Purchasing New Smartphones among University Students: The Role of Domain-Specific Innovativeness (DSI) and Technology Product Characteristics

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***Abstract*— This study examined the influence of University students' innovativeness and the technology product characteristics toward their intention of purchasing new smartphones by utilizing the theory of Domain-Specific Innovativeness (DSI). Data collection was done by distributing an online questionnaire. There were 156 responses collected from University students in Indonesia. The data were analyzed by using Smart-PLS version 3. The finding discovered that relative advantage had the strongest influence on purchase intention. Meanwhile, Product-Possessing Innovativeness (PPI) had a great influence on the social image. This also revealed a strong relationship between students' Information-Possessing Innovativeness (IPI) and their attraction of aesthetic products. Later, discussion of the results and its practical implications presented.**

Keywords—Domain-Specific Innovativeness, technology product characteristics, smartphone, University students

I. INTRODUCTION

In Q1 2020, there were 31 new smartphone models introduced by 11 vendors (Khoirunnisa, 15 Smartphone yang Rilis di Indonesia Maret 2020, 2020) (Khoirunnisa, 7 Smartphone yang Rilis di Indonesia Januari 2020, 2020) (Khoirunnisa, 8 Smartphone yang Rilis di Indonesia Februari 2020, 2020). Meanwhile, according to (Statista, 2020) there are already more than 190 million smartphone users in Indonesia. In fact, the population of Indonesia was about 276 million (Kompas.com, 2020), which made these vendors competed to become the most purchased brand in the country.

The adoption of new technology, particularly related to smartphones, continues being a substantial issue among researchers and practitioners. Much research on smartphone adoption, however, was conducted by utilizing the Unified Theory of Acceptance and Use of Technology (UTAUT), Technology Acceptance Model (TAM), and their extensions (Baishya & Samalia, 2020) (Shih, Yang, & Yang, 2018). For example, UTAUT & TAM was used to explain consumers' intention to use smartphone technology (Ma, Chan, & Chen, 2016). It aimed to investigate the relationships between perceived usefulness, perceived ease of use, attitude, facilitating conditions, self-satisfaction, and cost tolerance towards their behavioral intention to use smartphones. While beneficial, this approach neglected a critical aspect in new product adoption, the individual characteristics. There was a limited explanation about why some people are more likely to adopt smartphones and how their individual characteristics are influencing his/her behavior of smartphone use and adoption.

This study focuses on investigating consumers' innovative characteristics of smartphone purchase intention by utilizing Domain-Specific Innovativeness (DSI). This theory initially used in marketing and consumer behavior studies. However, recent studies examined DSI on the adoption of hi-tech products such as wearable devices (Jeong, Kim, & Park, 2016) and smart toys (Zhang, Sun, Liu, & Chang, 2020). New developments on smartphone features accelerated in the past decade, making it also potential to examine DSI in the context of smartphone adoption. Moreover, this study combines the theory with inherent characteristics of technology products such as relative advantage, social image, aesthetic dan novelty (Jeong, Kim, & Park, 2016). Indeed, this study observed the circumstance among university students because of the large portion of the early adopters of smartphones (Lee, 2014).

II. LITERATURE REVIEW

A. Domain-Specific Innovativeness

Domain-Specific Innovativeness (DSI) referred to the tendency to learn about and adopt product innovations (new products within a specific domain of interest) (Goldsmith & Hofacker, 1991). This theory consisted of two dimensions, Product-Possessing Innovativeness (PPI) and Information-Possessing Innovativeness (IPI). While PPI focusing on the individuals' desire to adopt new products, IPI mainly measuring individuals' intention to collect and analyze comprehensive information on new products. Past studies demonstrated DSI had a great influence on product adoption, such as imported apparels (Beaudoin, Moore, & Goldsmith, 1998), wearable devices (Jeong, Kim, & Park, 2016), and smart toys (Zhang, Sun, Liu, & Chang, 2020). This research utilizes attributes related to PPI and IPI to explain the effect of individual characteristics innovativeness on smartphone adoption.

B. Perceived Characteristic of Smartphone

This research also evaluated the characteristics of technology products with regards to both functional and social aspects that are believed to serve as important determinants of smartphones acceptance (Vankatesh & Brown, 2001). According to (Rogers, 1983) there are five attributes influencing the adoption of each innovation: relative advantage, compatibility, complexity, trialability, and observability. Indeed, the relative advantage was the most important factor.

The social image was related to individual's desire to be superior in a social setting (Jeong, Kim, & Park, 2016) which likely achieved by possessing symbolic goods and services. In this study, the symbol was interpreted as new smartphones that believed enhance the owners' social image. Meanwhile, technology products were designed aesthetically to attract consumers' visually (Kim, Kim, & Choi, 2017). Therefore, we also considered aesthetics as influencing factors of smartphone adoption. Lastly, innovation on technology products contains a certain degree of novelty (Jeong, Kim, & Park, 2016). Therefore, we included novelty on the perceived innovation adoption factors of smartphones.

III. Hypotheses Development

As a brand-new and highly innovative smartphone launched, it attracts the public's attention. People with high PPI tend to do impulsive buying and be the first that experience the advantage of the new smartphone (Jeong, Kim, & Park, 2016). Meanwhile, people with high IPI will look for any available information regarding the products and analyze the latest updates on the smartphone and want to feel confident in using the product regardless of smartphone possession (Jeong, Kim, & Park, 2016). Thus, we proposed:

H1: PPI has a positive effect on the perceived relative advantage of smartphone.

H2: IPI has a positive effect on the perceived relative advantage of smartphone.

People with high PPI usually try to impress others by purchasing goods and services. The products are visible symbols of wealth that signal their position in the social hierarchy (Pino, Amatulli, Peluso, Nataraajan, & Guido, 2019). Meanwhile, people with high IPI want to be the most knowledgeable of the brand-new products and become the opinion leaders (Zhang, Sun, Liu, & Chang, 2020). Thus, we proposed:

H3: PPI has a positive effect on the perceived social image.

H4: IPI has a positive effect on the perceived social image.

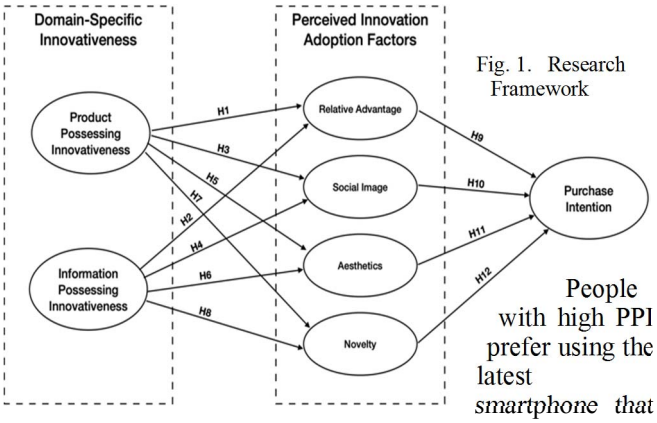

Fig. 1. Research Framework

People with high PPI prefer using the latest smartphone that also has an aesthetic design (Kim, Kim, & Choi, 2017). Meanwhile, people with high IPI also aware of visually pleasing products. They will comprehensively dig for information on related attributes of visual aesthetics before eventually they are engaged in word of mouth or adoption (Jeong, Kim, & Park, 2016). Thus, we proposed:

H5: PPI has a positive effect on perceived aesthetics of smartphone.

H6: IPI has a positive effect on perceived aesthetics of smartphone.

People with high PPI tend to seek novelty and are excited to try new products (Jeong, Kim, & Park, 2016). Meanwhile, people with high IPI will easily recognize the latest innovation as they gather extensive information on the new products (Zhang, Sun, Liu, & Chang, 2020). Thus, we proposed:

H7: PPI has a positive effect on perceived novelty of smartphone.

H8: IPI has a positive effect on the perceived novelty of smartphone.

Relative advantages such as the ability to help consumers achieve their goals while, at the same time, being easy to use are believed to affect their intention to purchase the latest smartphone (Baishya & Samalia, 2020; Jeong, Kim, & Park, 2016). Impressing others and maintaining social status may be achieved by buying the latest smartphone (Zhang, Sun, Liu, & Chang, 2020; Jeong, Kim, & Park, 2016). The fashionable design may also attract consumers to buy the products (Toufani, Stanton, & Chikweche, 2017; Pino, Amatulli, Peluso, Nataraajan, & Guido, 2019). Lastly, we suggest the novel technology may have a positive effect on consumers' intention to purchase new smartphones (Jeong, Kim, & Park, 2016; Zhang, Sun, Liu, & Chang, 2020). Thus, we proposed:

H9: Perceived relative advantage has a positive effect on purchase intention for smartphone.

H10: Perceived social image has a positive effect on purchase intention for smartphone.

H11: Perceived aesthetics of smartphone has a positive effect on purchase intention for smartphone.

H12: Perceived novelty of smartphone has a positive effect on purchase intention for smartphone.

All of our hypotheses are presented in Fig.1.

IV. Methodology

A. Data Collection

An online questionnaire was developed based on the research framework. For obtaining the data, the questionnaire was distributed via social media and messenger applications. It was distributed from April 16th to May 8th, 2019.

B. Tools and Methods

Valid means that the instrument is suitable to measure what is supposed to measure, while a reliable instrument is one that when used multiple times to measure the same object, will generate consistent outcomes under consistent conditions (Hair Jr., Hult, Ringle, & Starstedt, 2017). To analyze validity, loading factor, and Average Variance Extracted (AVE) were used.

The result obtained in the analysis of reliability is the value of Composite Reliability, which provides an internal-consistency measure of a scale to test the internal consistency of the questionnaire. The structural equation modeling (SEM) technique was used to identify the connection between the constructed model and explain the causes and effects between variables. The SEM model was examined by using Smart-PLS Version 3.

V. RESULTS

A. Profile of Respondents

A total of 156 responses from University students were collected in a period of three weeks, providing all the data used in this study. The demographics of the collected data has been shown in Table I. It can be seen that the respondents were rather quickly adopting new smartphones since their releases. In fact, most of the respondents kept using their smartphones for a fair amount of time.

B. Validity and Reliability Analysis

According to (Chin, 2010) measurement scale with loading factors of 0.5 to 0.6 is considered sufficient. In addition, the value of AVE should be above 0.5 (Hair Jr., Hult, Ringle, & Starstedt, 2017). In Table II, each loading factors and AVE scores were greater than the suggested value. This shows that the instrument is valid for the study.

TABLE I. DEMOGRAPHICS OF RESPONDENTS

Profile	Items	Frequencies	Percentage
Gender	Male	73	47%
	Female	83	53%
Age	16 - 20	73	47%
	21 - 25	81	52%
	> 25	2	1%
Time of Purchase after Release	≦3 Months	61	39.12%
	4 – 6 Months	37	23.72%
	7 – 9 Months	18	11.56%
	10 – 12 Months	11	7%
	＞12 Months	29	18.6%
Number of Purchase per 2 - 3 years	0	30	19.23%
	1	93	59.61%
	2	24	15.4%
	3	5	3.2%
	＞3	4	2.56%

According to (Hair Jr., Hult, Ringle, & Starstedt, 2017), the composite reliability (CR) score should be greater than 0.7 for the construct to be valid for the study. Table II shows the value of CR of the measured constructs of the research framework. It presents that the CR values obtained from all tested constructs were above 0.6. This indicates that all the proposed constructs in this research are acceptable for the study.

C. Structural Paths and Hypothesis

The result in Table III revealed relative advantage has a strong impact on consumers' intention to purchase a new smartphone. It also pointed out the high relation between PPI and perceived social image. Another finding was the strong relationship between IPI and aesthetics. All of these findings were supported by (Jeong, Kim, & Park, 2016; Beaudoin, Moore, & Goldsmith, 1998; Kim, Kim, & Choi, 2017).

As anticipated, all the hypotheses from the framework were supported as, except for hypotheses 2 (the effect of IPI on perceived relative advantage), 5 (the effect of IPI on perceived social image), and 10 (the effect of perceived social image on purchase intention). However, there was no significant relationship between social image, and purchase intention was surprising since (Filieri & Lin, 2017) highlighted that young consumer bought smartphones to makes them feel superior among their peers. Moreover, the insignificant relationship between IPI and relative advantage, nor social image, indicated that having more information about new products did not give any relative advantages nor increasing social status among University students.

TABLE II. VALIDITY & RELIABILITY ANALYSIS

Indicator	Loading Factor	AVE	Composite Reliability
IPI1	0.883	0.759	0.950
IPI2	0.858		
IPI3	0.875		
IPI4	0.902		
IPI5	0.836		
IPI6	0.871		
PPI1	0.796	0.636	0.875
PPI2	0.780		
PPI3	0.818		
PPI4	0.772		
RA1	0.822	0.635	0.897
RA2	0.740		
RA3	0.760		
RA4	0.797		
RA5	0.765		
SI1	0.829	0.738	0.934
SI2	0.876		
SI3	0.873		
SI4	0.848		
SI5	0.869		
AES1	0.893	0.757	0.926
AES2	0.870		
AES3	0.913		
AES4	0.800		
NOV1	0.781	0.659	0.852
NOV2	0.820		
NOV3	0.768		
PI1	0.842	0.789	0.882
PI2	0.798		

VI. DISCUSSION AND IMPLICATION

This study discovered a unique phenomenon that happened on Indonesian University students which is no relationship between perceived social image and their intention to purchase. This might be related to their limited financial ability (Lee, 2014) which made them prefer to buy an affordable smartphone with the highest possible specifications rather than a flagship smartphone. Thus, we suggested smartphone Vendors be more attentive to these needs because of their large portion of the market.

Another finding pointed out that by having more information about new smartphones did not give any relative advantages nor increasing social status among University

students. This might be related to their less experience with the new products. Therefore, we suggested smartphone Vendors organize events where young consumers could try and explore the new gadgets so they will obtain a real hands-on experience. Those events could make them recognize the true advantages of the products and the possibility to increase their social image because of those smartphones adoption.

TABLE III. HYPOTHESIS TESTING

Path	Path Coefficient	T Statistics	P-Values	Supported?
H1: PPI -> Relative Advantage	0.148	1.735	0.042	Yes
H2: IPI -> Relative Advantage	0.123	1.323	0.093	No
H3: PPI -> Social Image	0.546	7.651	0.000	Yes
H4: IPI -> Social Image	0.136	1.608	0.054	No
H5: PPI -> Aesthetics	0.202	3.010	0.001	Yes
H6: IPI -> Aesthetics	0.296	3.553	0.000	Yes
H7: PPI -> Novelty	0.242	2.470	0.007	Yes
H8: IPI -> Novelty	0.162	1.736	0.042	Yes
H9: Relative Advantage -> Purchase Intention	0.314	4.900	0.000	Yes
H10: Social Image -> Purchase Intention	0.024	0.247	0.402	No
H11: Aesthetics -> Purchase Intention	0.249	3.058	0.001	Yes
H12: Novelty -> Purchase Intention	0.140	1.678	0.047	Yes

VII. CONCLUSION AND LIMITATIONS

From the research we have conducted, we concluded that relative advantage, aesthetic, and novelty related to consumers' purchase intention of new smartphones. Moreover, the relative advantage and social image were only supported by Product-Possessing Innovativeness. Hence, we proposed several suggestions for smartphone Vendors so they can win the competition on the market of young consumers.

This research has some limitations. First, the study was conducted only in Indonesia which might not represent the global population. It can be seen from the surprising result that did not match previous studies. Secondly, the limited number of respondents and mostly living near or in the capital city might also impact the result. It might produce a different result if the study conducted with larger samples distributed in various regions of Indonesia.

For future research, this study provides several suggestions. Firstly, as discussed above, we suggest making comparisons studies between two or more countries to reveal global phenomenon. Secondly, we suggest varying the distribution of the respondents with a much more additional population.

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