1] user satisfaction, [2] usability of the system and [3] intensity of use.

The perceived competitive advantage after the use of IT in UKM is measured through indicators [1] timeliness, [2] price, [3] product innovation, [4] quality, [5] time to market. This indicator is modified from the indicators used by Oktavia (2014)

C. Data Analysis Method

Before conducting the compare means test, the data distribution was tested first with the Kolmogorov Smirnov test to determine the right tool. The size and the age of business were investigated using the Kruskal Wallis Test

IV. DATA ANALYSIS AND RESULTS

A. Demographics of the respondents

The demographic of respondents will describe below.

Table 1 Demographic of Respondents

Item	Frequency	Percent
<b>Gender</b>		
Male	61	52.6
Female	55	47.4
<b>Total</b>	<b>116</b>	<b>100</b>
<b>Age</b>		
21 – 30 years	18	15.5
31 – 40 years	35	30.2
Over 40 years	63	54.3
<b>Total</b>	<b>116</b>	<b>100</b>
<b>Education Level</b>		
Elementary School	2	1.7
Junior High School	13	11.2
Senior High School	51	44
Diploma	2	1.7
Undergraduate	27	23.3
Graduate	3	2.6
Unknown	18	15.5
<b>Total</b>	<b>116</b>	<b>100</b>

Based on the respondents' demographics, it can be seen that the majority of SMEs are male, over 40 years old with senior high school education.

B. SMEs profile

SMEs are categorized into micro, small and medium. SMEs will also be characterized based on the age of their business. The profile of SMEs is presented in Table 2.

Table 2 SMEs Profile

Item	Frequency	Percent
<b>Size of SMEs</b>		
Micro	74	63.8
Small	39	33.6
Medium	3	2.6
<b>Total</b>	<b>116</b>	<b>100</b>
<b>Age of SMEs</b>		
0 – 5 years	35	30.2
6 – 10 years	49	42.2
11 – 15 years	21	18.1
16 -20 years	10	8.6
Over 20 years	1	0.9
<b>Total</b>	<b>116</b>	<b>100</b>

C. Validity and Reliability Testing

This study uses Product Moment Pearson to test item validity and Cronbach alpha to test the reliability of the items. Based on the validity test it is known that ACC3 is the only item that does not meet the requirements. ACC3 is an indicator of acceptance of IT. This item measure IT usage on every working day. Therefore ACC3 was excluded from the analysis. Thus all items used in this study have met validity and reliability test.

D. Descriptive Statistic of Variables

Before presenting the descriptive statistics, a table of mean and category will be displayed in the table below.

Table 3 Mean and Category

Mean	Category
1.0 – 1.79	Very low
1.8 – 2.59	Low
2.6 – 3.39	Medium
3.4 – 4.19	High
4.2 – 5.00	Very high

Table 4 will present descriptive statistics based on the variables in TAM and competitive advantage. Based on the Table 4, almost all indicators are in the high category except CA3 which is in the medium category. CA3 is CA3 stating that by using IT, product innovation can be done. This result shows that IT adoption by SMEs has not been used for strategic purposes, but is only used for administrative purposes.

**Table 4 Descriptive Statistic of Variables**

Variable	Mean	Category
PEOU1	3.67	High
PEOU2	3.71	High
PEOU3	3.62	High
PEOU4	3.61	High
PEOU5	3.57	High
PEOU6	3.61	High
<b>Grand Mean</b>	<b>3.63</b>	<b>High</b>
PU1	4.03	High
PU2	4.10	High
PU3	4.07	High
PU4	4.00	High
PU5	3.90	High
<b>Grand Mean</b>	<b>4.00</b>	<b>High</b>
ACC1	3.66	High
ACC2	4.18	High
<b>Grand Mean</b>	<b>3.92</b>	<b>High</b>
CA1	3.47	High
CA2	3.41	High
CA3	3.34	Medium
CA4	3.73	High
<b>Grand Mean</b>	<b>3.49</b>	<b>High</b>

**E. Prerequisite Test**

Before conducting compare means test, it's necessary to having prerequisite test to evaluate data distribution using normality test. The test used is Kolmogorov-Smirnov value. Following are the results of the Kolmogorov-Smirnov test.

**Table 5 Kolmogorov-Smirnov Test**

Hypothesis Test Summary			
Null Hypothesis	Test	Sig.	Decision
1 The distribution of PEOU is normal with mean 21,793 and standard deviation 2,70.	One-Sample Kolmogorov-Smirnov Test	,000 <sup>1</sup>	Reject the null hypothesis.
2 The distribution of PU is normal with mean 20,191 and standard deviation 1,46.	One-Sample Kolmogorov-Smirnov Test	,000 <sup>1</sup>	Reject the null hypothesis.
3 The distribution of ACC is normal with mean 7,853 and standard deviation 1,05.	One-Sample Kolmogorov-Smirnov Test	,000 <sup>1</sup>	Reject the null hypothesis.
4 The distribution of CA is normal with mean 13,922 and standard deviation 2,17.	One-Sample Kolmogorov-Smirnov Test	,000 <sup>1</sup>	Reject the null hypothesis.

Asymptotic significances are displayed. The significance level is ,05.

These results indicate that the data is abnormally distributed, so that the compare mean test used is the Kruskal Wallis test.

**F. Kruskal Wallis Test.**

The following are the compare mean test results based on the size and age of the SMEs with the Kruskal Wallis test.

The results show that size is not a determinant of IT adoption. No matter size of the SMEs, they have the same perception in ease of use, usefulness, IT acceptance and competitive advantage. This breaks the assumption that the larger the size of the company, the greater the level of IT adoption. The rapid development of IT in all fields makes IT a necessity for all businesses, even for small-scale

businesses. Almost all business processes are supported with IT that provides various benefits and conveniences.

**Table 6 Kruskal Wallis Test Result based on Size**

Hypothesis Test Summary			
Null Hypothesis	Test	Sig.	Decision
1 The distribution of PEOU is the same across categories of Size.	Independent-Samples Kruskal-Wallis Test	,175	Retain the null hypothesis.
2 The distribution of PU is the same across categories of Size.	Independent-Samples Kruskal-Wallis Test	,068	Retain the null hypothesis.
3 The distribution of ACC is the same across categories of Size.	Independent-Samples Kruskal-Wallis Test	,133	Retain the null hypothesis.
4 The distribution of CA is the same across categories of Size.	Independent-Samples Kruskal-Wallis Test	,375	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is ,05.

**Table 7 Kruskal Wallis Test Result based on Age of SMEs**

Hypothesis Test Summary			
Null Hypothesis	Test	Sig.	Decision
1 The distribution of PEOU is the same across categories of Age.	Independent-Samples Kruskal-Wallis Test	,455	Retain the null hypothesis.
2 The distribution of PU is the same across categories of Age.	Independent-Samples Kruskal-Wallis Test	,511	Retain the null hypothesis.
3 The distribution of ACC is the same across categories of Age.	Independent-Samples Kruskal-Wallis Test	,190	Retain the null hypothesis.
4 The distribution of CA is the same across categories of Age.	Independent-Samples Kruskal-Wallis Test	,104	Retain the null hypothesis.

Asymptotic significances are displayed. The significance level is ,05.

Based on Table 6 and Table 7, it can be seen that both based on the size of the SMEs, as well as the age of the business, there is no significant difference between perceived ease of use, perceived usefulness, technology acceptance and competitive advantage. This shows that IT adoption has been believed to be easy and useful so that they accept the technology. They also believe that the use of technology will increase competitiveness. Both micro, small and medium sized businesses have the same perception. Thus the proposed hypothesis is rejected.

**V. FINDINGS AND DISCUSSION**

Based on the results above, it shows that there is no difference between perceived ease of use, perceived usefulness, IT acceptance and competitive advantage based on business size and age. This shows that the need for technology has been felt by all SME actors both on the micro, small and medium scale. This proves that all SMEs



with different sizes and ages of SMEs both recognize that IT is easy to use and provides many benefits for SMEs. Therefore their IT acceptance rates are high. Besides that they believe that their competitive advantage is increasing with the use of IT. This is in accordance with the findings of Tarute and Gatautis (2013) that ICT adoption can improve performance, including competitiveness.

The results of this study are in accordance with the findings of the study by Ramdani and Kawalek (2007) who stated that the adoption of ES does not strongly depend on company size. There are many other factors that influence the level of IT adoption, such as level of understanding, price, infrastructure etc.

The important thing to note in this study is that the CA3 level is still in the moderate category. CA3 states that by using IT, product innovation can continue. This shows that IT use is needed by SMEs but its use is not for strategic purposes.

Some of the SMEs that already have computers, not many have used it for strategic and external oriented activities. Referring to the IT adoption scenario, most SMEs in Indonesia are at level 0 or 1. This is supported by data that as many as 68.9% of SMEs use computers only to type letters or reports, 66.67% to do calculations, 34.5% for accessing the Internet, 43.7% for product design, 28.7% for running information systems, and 20.7% for conducting business presentations.

It should be noted that SMEs' confidence in adopting IT needs to be assessed in the realization of its use. Because their perception of IT is not necessarily accompanied by the use of IT in real terms in their business. This is in accordance with the results of research conducted by Nugrohoet. al (2017) which states that not each of business entity is going to use information technologies even they state that the importance of adopting information technology briefly.

### VI. LIMITATIONS AND FUTURE RESEARCH

In this study, we still need to explore more about the benefits of IT for competitive advantage. Research on how much influence the use of IT has on their level of competitiveness is needed. Besides that, it is necessary to do research on what types of IT they use in their business processes. Further research needs to be done to analyze the role of IT in business whether for strategic purposes or just for administrative purposes.

SMEs have believed in the importance of IT, therefore the role of government is needed to improve the skills of business people in using IT and open their eyes to the diversity of IT that can provide strategic benefits for SMEs.

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### Appendix

#### The list of items:

##### *Perceived Ease of Use (PEOU)*

1. IT is easy to learn
2. IT can be controlled easily
3. IT is clear and easy to understand
4. IT is flexible and can be adapted to the conditions of SMEs

5. My skills are increasing when I use IT

6. IT is easy to use.

##### *Perceived Usefulness*

1. IT accelerates the completion of work
2. IT is useful in supporting business activities
3. IT can increase work productivity
4. IT increases work effectiveness
5. IT can improve the performance of SMEs

##### *IT Acceptance*

1. I feel satisfied when using IT
2. I am willing to use IT to support my business activities
3. I use IT on every working day.

##### *Competitive Advantage*

1. Work can be completed on time
2. I can compare prices with competitors
3. By using IT, product innovation can be done continuously
4. IT is able to introduce my new product to consumers