# Socio Technology Perspective for E-Government Implementation in Indonesia

Dana Indra Sensuse, Sofian Lusa.
*Laboratory of E-Government*
*Faculty of Computer Science, The University of Indonesia*
Email: dana@cs.ui.ac.id, sofian@ui.ac.id

*Abstract*— **The development of information and communication technology (ICT) in the Indonesian government has brought a new paradigm shift in the methods and processes of interaction among government, society, business, and intergovernment. Various international surveys (United Nations, Waseda University, and Economist Intelligence Unit) show that the implementation of e-government in every country is significantly increased, and it brings impacts on government and community relationship which is conducted from conventional to digital-based forms. However, many challenges and problems come up during the implementation of e-Government, especially in developing countries such as Indonesia. For Indonesia, the survey results can be used as a barometer for improving the services because the position of Indonesia in the study results is still far from expectation. The challenges and problems faced by the Indonesian government can be categorized into technical and non technical factors. This paper, therefore, will explore and map the problems of the E-government implementation in Indonesia by using a fishbone analysis to discover the problem roots holistically. This study proposes a socio-technical approach to overcome the problems in implementing E-government in Indonesia. By developing a socio-technical model, the behavior of e-Government application users and the design standards of technology quality will be able to be measured so that the implementation of E-government in Indonesia can be more effective.**

## I. INTRODUCTION

The rapid development of e-Government in Indonesia cannot be separated from the influence of globalization and internationalization, in which Indonesia becomes a part of the world community. Since early 1990, various countries have had to initialize the use of information and communication technologies (ICTs) to transform the government's relationship with the community, industry and other government agencies. With ICT, the government can directly provide services to the community, interact with the world of business, create an image of good government, increase government revenues, and reduce corruption as more transparent. There are at least eight e-Government models namely: Government to Citizen (G2C), Citizen to Government (C2G), Government to business (G2B), Business to Government (B2G), Government to employees (G2E), Government to government (G2G), Government to Non-Profit (G2N) and the nonprofit to Government (N2G) [1].

Along with the development of E-government model, many research organizations perform world ranking research on the E-government implementation, such as the United Nations (UN), the Waseda University, and the Economist Intelligence Unit (EIU). The methodologies used in those studies employed a number of indicators, in which the study results were then categorized and compared (benchmarked) for various countries.

## II. E-GOVERNMENT BENCHMARKING WORLD STUDY

The methodology used is benchmarking, which means measuring the comparative performance of e-Government in various departments of state and government. There are three organizations (the United Nation (UN), the Waseda University Institute of e-Government, and the Economist Intelligence Unit) that are considered consistent, and publish the reference in the assessment of e-Government in the world. For the year of 2010, the research has been changed significantly by considering financial and economic crisis. The top 10 ranking of the year 2010 are the Republic of Korea, The United States of America, Canada, United Kingdom, The Netherlands, Norway, Denmark , Australia, Spain and France. This result indicates that the top ten positions are dominated by developed countries. For Southeast Asia, Singapore is ranked as the first or 11th in the world ranking. In this region, Indonesia is ranked at 109th, below Thailand, The Philippines, and Vietnam. There is a decline as Indonesia was ranked 106 in the

1

year of 2008.

The UN Web Measurement Assessment classified the Websites into four categories, namely Emerging information services, Enhanced information services, Transactional services, and Connected services[2]

*A.  E-Government Survey of the Waseda University.*

In the year 2010, this institution provides records of e-Government role because it is associated with the global financial crisis. Number of countries that become participants grew from 34 countries to 40 countries. In 2010, the top ten are occupied by Singapore, followed by the United Kingdom, USA, Canada, Australia, Japan, Korea, Germany, Sweden, and Taiwan. Singapore is ranked at the first in succession since 2009. In 2010, Indonesia was ranked at 32 out of 40 countries in the survey. It is lower than the results of 2009 in which Indonesia was 23 out of 34. There is a significant decrease in score, which was 62.02 in 2009 to 48.4 in 2010. As a comparison, in the last five years, the Waseda University ranked the top ten as follows: [3]

TABLE I
*E-GOVERNMENT SURVEY RANKED VERSION WASEDA UNIVERSITY (2006-2010)*

| Rank | 2010 | 2009 | 2008 | 2007 | 2006 |
|---|---|---|---|---|---|
| 1 | Singapore | Singapore | USA | USA | USA |
| 2 | United Kingdom | USA | Singapore | Singapore | Canada |
| 3 | USA | Sweden | Canada | Canada | Singapore |
| 4 | Canada | United Kingdom | Korea | Japan | Japan |
| 5 | Australia | Japan | Japan | Korea | Korea |
| 6 | Japan | Korea | Korea | Australia | Germany |
| 7 | Korea | Canada | Japan | Findland | Taiwan |
| 8 | Germany | Taiwan | Hongkong | Taiwan | Australia |
| 9 | Sweden | Finland | Australia | United Kingdom | United Kingdom |
| 10 | Taiwan & Italy | Germany & Italy | Finland | Sweden | Findland |

The assessment indicators for the year 2010 are as follows network preparedness, required interface-functioning applications, management optimization, national portals, chief information officer (CIO) in government, e-government promotion, and E-participation. [3]

*B.  E-Government Survey Version The Economist Intelligence Unit (EIU)*

Since 2000, the Economist Intelligence Unit (EIU) has conducted a survey that focuses on identifying the capacity of world countries in utilizing ICTs for economic and social interests. The results of this survey are used as the basis for investment for other countries that make ICT as a fundamental factor of economic growth. In 2010, the EIU made a lot of adjustments in line with the role of ICT in the world economy. The six categories, individual criteria, and their weights in the model are described connectivity and technology infrastructure, business environment, Social and cultural environment, Legal environment Government policy and vision *and* Consumer and business adoption. [4]

Results of the Digital economy rankings in 2010 show that the first rank is occupied by Sweden, while Denmark down to be ranked number two, followed by the United States, Finland, Norway Netherlands, Hong Kong, Singapore, Australia, and New Zealand. For Asia countries, Hong Kong and Singapore are the best, while Indonesia is ranked 65th out of 70 countries, which is the same rating as in 2009.

*C.  Comparison of e-Government Survey*

Those studies show that the top 10 was dominated by developed countries like USA, Sweden, Danish, Australian, United Kingdom, Finland, Netherlands, Korea, and Singapore.

From e-Government value chain perspective, the developed countries have entered the phase of e-Government Impact since it has been introduced in a long time, and the services provided by the e-Government are in a variety of forms and their impacts are felt by the community. In Asia, Korea and Singapore becomes an icon of the best countries in implementing e-Government. (UN, Waseda University and EIU) e-Government is Hong Kong, Korea, Taiwan and Japan.

TABLE II
THE COMPARISON OF E-GOVERNMENT SURVEY

| Rank | UNITED NATION | | Waseda University | | The Economist Intelligence Unit | |
|---|---|---|---|---|---|---|
| | 2010 | 2008 | 2010 | 2009 | 2010 | 2009 |
| 1 | Republic of Korea | Sweden | Singapore | Singapore | Sweden | Denmark |
| 2 | United States | Denmark | United Kingdom | USA | Denmark | Sweden |
| 3 | Canada | Norway | USA | Sweden | United States | Netherlands |
| 4 | United Kingdom | United States | Canada | United Kingdom | Finland | Norway |
| 5 | Netherlands | Netherlands | Australia | Japan | Netherlands | USA |
| 6 | Norway | Republic of Korea | Japan | Korea | Norway | Australia |
| 7 | Denmark | Canada | Korea | Canada | Hongkong | Singapore |
| 8 | Australia | Australia | Germany | Taiwan | Singapore | Hongkong |
| 9 | Spain | France | Sweden | Finland | Australia | Canada |
| 10 | France | United Kingdom | Taiwan & Italy | Germany & Italy | New Zealand | Finland |
| | 109. Indonesia (109/184) | 106. Indonesia (106/182) | 32. Indonesia (32/40) | 23. Indonesia (23/34) | 65. Indonesia (65/70) | 65. Indonesia (65/70) |

Some notes in connection with the activities in e-Government benchmarking can be summarized as follows [5]:

1. Benchmarking purposes is to offer benefits to stakeholders both for research purposes or as information for development of e-Government (state-of-the-art) from year to year.

2. The focus of the benchmarking study changes from year to year. This indicates that the existence of priorities and issues are tailored to the needs and level of implementation of e-Government that happened in the world. At the beginning of th year 2000 the topic level implementation of e-Government readiness into the spotlight of the world later in the year 2001-2004 is transferred to the level of service availability and uptake rate, last year 2006 until now more focus to the expected impact [6]. For each level, if associated with e-Government value chain, the indicators are used as input and outcome. The Preview of e-Government in the value chain is as follows:
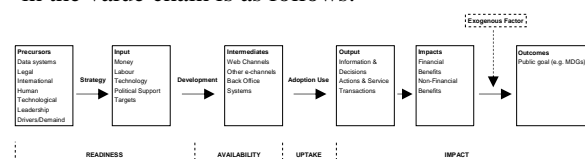


*Fig 1: e-Government  Value Chain*

2

3. Information technology (hardware, applications, and brainware) become tools as enablers that allow the achievement of goals with e-government are held for each country.

4. Findings of e-government survey in 2010, namely:
   a. Trend framework 2.0 [3] and the definition of connectivity is more directed to the broadband quality, 3G and 4G mobile quality .[4].
   b. Web 2.0 and social networks (Facebook, twitter, myspace etc) change the interaction patterns of government. [4] .
   c. Implementation of green ICT.[3].
   d. Roles of social, cultural environment, and education have become the determinant factor for the successful implementation of the fundamental portions of e-government [4]

## III. MAPPING THE PROBLEMS OF E-GOVERNMENT IMPLEMENTATION IN INDONESIA

### A. Problems of Implementation of e-Government in Indonesia

For the year of 2010, Indonesia is categorized as not satisfactory. From the United Nations study, Indonesia has experienced rank decline from 106 to 109. Assessment of the Waseda University shows that Indonesia decreased from 23 to 32 ratings. Finally, the assessment of Intelligence Economist Unit indicates that although there was an increase from the score 3,51 into 3.60, ratings remains the same, namely, Indonesia is still in rank 65 out of 70 countries.

In addition, the implementation of e-government in the developing countries faces many failures. In fact, 35% of the failure of e-government research are categorized as total failure, 50% as partial failures, and while 15% as succeed. [8].The cause of the failure was due to the existing gap between technical and non technical factors. For E-government in Indonesia, an estimated contribution of non technical factors is around 80% and 20% technical factors [9].

In order to explain the problems and challenges in implementing e-government in Indonesia, this study employs the framework of thinking. The idea is to identify problems of e-government implementation in Indonesia done by examining the results of the surveys conducted by research organizations (UN, Waseda, and EIU). The problems are then mapped into precursor stages of the e-government value chain. Systematic formulation is illustrated as follows:
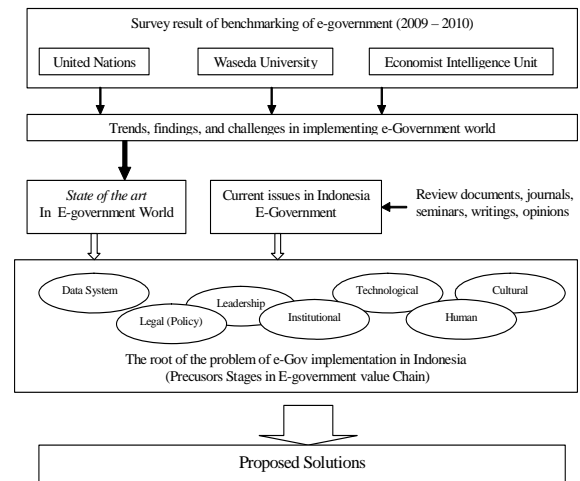


Fig 2: Systematic Formulation (Mapping Probelms E-Government in Indonesia)

This fact indicates the need of special attention on implementation of e-Government in Indonesia. To explore the problems of e-Government implementation in Indonesia, we need to record all of the problems holistically. There are seven aspects used in E-government value chain: Data systems, Legal, Institutional, Human, Technological, Leadership, and driver/demand translated in the Cultural aspect. These seven aspects are parts of precursor stage in e-Government value chain. Based on experiences, observation, and the various writings it can be concluded as follows: [9], [10], [11]

1. **Data Systems**.
   a. Platforms of diverse applications and databases that are used in application development that make it difficult to do the integration.
   b. Website is not updated even though some have been expired. This is because of the lack of technical guidance and supervision of the weak domain for *go.id*.
   c. There is no clear agenda on the national framework as to which is accepted as standardization in providing a national database.
   d. There is lack of standardization of ensuring the security of data and information.

2. **Legal (policy)**
   a. Regulations do not support.
   b. There is lack of regulation on e-Government promotion.
   c. Legal framework for interaction and transaction in the virtual world is unclear. Information and electronic transactions (UU ITE) law is actually counterproductive in some aspects.
   d. E-Government is still considered a project that depends on regional leaders who are in power.
   e. Cyber crime threats requires handling of a comprehensive law.

3. **Institutional**
   a. The main program of DeTIKNas (National ICT Council is poured into 16 flagship Programs, but

in fact the presence of this legislation raises many problems.
b. Organization structures do not support the implementation of e-government, especially in the region.
c. A partnership that is formed is not optimum, especially in local government.
d. There is gap between needs and analysis of e-government solutions that deliver.
e. Results of *Peringkatan E-goverment Indonesia* (PEGI) is not followed up by each institution.

4. **Human**
   a. Civil servants who are using ICT to serve the community are incompetent.
   b. There is no measurable competency readiness, which measures the level of competence in a government institution.
   c. Community as consumers are not getting adequate training about the advantages of of e-Government and how to use it.

5. **Technological**
   a. Constraints in collaborating and integrating databases that include the central government, regions, institutions and other relevant government agencies.
   b. ICT infrastructure has not been adequate and evenly distributed throughout Indonesia (digital divide).
   c. There is no government that adopted technology that supports e-government implementation, such as implementation of web 2.0, social networks, and mobile government.
   d. There is no analysis of technology readiness, which measures the extent of readiness of the technology in the E-government implementation.
   e. User Interfaces of government websites are not attractive.
   f. ICT convergence in the multimedia form such as chat, video, video conferencing are unavailable.
   g. Social networks applications such as Facebook, twitter, and others become more familiar for public use.

6. **Leadership**
   a. Initiatives from local leaders about e-government model are sporadic and adhoc.
   b. Regional autonomy provides negative impacts in which there will be possible conflicts between central and local budget allocations, and it will weaken coordination for ICT projects.
   c. Standardization among central, regional, and government agencies are lacking. It gives the freedom for local government in implementing e-Government.
   d. There is no political leadership, in which it generally occurs when regional leaders were replaced, and then the e-Government program is also likely to end.

e. There is no special education (certification) for regional leaders to understand e-government and ICT development.

7. **Driver/demand (culture).**
   a. Change management is needed nationally and followed by local governments, agencies, and other government agencies.
   b. Paradigm shift from manual to electronic job is to bring cultural changes.
   c. There is no willingness for sharing data and information among government agencies.
   d. There is no measure of organizational readiness, which measures the level of organizational readiness in using technology.
   e. There is still culture of corruption, collusion and nepotism in the bureaucracy in government.
   f. The use of computer for formal communication is so low that it is still necessary to communicate face to face.

*B. Mapping the problems of e-Government Implementation using Fishbone Analysis*

To view the problems of e-Government implementation holistically in Indonesia fishbone analysis is used. The description of the problem of mapping the application of e-government in Indonesia is as follows:
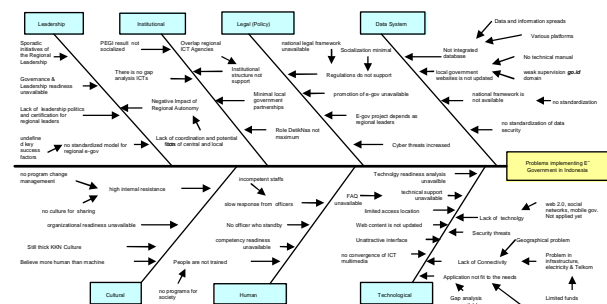


*Fig 3:* Mapping Probelms E-Government in Indonesia using Fishbone analysis

## IV. PROPOSED SOLUTIONS

Based on the e-government value chain, precursor stage is the beginning of the successful implementation of e-government. Every aspect of precursor stages has a strategy that is designed to overcome existing problems. Strategies can be divided in terms of technology, policy, and people. The technology and policies are related to provision of hardware, software, and infrastructure. Policy is related to a regulation and the enforcement of law in the interaction between government and stakeholders, Whereas strategy for the people is related to increased skill, competence, training, and certification. Previously, many solutions are given emphasis to technical factors in the solution, and ignore social factors such as measurement of the behavior of the user's e-government applications. Availability of

financial resources, infrastructure, and regulations are not fully guarantee the success of the use of e-government applications.

In this paper, the proposed solution is to overcome the problems of implementing e-government in Indonesia focusing more on socio-technical approach. Socio technical approach is a study that focuses on the social impacts arising from the presence of technology. Basic assumption of this approach is any process of implementation of information technology is always going to have an impact on the social aspects. Therefore, a comprehensive study needs to be done by considering a variety of social factors to ensure successful implementation of information technology. This approach could be a solution to minimize the failure of implementing e-government in Indonesia.

### A. The Socio-Technical System Approach.

The focus of the socio-technical system approach is that there is a gap between the presence of technology and the user's environment. The gap that occurs due to misalignments between the technological aspects with the social, institution (rules) and human aspects (group, organization, communities, and society). Socio-technical system design is needed as a bridge that can make alignment between technological aspects with social aspects, human, and institutions. Relationship between the three aspects are seen as follows [12]
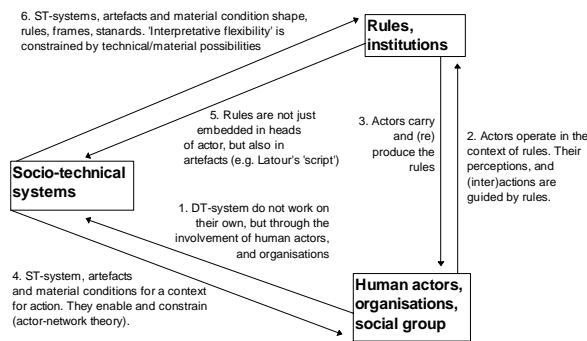


Fig. 5: Three Interrelated analytic Dimensions.

Original scheme showing the synthesis of socio-technical approach and its components are as follows: [13]
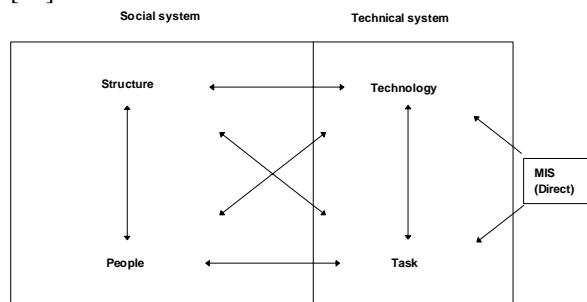


Fig. 4: Socio Technical Framework

In its development, Socio technical approach has been renewed by including aspects of human-computer interaction (HCI). Aspects of human computer interaction (HCI) become important, in which it uses psychological concepts like attention and usability in web applications, and organizational computing [14]. It leads to the socio-technical concept, based on general systems theory where one system type *emerges* from another as software data flows arise from hardware circuits [15] as follows:

1. *Hardware systems* based on *physical* exchanges of energy.
2. *Software systems* based on *information* exchanges emerge from hardware systems.
3. *HCI systems* based on *semantic* exchanges of meaning emerge from software systems.
4. *Socio-technical systems* based on *community* normative exchanges emerge from HCI systems to face problems like mistrust, unfairness and injustice. As the discipline of computing becomes social, the new "user" of computing is society itself.
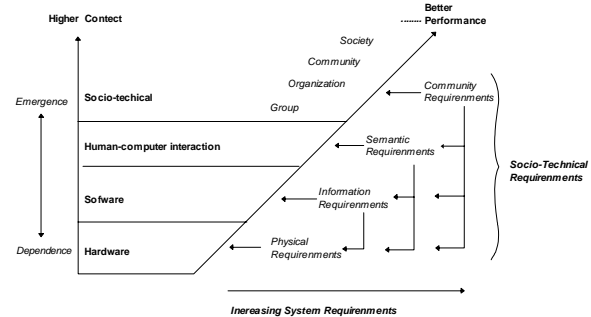


Fig. 6: Socio Technical System Levels

As shown in the Fig 9, the software cannot exist without hardware. Hardware is associated with physical requirements, and software is related to information requirements. Information exchanges allow human meaning, and human meaning allows the norms, culture, and identity of communities. Each level emerges from the one below it, then its nature changes the entire system's nature. The social level is the most complex, not only because it also contains more lower levels, but also because any social unit set can form a larger social unit ( family, village, city state, nation and so on. A socio technical system occurs when people interact via technology to create a community, as a socio physical system arises when they do the same physically [15].

### B. The Socio-Technical Model for E-government

In regard to finding solutions, it is necessary to design a socio-technical model tailored to the findings of the problems of e-government in Indonesia. Socio-technical model is proposed as a solution as follows:
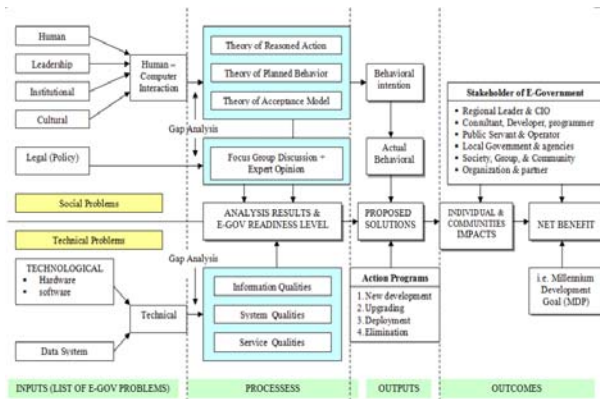
Fig. 7: Proposed Socio Technical Model for E-Government

Stages and explanation of socio-technical model are as follows:

1. Findings of implementing e-government problems in Indonesia (such as human, leadership, institutional, cultural, technological, and data system) are mapped into two categories: social and technical problems. Technical problems consist of technological and data systems, while social problems are categorized into human-interaction aspects for human, leadership, institutional, cultural, and legal (policy).

2. The next stage is conducting gap analysis by comparing current conditions with the criteria tailored to the methods used. Each criterion will be analyzed by creating a questionnaire and distributed to participants.

   a. For human-computer interaction aspects, three theories are interrelated, i.e., *Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB)*, and *Theory of Acceptance Model (TAM)*. TRA specifies that behavioral intention is a function of two determinants: a personal factor termed *attitude toward behavioral,* and person's perception of social pressures termed *subjective norm.* [16]. TPB extends the TRA for conditions in which individuals do not have full control over the situation. According TPB, people actions are directed by three kinds of considerations: *behavioral beliefs* about the likely outcomes of the behavior and the evaluations of these outcomes; *normative beliefs* about the normative expectations of others and the motivation to comply with these expectations, and *control beliefs* about the resources and opportunities possessed (or not possessed) by the individual and also the anticipated obstacles or impediments toward performing the target behavior [17]. TAM adapts the framework of the TRA and hypothesizes that a person's acceptance of a technology is determined by user's voluntary intention to use that technology.

Intention, in turn, is determined by person's attitude toward the use that technology and user's perception concerning its usefulness. Attitudes are formed from the beliefs a person holds about the use of the technology. The attitude components consist of *perceived usefulness and perceived ease of use. Perceived usefulness* is the user's subjective probability in which using a specific application system will increase user's performance, and *perceived ease of use* is the degree to which the user expects the target system to be free of efforts. [18]

   b. For legal (policy) aspects, gap analysis is conducted by holding focus group discussions and asking for expert opinion. Gap analysis is undertaken by performing benchmarking regulations of the countries that have successfully implemented e-government, the extent of support from the legal side to support the successful implementation of e-government.

   c. For the technical aspects, theory of *DeLone and McLean Model* is used. This model is able to explain the quality standards that must be owned by a hardware, software, and data system. Quality standards are referred to *information quality, system quality, and service quality.*

3. Results from the gap analysis provide a readiness level of the organization (social and technical aspect). Furthermore, the readiness level is designed as proposed solutions. The proposed solution is the result of analysis of e-government readiness level, and the analysis of the TRA, TPB, and TAM, which produce behavioral intentions and behavioral measures in the use of E-government. More detail, proposed solutions consists of four action that are *new development* for new solutions, *upgrades program* for solutions that already exist but are not maximized yet, *deployment program* for solutions that have been tested and will be used as a pilot model, and *elimination program* to factors that should not be necessary.

4. Expectations with the proposed solution will bring positive changes and impacts that will affect the use of e-government stakeholder (individuals and communities).

5. Finally, changes in the behavior of the users will bring net benefits in the long term, such as achievement of the Millennium Development Program (MDP).

## V. CONCLUSIONS

The world survey results indicate that e-government implementation shows significant results both in quality and quantity. The successful implementation of e-government applications not only depends on the

side of information technology, but also on user behavior that becomes the deciding factor of how big the impact and benefits posed by the existence of the e-government.

The continuation of this paper is the development of the questionnaires to each of the seven attributes mentioned above, adjusted for the application to be examined based on the characteristics of the application and then to be disseminated to the users of e-Government application in an area. The focus of the e-Government users may be divided into three parties, i.e., developers, administrators (operators) and end-users (community). After the questionnaire results are obtained, they can be used as information which represents the level of readiness of the institutions and people. Based on the results of these questionnaires, decision makers can make the program priorities to overcome the problems in every aspect, so it can make the successful implementation of e-Government.

## REFERENCES

[1] Zhiyuan Fang, (2002, May), "E-Government in Digital Era: Concept, Practice, and Development", *International Journal of the Computer, the Internet and Management*, Vol. 10, No. 2 pp. 2-10. Available http://www.journal.au.edu/ijcim/2002/may02/article1.pdf

[2] United Nations, (2010, April), " E-Government Survey 2010: Leveraging e-government at a time of financial and economic crisis", New York, USA. Pp. 59 – 97. Available http://unpan1.un.org/intradoc/groups/public/documents/UN-DPADM/UNPAN038853.pdf

[3] Waseda University, (2010, January)," Press Release: The 2010 Waseda University World e-Government Ranking", Japan, Available http://www.obi.giti.waseda.ac.jp/e_gov/World_e-Gov_Ranking10_en.pdf

[4] Economist Intelligence Unit, (2010, June), ,"Digital Economy Rankings 2010, Beyond e-readiness, A Report From the Economist Intelligence Unit", June 2010. pp. 3-20. Available http://graphics.eiu.com/upload/EIU_Digital_economy_rankings_2010_FINAL_WEB.pdf

[5] Heeks, Richard ," A Understanding and Measuring : International Benchmarking Studies", *Paper for UNDESA workshop, E-participation and E-government: Understanding the present and creating the future*, Budapest, Hungary, pp. 2-25. July, 2006.

[6] Heeks, Richard.,"Benchmarking eGovernment: Improving the National and International Measurement, Evaluation and Comparison of eGovernment", *iGovernment working paper series, Institute for development Policy and management, Manchester*, pp. 3-15. 2006. Available http://www.sed.manchester.ac.uk/idpm/research/publications/wp/igovernment/igov_wp18.htm

[7] Heeks, Richard," Most eGovernment for development Projects Fail:How can risks be reduced*?, iGovernment, working paper series,* Institute for development Policy and management, Manchester. pp. 2. 2003. Available http://unpan1.un.org/intradoc/groups/public/documents/NISPAcee/UNPAN015488.pdf

[8] Kumorotomo, Wahyudi, "Kegagalan penerapan dan kegitan tidak produktif dengan internet", pp. 2-10. 2009. [Online] Available: http://kumoro.staff.ugm.ac.id/wp-content/uploads/2009/01/kegagalan-penerapan-egov.pdf

[9] Azis, HerryAbdul ,"Integrasi : Tantangan Kebijkan dan Implementasi"., Jakarta: Seminar pelayanan Publik dan , Bappenas. Desember 2008.

[10] Mas Wigrantoro Roes Setiayadi, " E-government: Sudahkah memberikan manfaat?", Direktur INSTEPS I (institute for technology and economy policy studies). Pp. 1-5, 2008. [Online] Available http://insteps.or.id/File/media/Electronic%20Government.pdf

[11] Geel. S.Frank," Research Policy: From Sectoral Systems of Innovation to socio-technical system Insight about dynamics and change form sociology and institutional theory", Department of Technology Management, Eindhoven University, Netherlands. May, 2004

[12] Bostrom, R. P., & Heinen, J. S., (1977). MIS problems and failures: A socio-technical perspective. *MIS Quarterly*, *1* (3). Available http://users.cba.siu.edu/melcher/ba503/documents/BostromPartII--caseapplication.pdf pp. 24-25.

[13] Kuutti, K, "Context and Consciousness : Activity Theory and Human-computer Interaction". In B. A. Nardi (Ed.), Cambridge, Massachusetts: *The MIT Press*. Pp. 17-41. 1996.

[14] Whitworth , B. (2009*),"* The social requirements of technical systems'. In B. Whitworth & A. De Moor (Eds.), Handbook of Research on Socio-Technical Design and Social Networking Systems. Hershey, PA: IGI. Available http://brianwhitworth.com/STS/STS-chapter1.pdf . Pp. 4-6

[15] Fishbein, M., & Ajzen, I. *Belief, attitude, intention, and behavior: An introduction to theory and research*., 1st ed., Reading, MA: Addison-Wesley 1975.

[16] Ajzen, I. (1991). *The Theory of planned behavior. Organizational Behavior and Human Decision Processes, University of Massachusetts at Amherst,* [Online] Available: http://www.courses.umass.edu/psyc661/pdf/tpb.obhdp.pdf pp. 179–206.

[17] Davis, F. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13* pp. 319–340., [Online] Available http://areadocenti.eco.unicas.it/virili/old/ApprofondimentiOSI/CIO%20issues/Technology%20acceptance/DavisMISQ89%20Perceived%20Usefulness%20Ease%20of%20Use%20OCR.pdf .