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The Acceptance of Accounting Students on the Use of Internet of Things

Saarce Elsye Hatane
Faculty of Business and Economics
Universitas Kristen Petra, Indonesia
elsyehat@petra.ac.id

Inge Vera Desta Johari
Faculty of Business and Economics
Universitas Kristen Petra, Indonesia
elsyehat@petra.ac.id

Jesseline Valencia
Faculty of Business and Economics
Universitas Kristen Petra, Indonesia
valenciajesseline@gmail.com

Livia Erlyn Prayug
Faculty of Business and Economics
Universitas Kristen Petra, Indonesia
liviaprayugo@gmail.com

Abstract*—In a general sense, IoT is a physical device that is connected to the internet. IoT provides a revolution in accounting work, among others in the process of collecting data and processing data into useful information in decision making. From an early age, understanding and ability to adapt to changes that will be brought by IoT must be owned by prospective accountants, in this case, students in the accounting study program. This study surveyed accounting students at several universities in Surabaya, Indonesia, about their ability to master the IoT device. The components of IoT skills are information navigation, social skills, creative skills, and mobile skills. The results showed that female students have the same IoT abilities as male students. Their level of intelligence does not influence IoT expertise among students. No significant differences are found between high GPA students and low GPA students in IoT expertise. This research contributes to providing input to universities and the accounting profession that current students, who are a millennial generation, are very adaptable in the development of information technology.

***Keywords*—internet of things; gender; intelectual; information navigation, social, creative, mobile skills**

I. INTRODUCTION

Technology is one of the supports of human life in various aspects, so that humans continue to make innovations. The development of innovation was born in the form of a concept called the Internet of Things (IoT), which is a concept in the use of Internet connectivity that is always connected at all times [1]. Based on data from The Connected Consumer Survey in 2017, it is found that the percentage of people accessing the Internet through smartphones rather than computers is 86%, which is an opportunity for IoT to develop rapidly. This is because IoT itself is a concept where particular objects have the ability to transfer data over a network without requiring interaction from human to human or from human to computer devices. IoT has the potential to not only affect the way we live, but also the way we work becomes more practical and useful. IoT innovation needs to be applied in various lines of life because IoT supports everyone to have a high awareness of the world and its development. However, IoT adoption has not been spread, and a greater understanding of the concept is needed. An example of an IoT application is the Parkirin application, where users must download the application on Google Play and IOS on smartphones to check parking space availability, building facilities, and merchant promos. In using IoT effectively, it requires individual skills and organizations called IoT Skills [2]. Research shows that IoT Skills directly contribute to the use of IoT to predict the receipt and use of IoT [3]. IoT Skills itself is a skill to deal with smartphones and data collected by these devices. IoT Skills consists of mobile skills, information navigation skills, social skills, and creative skills.

IoT affects many aspects of life, one of which is in the field of accounting. Twenty billion devices have been estimated to be interconnected globally since 2018, from smartphones to vehicles, machines, and more. Data processed by these interconnected devices bring new trends in cost, productivity, and cash flow for accountants. Accountants have great potential to utilize the IoT trend to improve the efficiency and effectiveness of performance in receiving and sending data from various sources, as well as in processing and analyzing data. However, this trend of course requires the accountants to keep up with the times by having a good understanding and acceptance of IoT, because good user acceptance of IoT is the primary determinant of actual usage behavior [4]. The 6th annual digital IQ survey of PwC in 2017 showed that business in the financial services sector was one of the top 10 industries that invest in potential IoT innovation. However, in the field of accounting, the use of IoT is still in the maturing stage and left behind other fields of work such as health, manufacturing, retail, insurance in finance. Therefore, students majoring in Accounting as prospective accountants in the future should be able to follow the development of the present era by mastering IoT Skills. With the mastery of IoT

Skills, the students are expected to be able to practice IoT and make innovation regarding IoT while doing accounting work.

Male are known to have a tendency for technology mastery and acceptance faster than female according to the literature of computer attitude, which states that gender has an essential effect on technology acceptance [5]. It can be seen that those interested in majoring in IT-related lectures who are female are rare or less to be found than male. The United States workforce is 46.6% dominated by female, but the female workforce in the IT sector is only 35% [6]. In consequence, there is a possibility for male to master more technology, including mastering IoT Skills compared to female. Gender is an important construct that receives little attention in the context of TAM (Technology Acceptance Model) research [7]. Thus, the purpose of this study is to see whether gender affects the mastery of IoT Skills.

A person's intelligence does not always affect the level of IoT skills because the results show that not all "things" connected with IoT require intelligence [8]. This is supported by research that proves in its findings that the IoT application does not require intelligence in some ways [9]. Therefore, the researcher will also test whether the level of intelligence influences the mastery of IoT Skills.

II. Literature Review

A. Internet of Things

The meaning of IoT refers to the use of devices connected to an intelligent system to obtain data from sensors embedded in machines and other physical objects [10]. IoT connects objects to the Internet through predetermined protocols using information sensor equipment such as radio frequency identification technology, so that each real object in the analogue world will have a unique code such as an IP address [11]. IoT connects items and objects in the home, work environment, industry using technology systems for real-time interactions and sharing of data, information, and communication such as sensing, networking, connectivity, digital, media applications, and Internet platforms. IoT aims to expand the benefits of ordinary Internet, which are constant connectivity, remote control capabilities, information and data sharing, and so on [12]. By providing new levels of interaction and information from the environment in which devices can be found, IoT is a representation of a range of technologies that provide objects with intelligence ensuring that the objects communicate with humans or other machines [13]. With the concept of incremental innovation, the existing services and products become new creative products and services, or by using the existing services and being applied to other platforms to create new services, and the concept of combinative innovation which combines several existing services or products to create new services or products. IoT innovations cover a variety of fields and sometimes in the combination such as security, tracking and tracing, payment, health, remote control, maintenance, and measurement [14].

B. Creative Skills

Creative skills are skills to create appropriate content to be displayed online [3]. This content includes text, music and videos, photos and images, multimedia, or remixed media. Creative skills also involve the basics of uploading content [15]. In addition, there are also studies which prove that creative skills directly affect IoT Skills [3].

C. Social Skills

Social skills are the ability of communication and online interaction to understand and exchange meaning, search, choose, evaluate, and act on online contacts on the Internet [3]. The lack of a direct relationship between social skills and IoT Skills will show an unconscious indication that social skills are essential to be applied in the IoT context. Sharing content is included as making choices about changing settings regarding the content wanted to share, when to share it, and whom to share it with.

D. Mobile Skills

Mobile skills are the ability of smartphone users to operate smartphones and the Internet that allows assessing the distribution of the ability to use mobile devices such as downloading, installing applications and monitoring Internet costs incurred in using mobile Internet [15].

E. Information Navigation Skills

Information Navigation Skills consist of the ability to search on the Internet, including finding, selecting, and evaluating information sources on the Internet. Information Navigation Skills affect both directly and indirectly on IoT Skills [3]. There are still many people who still do not master Information Navigation Skills, resulting in less optimal use of the Internet [15].

III. Method

The target respondents in this study were students majoring in Accounting from public and private universities with regional boundaries in Indonesia, particularly Surabaya City. This study chose Surabaya because there was no research discussing it, and the number of students majoring in Accounting as a college major was quite a lot. The respondents were all Accounting students regardless of gender and the Graphics Performance Accelerator (GPA) ranged from <3.00 to>3.50. Data sources used in this study were primary data collected from surveys by distributing online questionnaires that received a total of 306 respondents during 2019. The respondents were asked to fill in details of gender, academic year, domicile of university, type of university, choice of concentration in Accounting, GPA , and e-learning facilities at the university. There were four variables in the questionnaire that were the main topics of this study: mobile skills, creative skills, information navigation skills, and social skills. Each variable had several questions to support it.

This study used probability sampling in which all elements had the same opportunity to be selected as a sample. This study specifically used purposive judgment sampling which is a strategy in which particular settings persons or events are

selected deliberately in order to provide important information that cannot be obtained from other choices [16]. The existence of this research was expected to find out the level of acceptance and the factors that influence Accounting students regarding the use of the Internet of Things.

The researcher used Likert Scale to indicate the level of respondents' agreement to a series of questions given in the questionnaire as a measurement tool in gathering data. The respondents were asked to fill out a five-point Likert Scale (from 1 = strongly disagree to 5 = strongly agree). Questions or statements used in this study were usually referred to as research variables and were specifically defined by the researcher. The type of data used was quantitative or numeric data, which uses a multivariate type of analysis. This questionnaire was adapted from previous research by Deboer. The distribution of the questionnaire was done by distributing it online.

Factor analysis is a collection of methods used to examine how underlying constructs influence the responses on a number of measured variables [17]. The results could also explain the correlation between a series of variables, seen from the KMO table and Bartlett's Test where the KMO MSA value was higher than 0.50 and the Bartlett's Test (Sig) value was lower than 0.05. To find out whether there was a strong correlation between variables or not, see the Anti-Image table. The correlation between variables might have a higher value of 0.50.

Analysis of variance or ANOVA is a statistical method used to test differences between two or more means and used to test general rather than specific differences among means [18]. If the test result of variance showed >0.05, this indicated that the ANOVA test was valid, the same variant and the Post Hoc Test used was the Bonferroni test. However, if the result was <0.05, it means the evidence was invalid and showed distinguished differences, then the Post Hoc Test used was the Games-Howell test.

TABLE I. OPERATIONAL DEFINITION

Type of IoT Skills	Description
IoT Skills	Factor 1 (IOTS 1) consists of operational understanding of smartphones, applications, Internet. Factor 2 (IOTS 2) consists of the difficulty level of using smartphones, applications, Internet.
Information Navigation Skills	The factor of the INS component is the ability of Internet users to search on the Internet.
Social Skills	In the SCS component, the factors are users' understanding of how to behave on social media and information sharing
Creative Skills	The factor of the CRS component consists of creativity in the creation and sharing of online content on the Internet.
Mobile Skills	The MBS component discusses the ability to operate the IoT system on a smartphone.

IV. RESULTS AND DISCUSSIONS

A. Overview

Table 2 shows the profile of the respondents whosethe profession areAccounting students at various universities in Surabaya. The total questionnaire of the respondents were 306 students and the majority of the respondents were 197 female students. The majority of the respondents were students in the academic year of 2016 and the level of intelligence based on the GPA was mostly from 3.00 to 3.50.

Table 3 below shows that the KMO MSA values for IOTS (Internet of Things Skills), INS (Information Navigation Skills), SCS (Social Skills), MBS (Mobile Skills), CRS (Creative Skills) have met the requirements. Table 2 shows that the values of IOTS, INS, SCS, MBS, and CRS have shown the condition because the significance value of KMO is above 0.05 or 5% (percent), and the significance of Bartlett's Test is below 0.05 or 5% (percent) which means it has been fulfilled the requirements. Thus, it can be concluded that the number of samples is sufficient, has a correlation between variables, and can be processed further.

In table 4, the Measures of Sampling Adequacy (MSA) must be higher than 0.5. The graph above shows that the MSA values of IOTS, INS, SCS, MBS, and CRS have met the requirements and can be further processed. Table 5 shows the values of the variables studied which can explain the factors. The variables are considered to be able to the explain the factors if the Extraction value is higher than 0.50. Based on Table 4, the extraction values of IOTS, INS, SCS, MBS, and CRS have been fulfilled the requirements, so they can proceed to the next stage because all variables have values above 0.50.

In the Total Variance Explained, it described that the requirement to be a factor is to have an eigen value higher than 1. In structural variables, there are ten structural components that are formed, where component 1 is 0.717, component 2 is 0.763, component 3 is 0.748, component 4 is 0.632, component 5 is 0.673, component 6 is 0.618, component 7 is 0.601, component 8 is 0.785, component 9 is 0.554, and component 10 is 0.6. The total of the ten components is 9.98; which is close to 10. The total number of variables must correspond to or close to the number of components, so that if the INS consists of 4 components, when the 4 components are calculated, the results must be equal to 4 or close to 4.

B. Analysis

According to table 7 and 8, it can be seen that there are no significant differences in each indicator. This shows that Accounting students who are male or female have equal mastery over IoT Skills. It can be seen that there has been an increase in female students because in previous studies, it was said that male are more in control of technological developments including IoT compared to female. Based on the mean difference values in table 6, Accounting students have a general and abstract understanding of IoT Skills. The results of this study are supported by studies that do not find the effect of gender on computer mastery [19]. Several studies have found that the level of confidence of male and female in

mastering their computers is the same [19] [20] [21] [22]. Gender differences regarding computer mastery are diminishing over time. This is because the frequency of computer use is becoming more frequent in various purposes, enabling female to get a portion of computer use that is close to or equal to male. Likewise, it was stated regarding computer attitude among the students, that male and female no longer differ significantly in their attitude towards computer mastery [23]. This is consistently explained by more recent study explaining that there is a narrowing of the gender gap in IT mastery, particularly in terms of basic connectivity or access to the Internet [24].

The second variable of the study is the level of intelligence (GPA), which can be seen in table 6 and 7 that the difference in the level of GPA does not affect the mastery of IoT Skills. This statement is supported by previous study which states that a person's intelligence level does not always affect the mastery and understanding of IoT skills, because not all things and activities related to IoT Acceptance require intelligence [9]. This happens because IoT Acceptance does not solely occur due to mastery of IoT Skills, but it is supported by a study that factors influence decisions in adopting and using technology and lead to understanding how individual reactions can predict the real use of certain technologies [25]. The use and mastery of technology, especially IoT is currently increasing because it is supported by existing global competition. IoT Acceptance is based on two factors, the first is the utility in which individuals are encouraged to use technology to improve their performance to be more optimal, the second is the individual's desire to get the maximum possible work with minimal effort [25].

TABLE II. RESPONDENTS PROFILE

		Total	%
Gender	Male	109	35.62
	Female	197	64.38
Grade	<2015	59	19.28
	2016	168	54.90
	2017	66	21.57
	2018	13	4.25
GPA	<3.00	93	30.39
	3.00-3.50	119	38.89
	>3.50	94	30.71895425

TABLE III. KMO AND BARTLETT'S TEST

		IOTS	INS	SCS	MBS	CRS
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.901	0.822	0.841	0.836	0.796
Bartlett's Test of Sphericity	Approx. Chi-Square	1829.16	489.43	882.033	829.109	705.261
	Sig.	0	0	0	0	0

TABLE IV. ANTI-IMAGE MATRICES

	1	2	3	4	5	6	7	8	9	10
IOTS	.894a	.884a	.922a	.929a	.939a	.898a	.908a	.550a	.862a	.891a
INS	.836a	.828a	.805a	.820a						
SCS	.925a	.824a	.789a	.860a						
MBS	.841a	.838a	.864a	.813a	.819a					
CRS	.767a	.779a	.798a	.773a	.883a					

TABLE V. COMMUNALITIES

	1	2	3	4	5	6	7	8	9	10
IOTS	0.717	0.763	0.748	0.632	0.673	0.618	0.601	0.785	0.554	0.6
INS	0.662	0.682	0.715	0.688						
SCS	0.661	0.836	0.865	0.801						
MBS	0.659	0.754	0.72	0.654	0.611					
CRS	0.568	0.636	0.695	0.689	0.581					

TABLE VI. TOTAL VARIANCE EXPLAINED

Component	1	2	3	4	5
IOTS	5.546	1.145	0.823	0.576	0.474
INS	2.746	0.453	0.423	0.377	
SCS	3.163	0.431	0.24	0.166	
MBS	3.398	0.697	0.328	0.306	0.272
CRS	3.169	0.779	0.473	0.315	0.264

TABLE VII. MEAN DIFFERENCE, STRUCTURE, SOLITARY, AND PRECISION TOWARDS GRADE, MAJOR, AND SCHOOL TYPE

INDICATOR	GENDER	GPA		
(I)	MALE	<3.00		3.00-3.50
(J)	FEMALE	3.00-3.50	>3.50	>3.50
MEAN DIFFERENCE (I-J)				
IOTS 1				
IOTS 1-1	0.705	0.062	0.0382	-0.0238
IOTS 1-2	0.335	0.068	0.07	0.002
IOTS 1-3	0.544	0.145	0.1122	-0.0328
IOTS 1-4	0.135	0.1252	0.1002	-0.025
IOTS 1-5	0.281	0.1124	-0.0043	-0.1168
IOTS 1-6	0.306	0.1878	0.0255	-0.1623
IOTS 1-7	0.525	0.1952	-0.0601	-0.2552
IOTS 1-9	0.517	0.1172	0.0037	-0.1135
IOTS 1-10	0.318	0.0275	0.003	-0.0245
IOTS 2				

IOTS 2-8	0.294	-0.037	-0.3594	-0.3224
INS				
INS 1	-0.10101	0.0472	0.1242	0.0771
INS 3	-0.02273	-0.2305	-0.3324	-0.1036
INS 4	-0.13973	-0.0097	-0.0876	-0.078
INS 5	-0.18603	-0.0047	0.1168	0.1215
SCS				
SCS 2	-0.00505	-0.0626	-0.0714	-0.0088
SCS 3	-0.04798	-0.1588	-0.0605	0.0982
SCS 4	-0.07828	-0.0704	-0.102	-0.0316
SCS 5	-0.12307	-0.112	-0.0816	0.0305
CRS				
CRS 1	-0.0665	-0.0671	-0.0561	0.0111
CRS 2	0.03704	-0.0109	-0.1221	-0.1111
CRS 3	-0.07155	-0.0719	-0.1598	-0.0879
CRS 4	-0.02357	-0.2413	-0.3722	-0.1309
CRS 5	0.11869	0.0765	-0.0073	-0.0839
MBS				
MBS 1	0.01852	0.0567	-0.0697	-0.1263
MBS 2	-0.00926	-0.0633	-0.1017	-0.0384
MBS 3	-0.13552	-0.0291	-0.026	0.0031
MBS 4	-0.11869	-0.0623	-0.1041	-0.0418
MBS 5	-0.05387	-0.1735	-0.1369	0.0366

TABLE VIII. MEAN PER GROUP VARIABLE

	Gender		**GPA**		
	Female	*Male*	*<3.00*	*3.00-3.50*	*>3.50*
IOTS1	4.2656	4.35	4.332258	4.2319	4.3393
IOTS2	3.278	3.4537	3.215	3.2521	3.57446
INS1	2.906	2.77037	2.8279	2.8638	2.88085
SCS1	4.4217	4.35879	4.336	4.4369	4.41489
CRS1	3.38	3.3796	3.31182	3.3747	3.455319
MBS1	4.428	4.368	4.3591	4.4134	4.4468

V. CONCLUSION

This study shows that acceptance of IoT by Accounting students in Surabaya is important to know whether IoT Skills are influenced by gender or intelligence level. Therefore, IoT Skills are described through four components which become the main points in this study to measure the acceptance of IoT by Accounting students. There are two main findings in this study, the first is thatthe differences between female and male students in terms of mastering IoT Skills are not found both in general and by the components. This happens because the difference in mastery of IoT decreases over time, which is caused by the increased use of technology for various purposes which demand all people without differentiating gender to be able to master IoT. Besides, the portion of learning related to IoT in educational institutions is equal to both male and female students, it is expected that the level of understanding received by the students is the same.

The second finding in this study is that there is no influence of the level of intelligence on the acceptance and mastery of IoT. The intelligence level described above uses the GPA of the Accounting studentsas a benchmark. The researcher's findings show that the level of mastery of IoT Skills is not solely determined by the level of intelligence because the understanding and mastery of IoT Skills can be driven by demands that must be fulfilled by the individuals, such as to be able to compete in an increasingly global work world. Thus, individuals with low intelligence levels are also able to master IoT maximally if there is a drive to follow the development of the existing era in order to be able to optimize their work with minimal effort.

The results of this study have implications for universities to encourage students to understand and master IoT because of the demands and technological developments that require the students to always update their IoT Skills. In addition, the skills can equip the students to be able to compete in the world of work because the work of accountants will become easier and more accurate using the application of IoT.

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