THE ROLE OF INTELLIGENCE IN E-LEARNING USAGE: AN EXTENSION OF UTAUT MODEL

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THE ROLE OF INTELLIGENCE IN E-LEARNING USAGE: AN EXTENSION OF UTAUT MODEL

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ABSTRAK

Tujuan utama penyelidikan ini adalah untuk menentukan peranan kecerdasan yang sederhana dan menentukan peranan perantaraan niat tingkah laku terhadap penggunaan E-learning di kalangan mahasiswa Indonesia. Khususnya, dengan menjalankan tinjauan di Indonesia, ia meliputi 360 responden di kalangan mahasiswa Indonesia. Tesis ini mengkaji ketepatan Unified Theory of Acceptance and Use of Technology (UTAUT) dan ia disederhanakan oleh tahap kecerdasan pengguna. Sumbangan utama dari kajian ini adalah memperkenalkan tahap kecerdasan pada model UTAUT untuk mendedahkan peranan tahap proses kognitif pada penerimaan dan penggunaan teknologi baru. Hasil pengantara kami menunjukkan bahawa Harapan Kinerja dan Harapan Usaha tidak ada pengantaraan, kondisi memfasilitasi dan EQ adalah pengantian separa dengan kompetitif dan IQ dan pengaruh sosial adalah pengantian sepenuhnya. Kesemua model ini mempunyai kesan penyederhanaan yang lebih besar untuk menggunakan tingkah laku E-learning di kalangan mahasiswa Indonesia. Walau bagaimanapun, hasil carian hasil moderator menunjukkan pengaruh moderator yang signifikan dari segi pengaruh sosial sahaja. Penyelidikan ini membayangkan tiga penemuan penting bagi pembuat dasar. Pertama, pembuat polisi perlu menyediakan e-pembelajaran kepada pelajar sarjana muda di Indonesia seperti berkomunikasi, berkongsi pengetahuan, kerja berpasukan dan kerjasama. Kedua, pembuat polisi boleh menjelaskan bahawa penting pengaruh sosial adalah penganjur yang kuat untuk pelajar menggunakan blog dalam pembelajaran dan pengajaran e-perniagaan mereka. Akhir sekali, pembuat dasar perlu lebih memberi tumpuan kepada

pengaruh sosial untuk menggunakan e-learning kerana ia dapat menarik kesedaran dan perhatian pelajar.

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ABSTRACT

The main aim of this research is to ascertain the moderating role of intelligence and determine the mediating role of behavioural intention on the use of E-learning among third year Indonesian undergraduates. Specifically, by conducting survey in Indonesia, it covering 360 respondents among third year Indonesia undergraduates. This thesis examines the accuracy of Unified Theory of Acceptance and Use of Technology (UTAUT) and it is moderated by the intelligence level of users. The main contribution from this research is introducing intelligence level on UTAUT model to reveal the role of cognitive process level on an acceptance and usage of new technology. Our mediator results show that Performance Expectancy and Effort Expectancy are no mediation, Facilitating condition and EQ are partial mediation with competitive and IQ and social influence are fully mediation. All the model have larger moderating effect to use behaviour of E-learning among Indonesia third year undergraduates. However, the finding for the moderator result shows significant moderator influence in terms of social influence only. This research implies the three important findings for the policy makers. First, policy maker should provide the e-learning to undergraduate student in Indonesia such as communicate, shared knowledge, teamwork and cooperation. Second, policy maker can explains that the important of social influence is a strong promoter for students to use blogs in their e-business learning and teaching. Last but not least, policy maker (school board; government)should more focus on social influence to use e-learning because it is able to attract the student's awareness and attention.

CHAPTER 1

INTRODUCTION

1.0 Introduction

E-learning is predominantly linked to a form of learning that utilises electronic equipment which mostly have link to internet, intranet or both. The logistics include computers, mobile phones and some audio-visual electronics. Generally, E-learning is defined as a web-based delivery of learning, training or education programme that utilises information technology and computer networks (internet and intranet) to facilitate access to education and training with the aim of improving quality of learning and competitive advantage among students in the changing job market (Stockley 2003; Hsbollah et al., 2009; Pucciarelli & Kaplan, 2016; Lomer et al., 2018). Since the introduction of web-based browser by Tim Berner in the 1990s the world has gradually drifted away from the traditional approach of handling and spreading information flow to a more flexible pattern indifferent to time and location, a trend which affects the contemporary learning methods (Luthfihadi & Dwewanto, 2013). The impact of this technology trend has extended into the area of educational learning and it is exerting its impact on all levels of education especially among the undergraduates in the various universities around the world.

Individual and firms have adopted the E- learning and the justification that motivates the adoption include ease of access, quality of learning, competitive advantage in the changing market place (Faytal 1998; Blaise et al., 2018), flexibility and improvement on the traditional learning (Mackpherson 2005). The merits associated with web-based usage sparked up a massive usage of web based related activities in Indonesia and between 2000 and 2011 there had been an increase in the

usage of the web technology by 50 million people, which represents an improvement of one thousand percent, an increasing trend confirming that the awareness and participation of Indonesians in web-based activities is on the ascendency (Luthfihadi & Dwewanto, 2013).

The framework of this research relies on Unified Theory of Acceptance and Use of Technology (UTAUT) of Venkatesh et al (2003). This model is an extended version from many prior theories such as Theory Reasoned Action, Theory of Planned Behaviour, and Technology Acceptance Model. The formulation of UTAUT is preceded by behavioural phenomena that characterises the user's difficulty in accepting new technology in areas like commerce, health and education (Bowen, 1986). In spite of the difficulty in acceptance the technological innovation has nevertheless creeped its way into the domain of academia which resulted in a tremendous revitalisation of the traditional learning process through the advent of multimedia, internet and information technology (Wang et al., 2012). The benefit derived from the technology's inception in the academia is a new learning process in E-learning (Hang & Cho, 2008; Hart, 2015). However, the major players within the academia (students and lecturers) have had difficulties in one way or the other to accept and adopt its usage (Al-alak, 2011). Teachers and students alike have held on to the believe that the traditional system is the best way of learning, meanwhile for students to adopt this new technology of E-learning it requires that the instructors are knowledgeable in such technology in order to boost the student's acceptance (Swan et al., 2002). In order for students to accept this technology it is germane that a concrete understanding of the user acceptance process be established which must include means to entice the students to accept this technology (Saade & Bahli, 2005).

UTAUT has one dimension called performance expectancy, which within this study context, it is defined as the degree to which students believe that using the system will help them improve their performance. The model hypothesizes that the degree of which performance expectancy influence behavioral intention is moderated by gender. Meanwhile, Effort expectancy is the degree of ease of use the e-learning by students. Some researchers suggest that gender, experience, and voluntariness of use may moderate the association between effort expectancy and technology acceptance (Venkatesh et al., 2003; Venkatesh & Zhang, 2010; Skoumpopoulou et al., 2018). Social influence dimension is the dimension that capture student perception about the important of social pressure on the decision of using e-learning. All moderators have an affect on this variable, gender, experience, and voluntariness of use. Venkatesh et al. (2003) suggest that social influence is an important construct in mandatory use environments such as this study. This variable is important in the early stages of experience with technology, with the effect diminishing over time. Facilitating conditions, anxiety, self efficacy, and attitude toward technology are not included in the UTAUT but are included in this research model to provide a more complete analysis of the research environment (Taylor and Todd, 1995; Venkatesh et al., 2003; Venkatesh & Zhang, 2010; Skoumpopoulou et al., 2018) found that these variables to not be significant as a determinant of intention.

Yet, UTAUT model excludes the role of intelligence level on the technological acceptance. Prior research such Russo (2004) and Hendon et al. (2017) showed this cognitive-psychological factor is important for an individual to accept a new technology. This research therefore proposes differences in ‘intelligence’ as a moderating variable to investigate the acceptance of E-learning by the undergraduate students in Indonesia where Intelligence is measured by IQ and EQ of the student.

According to Aydin (2005) and Batool (2013), IQ and EQ are intelligent variables that play important role in superior performance and that there exist a strong and significant relationship between superior performance and intelligence as measured in EQ and IQ. Intelligence is proposed here as a moderating variable because the UTAUT fails to provide guidelines regarding how to make technology easy to use and this requires intelligence to unlock complications pertaining to the system use. Again, intelligence is proposed as a moderator considering the fact that UTAUT assume that all people plan their behaviour and are rational and therefore hold the assumption that people evaluate expectancy and acceptance dimensions before developing the intention to use and actually use the technology which is really not the case and for this reason rationality and planning which are guided by a person's intelligence is lacking in the model hence the proposition of intelligence as a moderating variable.

The acceptance of e-learning was evaluated using a modified UTAUT model that was originally proposed by Venkatesh et al. (2003). The research model postulates six constructs (performance expectancy, effect expectancy, social influence, self efficacy, anxiety, and attitude toward using technology) that determine the behavioral intent and two constructs influencing usage behavior (behavioral intent and facilitating conditions). The research examines four moderating variables (gender, age, experience, and voluntariness) that have varying influence on the primary Constructs. The main contribution from this research is introducing intelligence level on UTAUT model to reveal the role of cognitive process level on an acceptance and usage of new technology. This research holds the view that individual differences in terms of intelligence play a vital role among the undergraduate students towards their willingness to accept E-learning, an additional variable that is postulated to enrich further the direct relationship of UTAUT's construct regarding intention and use

behaviour by users. The assertion that an individual difference is germane in the adoption and usage of information system is a key deterministic variable (Zikmud, 1979).

Meanwhile in Indonesia there has not been any concrete attempt to ascertain the moderating effect of intelligence on the use of E-learning among under graduates. Yet other areas have been assessed for example preparedness of implementation (Maulida, 2014), E-commerce (Luthfihadi & Dwewanto, 2013) and Public Banking (Casandra, 2013). This research posits that individual intelligence is a key deterministic variable that moderates the use of E-learning among undergraduate students specifically those in Indonesia.

The introduction of the study begins by pointing out the fact that technology acceptance can be explored by testing and analysing Unified Theory of Acceptance and Use of Technology (UTAUT) and it is moderated by the intelligence level of users. UTAUT's ability to sufficiently use its construct fully is inadequate and as a result this research proposes 'intelligence' as a moderating variable to investigate and enrich the UTAUT. Previous research in this area has successufully predict the acceptance of an innovation in about 40 percent of the cases (Davis et al 1989; Venkatesh and Davis 2000; Taylor and Todd 2001; Kijsanayotin et al., 2009; Skoumpopoulou et al., 2018). The new proposed model UTAUT was shown to be 70 percent accurate at predicting user acceptance of information technology innovations (Venkatesh et al., 2003). By generating a significantly higher percentage of technology innovation success the UTAUT is deemed a superior model compared their predecessor such as TRA, TAM or TPM. The rest of the chapter is arranged starting from the background of the study which covers the historical perspective of E-learning, definitions and types of E-

learning and some characteristics. This is then followed by problem statement, research questions and objectives of the study respectively. The contribution of the study, scope, organisation of the study and summary also follow respectively.

1.1 Background of Study

There is no definite evolutionary source that could be linked to the history of E-learning however there are major players who have contributed to the development of E-learning at different times and places. The notion that E-learning is a new form of learning that utilises the luxury of internet to deliver customised learning packages and interactive learning is inconsistent with history. Neglecting educational efforts and theories that have nurtured E-learning over the past four decades is a flaw in the history of E-learning (Nicholas 2007; Reimers & Chung, 2019). E- learning is practiced across all sectors of industries for example Military, Businesses, Health and education (Charp,1997). The meaning of E-learning therefore fits contextually other than generalising the concept. In education sector E- learning relates to internet based flexible learning model containing content and program to serve the learning needs of the student (Campbell 2004; Keengwe & Kidd, 2010; Maseleno et al., 2018). Some of the key players who play active role in the evolution of the E-learning are Patrick Suppes at Stanford University and Don Bitzer at the University of Illinois who advocated the use of computers in learning. Other actors who were active in the early stage of E- learning are Porter in 1969 and Utah in 1962 (Fletcher, 2002).

E-learning is defined in several ways depending on the industry where it is practiced. It is defined as the acquisition of knowledge distributed and facilitated primarily by electronic means (Wentling et al., 2000). The features of E-learning include the following (a) it is internet based (b) it is a worldwide sharing of academic

resources (c) it is flexible considering the fact that it is not constrained by time and place (d) finally it allows for individual support because it allows for convenient learning schedules (Wang, 2009). E-learning derives its motivation from increase in its high productivity and lower cost component whiles emphasising online course content and online course management. E-learning covers both formal and non-formal learning categories. It offers the advantage of just in time learning and minimum locational constraints (Nicholson 2004). In the higher educational setting efficient E-learning concentrates much on the development of metacognitive skills which advocates reflective and collaborative learning (Campbell, 2004; Keengwe & Kidd, 2010; Maseleno et al., 2018). In a wider context E-learning is more than just an online context of learning, rather it includes diverse range of practices, technology and logistics. It covers the entire range of computer based learning and formats which further include multimedia, educational programming and media on both fixed and mobile logistics geared at improving learning (McDoughall & Bettis 1997).

The implementation success of E-learning comes along with information technology that facilitates and enhance E-learning however, the acceptance of the technology by the players of E- learning have not been an easy one. According to Grandson and Pearson (2004), the issue of technology adoption and acceptance by the users of such technology has been difficult. This has attracted expanse of research literature in the information technology discipline. In accordance to this impasse several models have been developed by researchers in an attempt to unravel the technology acceptance deadlock (Abbad, 2011). Even though the inception of information technology has invigorated educational revolution in E-learning, the undergraduates of universities show reluctance in the adoption and usage of this

change. In an ensuing development, UTAUT has been widely chosen as a framework to determine factors that affect undergraduates' choice of E-learning.

UTAUT was an unification from several theories in technology management. Yet, it is modification from Technology Acceptance Model (TAM), proposed by Davies (2003). This TAM theory primarily provides the guidelines to identify the impact of external factors on internal beliefs, attitudes and intention to use new technologies. Following this assertion, TAM postulates perceived ease of use (PEOU) and perceived usefulness as key factors in determining the acceptance behaviour (Abbad 2011; Ifinedo et al., 2018). TAM explains the acceptance behaviour with its two constructs (PEOU & PU) emphasising that external factors provide a bridge between the internal factors and individual differences, social influence and managerial controls that affect behaviour (Hu et al., 1999).

Even though the model shows accuracy in explaining user behaviour, some researchers show that it does not show maximum impact and still need further enrichment. Mathieson (1991) documents that TAM provides very general information on users' view about a technology but does not provide specific information that can improve system development. Abbad (2009) shows that TAM constructs partially mediates whiles Burton Jones (2005) shows that TAM is accurate but not sufficient model to predict users behaviour. Following the pros cons shown the research proposes to enrich the model by postulating that intelligent of undergraduates (students) could be a determining variable that can further explain that relationship.

The contention of acceptance to use information technology systems in general and for that matter E-learning is higher in the emerging economies. Investigating lecturers' intention to adopt E-learning in the Jordanian universities show that, there

is a positive relationship between PU, PEOU, knowledge, management support and intention to adopt. A section of lecturers who lack the skill and knowledge of technology finds E- learning unattractive (Al -alak et al., 2011). There again, a research conducted in Kenya shows that there exist a high resistance against the implementation of E-learning emanating from the fact that many key players in the educational terrain were not technologically skilled and were afraid of losing their jobs, confirming ease of use as postulated in TAM (Munyi Felister,2013). The unwillingness regarding acceptance of E-learning prompted an investigation to ascertain whether quality factors as antecedent affect the belief of learner's intention to adopt E-learning in Taiwan. Following the rudiments in TAM the findings show that quality factors are essential variables in explaining user's intention to adopt E-learning (Cheng 2012). Finally, in Malaysia E-learning adoption is found to dependent on trialability, relative advantages and academic specialisation. These are the major factors that influence adoption decision of E-learning. In short the challenge confronting adoption of information technology system permeates most emerging economies.

Yet, TAM is particularly used within the information system domain, and is mainly concerned with how the technology is accepted and use (Davis, 1986). It relies on the Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) of the end users of technology. On the basis of these two constructs and by combining another key construct that is users' attitude (ATT) towards information technology (IT), TAM is more on predicting users' behavioural intention of use of technologies. Therefore, Venkantesh (2000) expands this model to capture not only acceptance and use, but also the expectancy of users, and the theory called unified theory of acceptance and use of technology or UTAUT.

UTAUT renames the old key constructs in TAM in such way: First, PU has become Performance Expectancy, PEOU has become Effort Expectancy, and SN has become Social Influence. The UTAUT also has a Facilitating Conditions construct to predict Behavioural Intention. This model is more robust to capture intention of using technology especially when it engages with demography profile of users.

This research adapt UTAUT as a validation tool of captured user needs and requirements of particular interactive software technologies, within the framework of e-learning use in Indonesia context. There are two main additions to the Proposed UTAUT Model. Firstly, condensing (age, gender, experience level, speciality, and voluntariness to use the system) under one dimension called Individual Factors. Secondly, the introduction of intelligence as new intervening dimensions along with relevant variables.

The reason of adding intelligence in UTAUT model is because acceptance and expectancy of users towards technology might be moderated by level of intelligence. Different level of intelligence will result different explanatory power in accepting and expecting the power of tecehnology adoption. Therefore, this modified UTAUT model is chosen as the base theoretical model for this study because its comprehensiveness and high explanatory power in comparison to other technology acceptance and use models. Moreover, in Indonesia context, where education disparity is high, intelligence may give interesting insight about the acceptance and expectancy of technology adoption.

E-Learning has been a new trend around the world, and Indonesia is no exception. In term of e-learning market growth, Dacebo.com reported that e-learning market capitalization in Indonesia is the highest in the world. It reached 25% annual

growth. This number is far higher compared to the world that reached US$ 51.5 billlion in 2016 with the annual growth of 8%, or Asia region where the market reached US$ 7.1 billion with annual growth of 1.3%. Business week also predicted that Indonesia has promising e-learning market, and projected that there will be increasing e-learning market up to US$ 12.2 billion making *Indonesia as Top 5 Buyers of mobile learning products and services in the world after China, US, India, and Brazil*

Indonesia develops its e-learning system due to the geographical condition and disparity of education infrastructure across the country. Having more 13,000 islands and centralized education, e-learning is the best answer to improve the education sector for Indonesia. At the end of 2003, e-learning was a new hit, especially after the launching of E-Learning 2.0 including the Web 2.0, social networking, and personal learning environment. As the economy of Indonesia grows, the ICT infrastructure has become better since then leading to e-learning improvement. The detail is as follow:

- 1999-2000 Jaringan Internet / National Internet Network
- 2000-2001 Jaringan Informasi Sekolah (JIS) / School Information Network
- 2002-2003 Wide Area Network Kota (WAN Kota) / Municipal Wide Area Network
- 2004-2005 Information and Communication Technology Center (ICT Center)
- 2006-2007 Indonesia Higher Education Network (Inherent)
- 2007-now Jejaring Pendidikan Nasional (Jardiknas) / National Education Network
- 2008-now Southeast Asian Education Network (SEA EduNet)

The goal is e-Learning System is intended to bridge lecturers with students in teaching and learning outside of school / school hours. The latter, the free sharing e-

learning websites has started coming in 2008, i.e. BRAINMATiCS (2018) and Advancing the art & science of education (2018).

Along with the development of ICT infrastructure, the educational institutions began to develop elearning. Some universities are developing their own elearning platform, including: Universitas Gadja Mada (2018), Unissula Semarang (2018), and Amikon Jogjakarta (2018).

Some universities use the open source Moodle platform, for example: ITB (2018), UNPAR (2018), Universitas Gunadarma (2018), ITS (2018), Universitas Brawijawa (2018) and Universitas Budi Utomo (2018).

In Indonesia, this e-learning system is regulated in national Act, specifically, Indonesia Act No. 20 2003 about National Educational System. The act regulates and encourages the use of e-learning in Indonesia by addressing three important points. First, Distance education under e-learning serves to provide educational services to community groups who cannot attend education face to face or regular. Second, e-learning is conducted on all lines, levels and types of education. Third, distance learning is organized in a variety of forms, modes and scopes supported by learning facilities and services as well as a scoring system that ensures the quality of graduates in accordance with national education standards, and Form of distance education includes computer based media such e-learning. As the result of having legal platform behind the e-learning system many Indonesia universities implemented e-learning system in 2007. For example, there are Universitas Pendidikan Indonesia (UPI) di Bandung, Universitas Sriwijaya (Unsri) di Palembang, Universitas Negeri Yogyakarta (UNY), Universitas Negeri Makassar, Universitas Negeri Malang, Universitas Muhammadiyah Malang, Universitas Cendrawasih, Universitas Nusa Cendana,

Universitas Katolik Atma Jaya, Universitas Negeri Solo, Universitas Lampung, Universitas Tanjungpura, Universitas Mataram, and Universitas Bali,

Further, E-learning in Indonesia is paving its way across all levels of educational ladder. Indonesian government envisaged a possible boost in web based education and as a result restructure the nation's education to include E-learning infrastructure. This implementation is germane considering that fact that competition in employment does not allow the employees to leave their jobs for further education and E-learning is the best replacement. Since 2006 Indonesia has accepted into the universities a number of web based learning systems and a typical example is the degree jungle search engine which facilitates Indonesian learner's choice of programme for academic pursuance.

Sanata Dharma University has a web based learning management system called EXELSA (Experieintial E-learning of Santa Dharma University) and it has been underway since 2008. The facility provides services like online board discussions, information announcement online tests, auto mark quizzes and exams (Sedana et al., 2010). Besides there is also Elfindo, an E-learning portal developed in 2008 to serve some information needs of Indonesian education (Efindo, 2008). This is based on MOODLE – modular objective- oriented dynamic learning environment, a software package developed for internet learning (Cole & Foster, 2007)

There are many universities that run online and web based undergraduate programs in Indonesia. Institut Pengembangan Manajemen Indonesia (IPMI) International Business School is an accredited institute that undertake business management and educational research online. It is situated at Kalibata Pancoran South Jakarta. Pelayanan dan Pengembangan Sumber Pembelajaran (PPSP) University of

Indonesia also do undergraduate web based program. There is Inti College Indonesia (ICI) College which has an E-learning platform for prospective undergraduates, Corlins University which run bachelor program over the web and Glion Institute of Higher Education which organises accredited on-line MBA program in international hospitality.

To make a successful e-learning acceptance and use, it needs three important factors: (1) fund support from government (Inglis et al, 1999), (2) human capital (Errington 2001), and (3) internet penetration (Citation). Indonesia offers unique and interesting research context for testing role of intelligence on UTAUT model as it complies with the lack of those three important factors.

Firstly, according to Inglis, Ling, and Joosten (1999) the use of limited costs in building online learning is a mistake. Meanwhile, Indonesia was the largest growing for e-learning system infrastructure. Indonesia e-learning market has increased up to US$ 12.2 billion making Indonesia the most promising country for e-learning. In economy perspective, Indonesia is well known because it has the largest economy in the South-East Asia region with gross domestic product (GDP) worth 861.93 billion US dollars in year 2015. Indonesia is also one of the newly industrialized countries that undergo rapid economic growth. This indicates that Indonesia has economies of scale to fund the e-learning system

The second interesting context offered by Indonesia is related to its education. According to Errington (2001), the most important role in this process is the human factor. This factor is actually very influential on the success of e-learning innovation, because preparation in developing e-learning takes longer than when doing face-to-face learning preparation. Moreover, internet literacy also may affect the adoption of

e-learning. Yet, Indonesia lacks of this intelligence factor. There is a dearth of data on the factors which influence IQ and EQ in Indonesian children; hence, this study conducted a several of questionnaire-based study to conclude the environmental factors which influence IQ and EQ in Indonesian children.

In terms of Human Development Index, Indonesia was in 108 rank out of 187 countries (see Figure 1.1). This means that applying e-learning in Indonesia may face challenges in its acceptance and use. The human capital of Indonesia may not be ready to accept this new e-learning, and also may face difficulties in developing the e-learning due to this low level of human development. Therefore, the context of Indonesia should give another interesting insight to explore the research objective.

Rank 2013 (2012)	Country	1980	1990	2000	2005	2010	2011	2012	2013
1 (1)	Norway	0.793	0.841	0.910	0.935	0.939	0.941	0.943	0.944
5 (5)	United States	0.825	0.858	0.883	0.897	0.908	0.911	0.912	0.914
9 (12)	Singapore	..	0.744	0.800	0.840	0.894	0.896	0.899	0.901
15 (15)	Hong Kong	0.698	0.775	0.810	0.839	0.882	0.886	0.889	0.891
15 (16)	Korea	0.628	0.731	0.819	0.856	0.882	0.886	0.888	0.891
17 (16)	Japan	0.772	0.817	0.858	0.873	0.884	0.887	0.888	0.890
30 (30)	Brunei Darussalam	0.740	0.786	0.822	0.838	0.844	0.846	0.852	0.852
57 (57)	Russian Federation	..	0.729	0.717	0.750	0.773	0.775	0.777	0.778
62 (62)	Malaysia	0.577	0.641	0.717	0.747	0.766	0.768	0.770	0.773
79 (80)	Brazil	0.545	0.612	0.682	0.705	0.739	0.740	0.742	0.744
89 (89)	Thailand	0.503	0.572	0.649	0.685	0.715	0.716	0.720	0.722
91 (93)	China	0.423	0.502	0.591	0.645	0.701	0.710	0.715	0.719
108 (108)	**Indonesia**	**0.471**	**0.528**	**0.609**	**0.640**	**0.671**	**0.678**	**0.681**	**0.684**
117 (118)	Philippines	0.566	0.591	0.619	0.638	0.651	0.652	0.656	0.660
118 (119)	South Africa	0.569	0.619	0.628	0.608	0.638	0.646	0.654	0.658
121 (121)	Viet Nam	0.463	0.476	0.563	0.598	0.629	0.632	0.635	0.638
128 (129)	Timor-Leste	..	..	0.465	0.505	0.606	0.606	0.616	0.620
135 (135)	India	0.639	0.431	0.483	0.527	0.570	0.581	0.583	0.586
136 (137)	Cambodia	0.251	0.403	0.466	0.536	0.571	0.575	0.579	0.584
139 (139)	Lao, PDR	0.340	0.395	0.473	0.511	0.549	0.560	0.565	0.569
150 (150)	Myanmar	0.328	0.347	0.421	0.472	0.514	0.517	0.520	0.524
187 (186)	Niger	0.191	0.218	0.262	0.293	0.323	0.328	0.335	0.337

Figure 1.1: HDI rank around the world

Lastly, it is about the internet penetration and consumption. Indonesia is the fourth internet consumer in Asia with about 78 million users. Even though internet usage is encouraging report from Esfindo survey shows that only 187 schools use E-learning and have learning sites scattered across 20 provinces. The top five provinces are central Java 41 sites, west java 33 sites, Yogyakarta 31 sites, east java 27 sites and Jakarta 16 learning sites (Suhartanto et al., 2010). The use of ICT in schools is low and this has affected E-learning drastically. The low level of E-learning is attributed to inadequate learning infrastructure that supports the implementation of E- learning especially internet logistic needs. Besides there exist many Universities and Colleges which do not consider E-learning as a medium that can improve education (Suhartanto & Junus, 2014; Tikoria & Agariya, 2017).

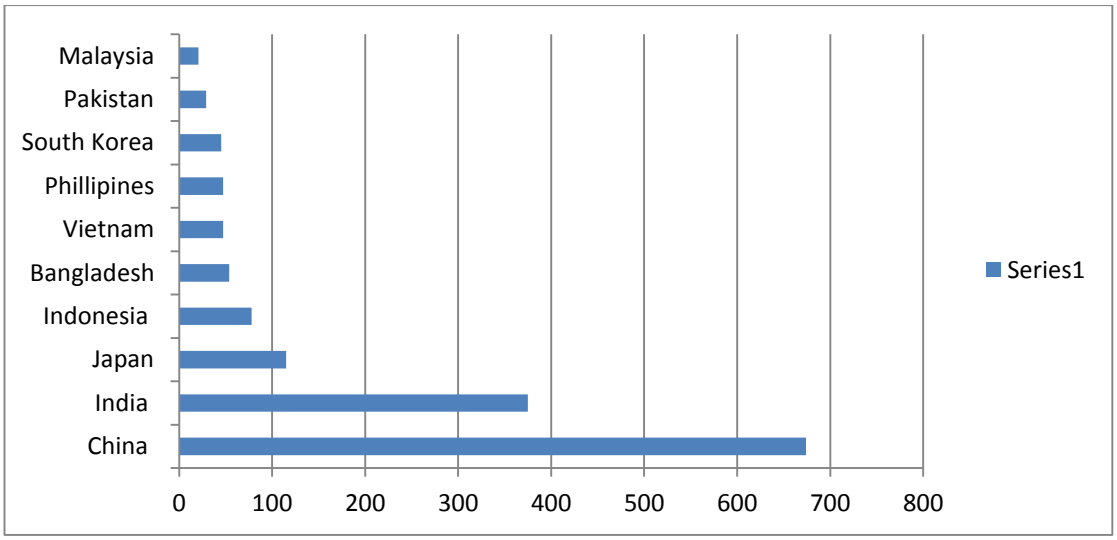

Figure 1.2: Top Internet Consuming Countries Asia
(www.internetworldstats.com/stats3)

1.2 Problem statement

Testing of Unified Theory of Acceptance and Use of Technology (UTAUT) model has been heavily studied amid the conflicting empirical evidence and theoretical

disagreement documented in the extant empirical technology management literature. Thus far most of the existing literature in based on the developed countries, and little is known about the success story of determinants factors of UTAUT model from developing countries notwithstanding a few recent undertaken studies (e.g., Maldonado et al, 2009; Maldonado et al, 2011; Tarhini et al, 2014). Comparatively, developing markets like Indonesia have issues on human development and education equality, left them behind in the adoption of new technology, especially, e-learning adoption. The complexity and rapid development of e-learning might need intelligence to make it successful (Venkatesh et al, 2014). Taking Indonesia as research context could offer a different snapshop of the intelligence role on UTAUT model. In other words, the prior findings of technology adoption in UTAUT framework in developing markets may not necessarily at the same magnitude with the developed countries due the role of intelligence. Building on these theoretical assumptions, this research aims to empirically examine the intelligence moderating role on UTAUT model in the context of acceptance and use of e-learning in a relative developing country like Indonesia.

Indonesia offers unique environment setting of the intelligence role on UTAUT model. Firstly, Indonesia relatively has smaller technology users compared to their peers. Figure 1.3 shows that Indonesia is the lowest even though their economy (GDP) is the highest compared to Singapore, and Malaysia. This figure is followed by the chart of Human Development Index (HDI). Figure 1.4 shows again Indonesia is the lowest compared to their peers. HDI is an indicator to show education quality and equality in a country. It is usually used to analyze the level of education system in a country. Alas, there is close correlation between technology users and HDI level. Figure 1.5 shows that Indonesia's technology adoption is closely related to their HDI.

When the HDI increases, the technology users also increases. In other words, education or intelligence hypothetically is associated with technology adoption. Figure 1.3 shows that in the context of Indonesia, HDI or education is an important factor for technology adoption.

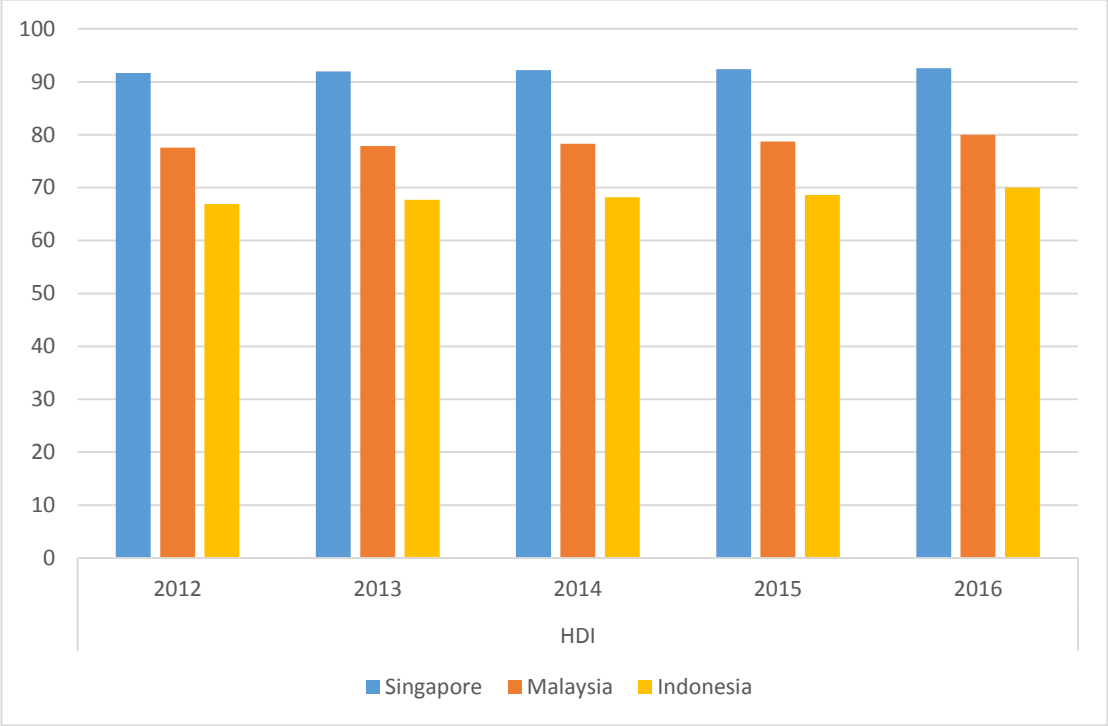

Figure 1.3: Human Development Index in Singapore, Malaysia, Indonesia over 2012-2016

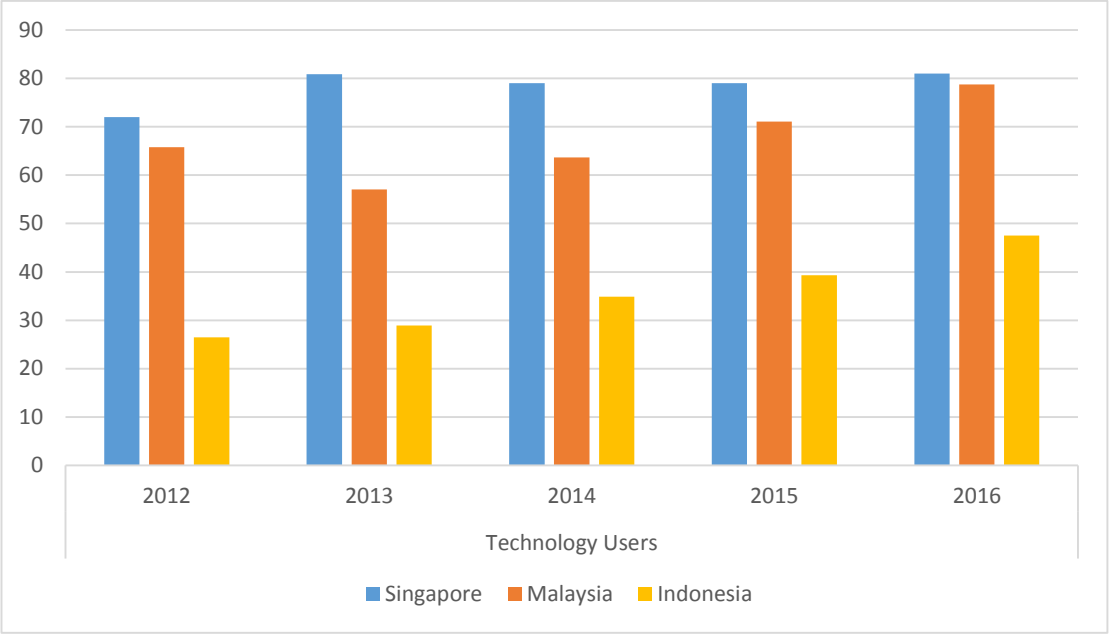

Figure 1.4 Technology Users in Singapore, Malaysia, and Indonesia over 2012-2016

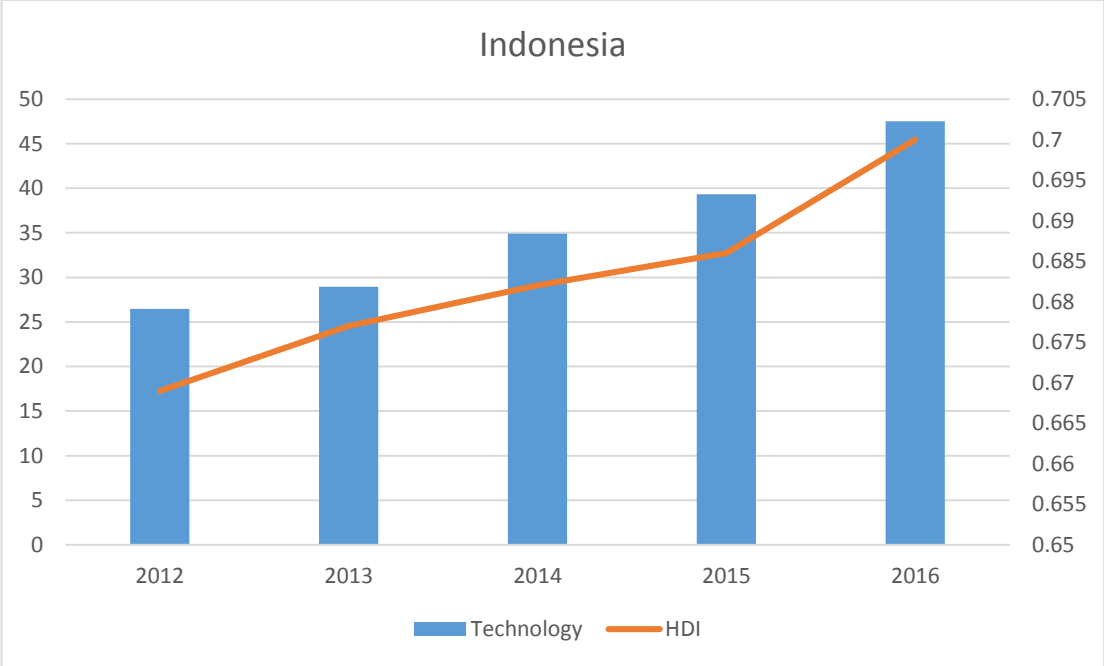

Figure 1.5 Technology Users vs HDI in Indonesia over 2012-2016

Indonesia also gives interesting snapshot in terms of e-learning acceptance and use. It is reported that E-learning in Indonesia faced challenges due to infrastructure and willingness of the education stakeholder. Indonesian Students and lecturers/teachers feel it is hard to adopt e-learning because they have to learn again from the beginning. This is tally with prior research such Venkatesh (2000) and Venkatesh et al (2014) where the technology adoption will face difficulties due to the willingess of users. This willingnes is closely related to their education level or intelligence.

Kaliky (2016) is a good example to show the role of intelligence on technology adoption. He carried out a study about using internet in learning process. The findings are interesting where most of Indonesian students did not use internet as part of learning process. He relates that finding with the intelligence student where intelligence students are more likely to use internet rather than less-performed students.

Meanwhile, Lestari and Harjo (2016) argue that the success of e-learning adoption such blended learning in Indonesia is due to the innovation of lecturers. Blended learning in Indonesia has to be more innovation because there is variation of knowledge level among Indonesian students. In other words, intelligence level may give different impact on e-learning adoption for Indonesian students. http://repository.ut.ac.id/6551/1/TING2016ST2-28.pdf

Interestingly, UTAUT model has no intelligence variable in the model. It is propounded with the purpose of explaining users' acceptance behaviour have shown remarkable contribution in explaining the users intention, however studies have come with findings that UTAUT constructs do not fully explain the variations in user behaviour and intention to adopt information technology system (E-learning) though

accurate (Burton, 2005; Davis 1991). Sedana (2010) used the unified theory of acceptance and use of technology (UTAUT) proposed by Vankatesh (2003) in explaining user intention to use EXELSA in Indonesian university and establishes that the model though good, could only explain 27.3 percent variations regarding intention of use behaviour among university students and lecturers. In an attempt to fill this gap created by UTAUT to fully explain the variations in user behaviour several researchers have proposed additional variables to bridge the gap. Sanchez et al., (2012) proposed effective technical support and establishes that this has a direct effect on PEOU and PU to explain user behaviour however this research is done in Spain and impact in explaining behavioural intention was same as UTAUT's construct. Cheng (2011) proposed quality information, service and instructors in Taiwan and found an impact on user behaviour. Hasibuan and Suhartanto (2013) proposed individual differences to explain the variation in intention to use behaviour in E-learning but did not access IQ and EQ of undergraduates. All the above attempts though good, still could not address the variation lapses in the intention behaviour and actual use partly because these researchers fail to address a major assumption flaw of the model which presume that people by nature can plan their behaviour and are rational and will automatically assess PU and PEOU before developing intention to use and the actual use syndrome. UTAUT has no prescription as to how to make technology easy to use (Mathieson, 1991). Eugenijus Kurilovas (2018) mentioned that UTAUT is examined while being applied in education in terms of acceptance and use of e-learning purposes. However, these behavioural lapses in UTAUT lead this research to identify intelligence, a precipitator of good planning, rationality and innovation as a moderator to explain and enrich UTAUT.

This study proposes as gap in research the moderating effect of intelligence (IQ and EQ) as a determinant to explain the variations in behaviour intention and use behaviour among third year undergraduates in Indonesia considering the fact this area of research has neither been explored in Indonesia nor within the quest to enrich the prediction of UTAUT's constructs nor among then undergraduates in Indonesia. The inclusion of "IQ and EQ" in UTAUT model of this variable offers "newness" and "originality" in the thesis. Again Aydin (2005) shows that IQ and EQ are important determinants in superior performance and that there exist a strong and significant relationship between intelligence as measured in IQ and EQ and performance. Connecting the finding of Aydin (2005) to the technology Acceptance Model, this research posits that individual intelligence could explain further the variations in the model and that differences in Intelligence as measured in IQ and EQ are effective moderating that could explain further the lapses in the perceived usefulness and ease of use to explain intention and actual use of information system (E-learning).

In addition most of the various attempts to enrich the UTAUT model are made in other countries (Venkatesh et al . 2012; Williams et al., 2015) other than Indonesia which means that such findings are dearth of evidence and cannot explain precisely the case of behavioural intention to use E-learning among Indonesian undergraduates. This leaves scanty literature in the context of Indonesia regarding E-learning acceptance behaviour among third year undergraduates in Indonesia.

1.3 Research Questions

The following questions are asked in order to enable this research to investigate successfully the drill to establish the moderating impact of intelligence on the use of E-learning among third year Indonesian undergraduates. The main research question

of this study is "*Is there moderating role of intelligence on the relationship between user acceptance on e-learning and the intention of use of e-learning among Indonesia undergraduates*".

This main question are divided into four specific question, which are :

1. What level of student's intention to use E-learning in Indonesia?
2. What are the relationship between Performance Expectancy, Effort Expectancy, Social Influence and behavioural intention of adopting E-learning among undergraduates in Indonesia?
3. What is the significant relationship between behaviour intention and use behaviour in E-learning among Indonesian undergraduates?
4. Do IQ and EQ significantly moderate the relationship between Performance Expectancy, Effort Expectancy, Social influence and Behavioural Intention of E-learning among Indonesia undergraduates?

1.4 Research objectives

The main objective for this research is to investigate the moderating effect of intelligence as measured by IQ and EQ on the adoption and use of E-learning among Indonesian undergraduates taking into consideration the constructs of the UTAUT model.

In line with the research questions and research model, the detail objectives of this research are :

1. To examine the level of student's intention to use E-learning in Indonesia.

2. To predict the relationship between performance expectancy, effort expectancy, social influence and behavioural intention to adopt E-learning among undergraduates in Indonesia.
3. To evaluate the relationship between behavioural intention and use behaviour to use e-learning among undergraduates in Indonesia.
4. To investigate the moderating effect of IQ and EQ on the relationship between Performance Expectancy, Effort Expectancy, Social Influence and Behavioural Intention to use E-learning among Indonesian undergraduates.

1.5 Scope of Study

The study seeks to assess the role of intelligence on the use of E-learning among third year Indonesian undergraduates. The study will use structural equation model to assess the relationship among the selected variables and assess the moderating effect of intelligence on the behavioural intention and use behaviour among the selected third year undergraduates. The population of the study are third year undergraduates in the Indonesian universities. This research is conducted in Indonesia, a country with an emerging market. Primary data are taken to ensure the accuracy of the data. The measurement of actual use of e-learning by Indonesian undergraduate students is adopted from earlier studies first model which includes the experience, gender and voluntariness of use of the firms. In this study, intelligence is introduced and added into the first model. Intelligence divided into two dimensions, namely, IQ and EQ. Each intelligence is measure using 25 items where it is adopted from Salovey et al (1995), and Meyer and Geher (1996), which the latter modified by Bryant and Veroff (2017). These data are going to be run using Smart PLS to be interpreted.