

THE TECHNOLOGY ACCEPTANCE MODEL (TAM) ON INNOVATIVE TECHNOLOGY E-KTP INDONESIA

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Abstract: Nowadays, Technology Acceptance Model (TAM) is becoming more important due to technological innovation and shorter product life cycle. This is because of the level acceptance of technology is varied and unpredictable which lead to failure implementation. Meanwhile, Indonesia's government recently has established e-KTP (KTP Electronic) program in order to improve public service about Resident Identity Card (KartuTandaPenduduk/KTP). Hence, this study aims to analyze the implementation of electronic-Resident Identity Card (e-KTP which stands for "electronic-KartuTandaPenduduk") at Indonesia. Specifically, this study analyze on four main aspect of Technology Acceptance Model namely: perceived usefulness, perceived ease of use, behavioral intention to use and actual system use. For doing so, this study has analyzed the implementation of e-KTP using both primary and secondary data. Furthermore, this study discusses the benefit, strength and weakness of the implementation of e-KTP according Technology Acceptance Model perspective. The contribution of this study especially for (1) understanding the main problems on the implementation of innovative technology i.e. e-KTP in Indonesia, (2) understanding key success factors for new technology acceptances based on cases study of e-KTP in Indonesia.

JEL Classification : (4) Management (MAN); Technology Management,

Key words : Technology Acceptance Model, e-KTP, Indonesia

INTRODUCTION

Nowadays, Technology Acceptance Model (TAM) is becoming more important due to technological innovation and shorter product life cycle (Ma, Q, 2004; Azis, 2010). TAM is used to understand the factors that influence the acceptance of the use of new technology (Davis, 1989; Chau, 1996). This is because of the level acceptance of new technology is varied and unpredictable which lead to failure implementation. TAM provides a theoretical basis to determine the factors that influence the acceptance of a technology within a country, such as Indonesia.

Indonesia is one of the most populous countries after China, India, and the United States, with a population until the year 2011 has reached 241.973.879 people. In order to manage the population is dense and dynamic, with high growth, it is

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important that governments implement the code of civil registration program, ranging from population registration, civil registration and processing of information. One form of activity in the population registration is issued identity cards or ID cards (KTP stands for *Kartu Tanda Penduduk*). ID cards (KTP) according to Minister of Home Affairs No. 28 of 2005, is self evident as to the legitimacy of population published by the districts / cities applicable throughout the territory of the Republic of Indonesia. ID cards (KTP) are valid nationwide, and is used as identification in public services. ID cards (KTP) given to the citizens and residents of Alien Permanent Residence has 17 years of age or married or never married. The validity period of ID card for foreigners stay tailored to the validity of permanent residence.

The basic function of ID cards (KTP) are known as conventional ID card is the official identity card as a resident of Indonesia issued by the state and become a requirement in the care of the needs associated with government bureaucracy. Through a national ID card are identified according to its distinctive characteristics as a unique identity. New problems began to arise in the event of urbanization on the grounds of economic factors, which impact on the increasingly unequal distribution of the population in a region. This causes many people who have more than one identity card so that the government's difficulty in identifying the population of an area. This is due to the absence of integrated databases that collect data from the entire population of Indonesia. This fact gives an opportunity to the people who want to cheat against the state by duplicating ID cards (KTP). Some of which are used to avoid taxes, facilitate the passport cannot be made across the city, securing the graft, and hide your identity.

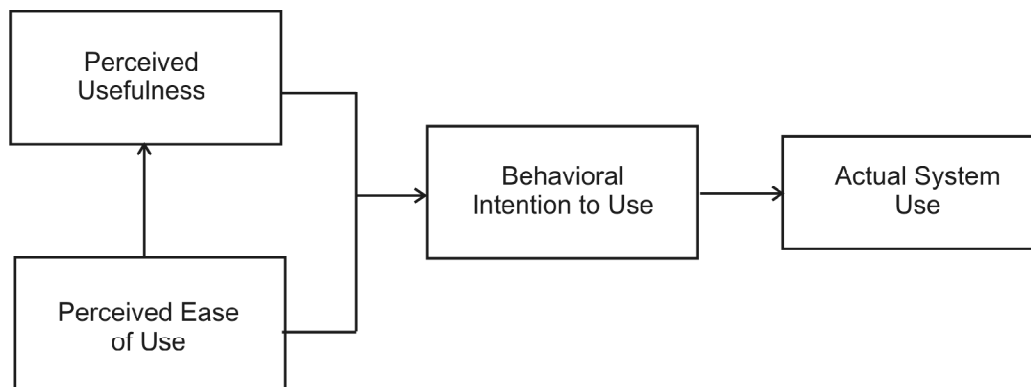
In order to overcome the disadvantages of conventional ID card, this time, the government began construction of the new Republic of Indonesia on population database coordinated by the Directorate General of Civil Registration, Ministry of Home Affairs, which initiated the birth of e-ID card program or e-KTP (e-KTP which stands for "electronic-*Kartu Tanda Penduduk*"), as an effective and efficient solutions for government to conduct monitoring of population problems and provide better service to the community. Hence, this study aims to analyze the implementation of electronic-Resident Identity Card at Indonesia.

THEORETICAL FRAMEWORK AND RESEARCH METHODOLOGY

Technology Acceptance Model (TAM) is one of the models built to analyze and understand the factors that influence the acceptance of the use of technology. The aim of the TAM is to models how users come to accept and uses of technology (Adams, 1992; McCloskey, 2003). TAM provides a theoretical basis to determine the factors that influence the acceptance of a technology within an organization, both private and public organization (Pin Yu, *et al.*, 2009). TAM explains the causal relationship between belief (of the benefits of an information system and the ease

of use) and behavioral goals / purposes, and actual use of the user / user of an information system. TAM models actually adopted from the model of TRA (Theory of Reasoned Action), namely the theory of reasoned action with the premise that one person's reaction and perception of something, will determine the attitudes and behavior (Szajna, 1996; Yu, *et al.*, 2003). Reactions and perceptions of users of Information Technology (IT) will affect his attitude in the acceptance of such technologies. One factor that can influence the user's perception of the usefulness and ease of use of innovative technology as an action that is reasonable in the context of technology users, thus the reason someone in to see the benefits and ease of use of innovative technology to make the actions / behavior of the person as a benchmark in the acceptance of a technology. As an information systems theory, TAM model suggests a number of factors that influence the user decision when they are presented with a new technology, specifically on how and when they will use it. As developed by Davis *et al.* (1989), TAM has four main aspects i.e. perceived usefulness, perceived ease of use, behavioral intention to use and actual system use, as presented in figure 1.

Figure 1: The Technology Acceptance Model (TAM) Model



Source: Davis *et al.*, 1989; Venkatesh, 2000

Davis *et al.* (1989) defines the perception of the benefits (perceived usefulness) as "the degree to which a person believes that using such a system can improve its performance in the work". The perception of ease of use (Perceived ease of use), in contrast, refers to "the degree to which a person believes that using such a system does not need to bother. It follows the definition of "easy" ("Release"): "Freedom from difficulty or great effort" or "Do not have any trouble or effort or hard (Davis, *et al.* 1989, Venkatesh, 2000). Behavioral intention to use is a behavioral towards the use of the system in the form of acceptance or rejection as the impact when someone is using a technology in its work. Other researchers claim that the factor attitude (attitude) as one of the aspects that influence individual behavior (Jackson *et al.*,

1997; Lucas, 1999). The *behavioral* of a person consists of elements of cognitive / perspectives (cognitive), affective (affective), and components related to the behavior (behavioral components), while the behavioral intention to use is a behavioral tendency to use the technology. The Actual system use of an innovative technology is a function of perceived ease of use and perceived usefulness. TAM model emphasizes that actual system use is determined by users' behavioural intention to use, in which is influenced by users' attitudes toward using an innovative technology.

This study analyzes the e-KTP (e-KTP which stands for "electronic-Kartu Tanda Penduduk") implementation using four main aspects of Technology Acceptance Model i.e. perceived usefulness, perceived ease of use, behavioral intention to use and actual system use. The research methodologies used are empirical and literature study of Technology Acceptance Model on implementation of electronic-Resident Identity Card at Indonesia. This was conducted by analyzing related government rules, observing processes of e-KTP implementation, and grasping the key success factors for new technology acceptances based on case study of e-KTP in Indonesia. Data is collected through literature surveys i.e. government websites, newspapers, proceeding seminars, official presentations, magazines, press releases, and other trusted and related materials. Selected primary data was collected by discussion to key persons and direct observation during e-KTP implementation. This methodology has capability of offering advantages which cannot be found in more quantitative research methodologies (Eisenhardt, 1989; and Patton, 2003; Azis, 2011).

THE E-KTP INDONESIA

The e-KTP is an authentication method and design with high data security. This can be achieved by embedding the chip in the card that has the ability to authentication, encryption and digital signatures. The e-KTP card program is using the residence identity number (NIK), which ensures that each resident has one and only one ID number. The process of creating e-KTP consists of several stages. It starts from invitation to compulsory ID card holders, data verification, through the recording process. On the recording phase, the compulsory finger prints are taken with autographs, taking pictures, and taking iris. By using fingerprint biometrics system, then any holder of e-KTP can be connected into a single national database, so that each resident requires only 1 (one) ID cards only and can be used anywhere throughout Indonesia. The government also ensures that the Indonesian population data are protected from duplication interceptions and foreign parties via e-ID card printing machines. E-KTP structure itself consists of nine layers which will increase the security of conventional ID card. Chip planted between white and transparent plastic on the top two layers (viewed from front) as can be seen on figure 2.

Figure 2: e-KTP Indonesia



The chip has an antenna in it that will be issued if the wave is swiped. This wave will be recognized by the e-ID card detection tool that can be known whether the ID is in the hands of one who is right or not. In the e-ID chip with 8KB capacity that can have recorded all residents of identity data, equipped with a photo, fingerprint data of the ten fingers, and photo eye scanning. Electronic ID cards have actually been launched since early 2010. But because there are some barriers concerning technology and human resources officers, so it is not expected to be completed (to reach all parts of Indonesia) in 2012. The government policy from 2010 until 2012 with its budget commitment is presented in table 1.

**Table 1
Main activity and Budget of e-KTP Indonesia**

<i>Year</i>	<i>Main Activity</i>	<i>Budget (in Million Rupiah)</i>
2010	Updates data in all the District / City and Publishing NIK (ResidenceIdentity Number) in 329 districts / cities	384.000
2011	Issuance of Population Identification Number in 168 districts / cities and implementation of e-KTP In 197 districts / cities	2.468.000
2012	The implementation of e-KTP in 300 districts / cities	3.827.000

Source: adoption from presentation slide, entitle: Consolidating Preparation application of e-KTP, April 2011, presented by Director of General Population Civil Registry and ministry of home affairs.

The e-KTP program is a national program managed by the central government. The Directorate General Administration of the Ministry of Population Affairs, adopted by the government areas. To handle this project, the government

gave full confidence to the Ministry of Home Affairs and the Agency for the Assessment and Application of Technology (BPPT), and involving 15 ministries and supported by relevant bodies. The leading sector in the region is the Department of Population and Civil Registration coordinate with the Work Unit (SKPD), is related to the program e-KTP card.

With electronic ID cards, each resident does not require a lengthy process involving a move in an area and do not need to create a local identity card when moving residence. Electronic ID card also has a number of benefits for the accuracy of the data among the population that is expected to minimize the misuse of identity. As in the case of sale and purchase of vehicles, maintenance of passport, etc. Expected in the future e-KTP card can also be used for various other purposes such as maintenance of the land deed to health services, as well as the tax ID card.

THE E-KTP ANALYSIS USING TAM MODEL

This study analysis the implementation of four main aspect of Technology Acceptance Model namely: perceived usefulness, perceived ease of use, behavioral intention to use and actual system use. **Perceived usefulness:** The usefulness of e-KTP is strong since the NIK (residence identity number) in the e-KTP is used as the basis for issuance of Passport, Driving License (SIM), Taxpayer Identification Number, Insurance, Certificate of Land Rights and the issuance of identity document. The problem occurs on the perceived usefulness only due to the limitation on dissemination information to the residence about the new innovative technology e-KTP. **Perceived ease of use:** Authentication Identity Card (e-KTP) typically uses the biometric verification and validation of the system through the introduction of physical or behavioral characteristics of human beings. There are many types of security in this way, including finger print (fingerprint), retina, DNA, face shape, and the shape of the teeth. However, in the e-KTP only used fingerprints, hence it easy for use which influence the perceived ease of use. The use of e-KTP fingerprint more sophisticated than had been applied for a license (driver's license). Fingerprints are not just printed in the form of images (jpeg format) such as driver's license, but can also be identified through the chip installed on the card. The data stored on the card is encrypted by a particular algorithm. **Behavioral intention to use:** The users are intention to use the e-KTP system. From the intention behavioral, one can predict the level of usage of attention attitudes toward these e-KTP innovative technologies, such as his tendency to always use the e-KTP for daily activities. However, since the e-KTP still new and very limited residence has received their e-KTP, hence the pattern of behavioral intention to use is still in the early stage. Therefore, there are possibilities to conduct more quantitatively research to obtain the pattern of this behavioral. **Actual system use:** The actual system use is the real situation in the use of e-KTP can be seen from the shape measurement frequency and duration of use of e-KTP technology. Since the

e-KTP will replace the traditional or manual KTP system, hence the usage of this new e-KTP system will revolutionize the way of information data transaction.

In the application of e-KTP, there are several main benefit of e-KTP includes: (1) As self-identity with nationwide applicable, so no need to create a local ID card for a permit, opening a bank account, and so on; (2) Preventing multiple ID cards and ID card forgery; creation of accurate data to support the development program. (3) Preventing forgery of documents or multiple documents with reliable data security. The strength points of e-KTP implementation in Indonesia are as follows: government commitment with strong support of budget. As presented in table 1, the Indonesia government put strong budget commitment for the implementation of e-KTP program. One of the main objectives of e-KTP implementation is to support the election of president before 2014, hence the support from many stakeholder also strong for successfulness residence database system. In addition, the computerized technology support system is not new for Indonesia residence. The similar system has established in banking as well as in communication and telecommunication system.

Apart from a wide range of benefits gained through the use of e-ID card, but in practice, still found a few flaws, so it seems too premature to be implemented. Weaknesses include: (a) A lot of the infrastructure supporting the e-KTP card is not ready, especially in rural areas such as Kalimantan, Sulawesi, Nusa Tenggara and Papua. District in the interior region of Merauke, Papua, has yet to accept electronic equipment for the implementation of an electronic ID card program (e-KTP). E-KTP equipment to remote areas is also not complete. Service creation e-KTP 2011 has not approached the community. (b) Factor of safety data on its own as far as e-KTP card is also still doubtful, while the population data is considered something of privacy and secrets of each individual. The limited knowledge of most of society would lead to the emergence of new problems in data processing. Data processing is too long it will reduce the productivity performance. (c) Some areas are still difficult to access by the communication network, but his hopes of the e-KTP card is the data integration of all communities throughout Indonesia in the presence of this single identity number. The device used to input the identity ID cards only in the district office, so people who live far are burden with the cost of transportation.

KEY SUCCESS FACTORS

From the above discussion, several key success factors for new technology acceptances based on cases study of e-KTP in Indonesia are as follows:

- Government commitment: The main factor for the successful implementation of e-KTP is the government commitment through seriousness of the local government to work. This is because of the target number for e-KTP is huge

i.e. 172 million by end of 2012. Therefore, without the government commitment by putting e-KTP program as the first priority, hence the implementation of e-KTP will be difficult and tend to failed. Indonesia government shows their commitment through a huge budget as shown in table 1 above.

- Socialization: e-KTP is a new thing for the people of Indonesia, despite the conventional implementation has been going on for a long time. The new policy would have to be disseminate deffectively, in order to get a good response from the public. The mass mediadoes play a role in the dissemination of e-KTP, but of course the content is very limited, because itis important to realizethat the commercial orientation of the mass media would be more in the future than the interest of public understanding of thee-KTP. Hence, the synergy socialization among stakeholder to the community is a key for success of adoption new technology.

CONCLUSIONS

The application of e-KTP is a strategic step towards the orderly administration that mandates a single identity for each population and the establishments of the population database are complete and accurate. This study discusses the benefit, strength and weakness of the implementation of e-KTP according Technology Acceptance Model perspective. The contribution of this study especially for (1) understanding the main problems on the implementation of new technology i.e. e-KTP in Indonesia, i.e. infrastructure supporting in rural areas is not fully ready; data secure is still doubtful; some areas are still difficult to access by the communication network. (2) Understanding key success factors for new technology acceptances based on cases study of e-KTP in Indonesia, i.e. government commitment and socialization.

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