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Content validity of critical success factors for e-Government implementation in Indonesia

D Napitupulu^{1,2}, M Syafrullah², R Rahim³, A Amar⁴, YG Sucahyo⁵

¹Research Center for Quality System & Testing Technology,
Indonesian Institute of Sciences, Tangerang Selatan, Banten, Indonesia

²Program Studi Magister Ilmu Komputer, Universitas Budi Luhur
Ciledug Raya, Petukangan Utara, Kebayoran Lama, Jakarta Selatan

³School of Computer and Communication Engineering, Universiti Malaysia Perlis,
Malaysia

⁴Department of Statistics, Universitas Negeri Makassar, Makassar, Indonesia

⁵Computer Science Faculty, Universitas Indonesia, Depok, Jawa Barat

E-mail: darm003@lipi.go.id, mohammad.syafrullah@budiluhur.ac.id,
usurobbi85@zoho.com, ansarisaleh@unm.ac.id, yudho@cs.ui.ac.id

Abstract. The purpose of this research is to validate the Critical Success Factors (CSFs) of e-Government implementation in Indonesia. The e-Government initiative conducted only to obey the regulation but ignoring the quality. Defining CSFs will help government agencies to avoid failure of e-Government projects. A survey with the questionnaire was used to validate the item of CSF based on expert judgment through two round of Delphi. The result showed from 67 subjects in instrument tested; there are 11 invalid items deleted and remain only 56 items that had good content validity and internal reliability. Therefore, all 56 CSFs should be adopted by government agencies in Indonesia to support e-Government implementation.

1. Introduction

Nowadays, many organizations including government agencies have chosen to utilize Information and Communication Technology (ICT) to succeed in an increasingly dynamic, demanding and complex world. Furthermore, they have seen expectations for value and quality of services rise from their various stakeholders [1]. In response, they have invested in ICT solutions in term of e-Government, with the hope of fulfilling the expectations of their stakeholders. Successful implementation of e-Government system is believed in gaining many advantages such as (1) efficiency in the form of cost reduction; (2) enhanced service quality to stakeholder; (3) transparency, accountability, democracy; and (4) competitive advantage gaining, many government agencies around the world are expending a significant amount of resource [2][3][4][5][6]. As an illustration, the central government in the United Kingdom (UK) spent on ICT in 2007/2008 had achieved £3.2 billion and estimated to expend approximately £4.2 billion in year 2010/2011 [7]. Other researcher reported that about US\$4.2 billion in 2004 and US\$5.8 billion in 2009 was spent by United States (US) government. Almost the same as



that, about US\$2.3 billion invested for ICT by Russian Federation to develop their e-government in 2006 [8].

Despite the massive resource allocated for government's ICTs expenditures, a different disparity of e-Government implementation occurs among countries. Through the last decade, the universal movement for E-government was supported. Since 2003, the world has gradually enhanced their e-government development where European countries are increasing in global classification especially till 2012. Asia as a complete progressed at a leaner rate till 2010 – approximately according to the advances with the global average – and after that go ahead. Based on the progress of e-Government for the period 2003-2012, e-government in Africa was slow implemented and said to be lack of ICT readiness among others [8][9].

Table 1. World Top Ten of UN e-Government Survey [8]

| No | Country | Index Value |
|-----|-------------------|-------------|
| 1. | Republic of Korea | 0.9283 |
| 2. | Netherlands | 0.9125 |
| 3. | United Kingdom | 0.8960 |
| 4. | Denmark | 0.8889 |
| 5. | United States | 0.8687 |
| 6. | France | 0.8635 |
| 7. | Sweden | 0.8599 |
| 8. | Norway | 0.8593 |
| 9. | Finland | 0.8505 |
| 10. | Singapore | 0.8474 |

There are 192 countries in the global classification of e-Government survey [8]. In fact, some countries have high position significantly more than others. South Korea is the best world country which has e-government index in (0.9283), at second rank comes the Netherlands with (0.9125), the United Kingdom with (0.8960) at third position, followed by Denmark (0.8889) at fourth position, United States with (0.8687) followed by France, Sweden Norway, Finland, Singapore, Canada and other as illustrated at Table 1 above. These top rank developed countries have achieved ideal maturity of e-Government development according to UN survey [8]. What about developing countries? It is known that there is significant gap between countries around the world in adopting e-Government such as infrastructure, human resources, culture, e-participation, computer literacy, etc. [10]. For example, the developed country had already excellent ICT infrastructure and supporting high-speed internet access for the public domain. On the other hand, many developing countries do not have adequate infrastructure to build e-government system in their area. Low ICT infrastructures and internet access became problems classically in most developing countries. Another big challenge in e-Government implementation is human resources, where developed countries had many qualified HR or expert staff who able to define requirements or needs in e-Government system. Further, the one is also lack of well-skilled and trained people that could bring the initiative of e-Government implementation [11][12].

According to Heeks (2008), level of failure implementation of e-Government was quite high until 85%, especially in developing countries. The rate of successful e-Government projects only 15% while 85% of one was failed [13][36]. Similarly, Kettani & Moulin (2014) also reported that e-Government projects tend to fail especially for developing countries (i.e. India, China and Bangladesh) [14]. The two main characteristics or criteria that must be fulfilled in the e-Government system, they are availability and accessibility [15]. The information and services could be provided every time user need it. Users are free to choose at any time concerned want to deal with the government to carry out various transactions or mechanisms of interaction. It allows communities and businesses with the

flexibility to access government services outside working hours. Second, e-Government success is highly determined by the accessibility of services available on the website. If the e-Government services or transactions could not be accessed or available, it could be said of e-Government will not succeed or fail.

In the initial stage of e-Government implementation, people awareness become a most important thing [4]. According to Delon & McLean (2003), the success of technology depends on how far a technology being adopted by users [16]. In another word, e-government is said to be successful when it has been utilized optimally by its users. Many factors influence users adoption to achieve success e-Government. In this research, that kind of elements called Critical Success Factors (CSFs). Al-Kaabi (2010) had proposed some CSFs derived from best practice, specially developed country. Defining CSFs particularly during e-Government development could enable organizations to avoid of a fail e-Government implementation [17]. Heeks (2008) also argued that is critical to identify the factors of e-Government success. In this paper, we will validate a previous research a list of CSFs derived from literature study. This research's purpose is to get a big picture of CSFs that should be accommodated by government agencies in developing country especially Indonesia [13][18].

2. Literature Review

2.1. E-Government in developing country

The gap of e-Government field between developed and developing countries is vast. Most developing countries have limited resources, i.e., bad ICT infrastructure, and must encounter so many challenges as inhibit factors such as social & cultural factors, human resources factors, economic factors, political factors, etc. [10]. Thus, developing countries should overcome the barriers during e-Government development both internal and external factors.

UN (2001) reported the impediments factors of e-Government implementation as shown in Table 2 below [19]:

Table 2. Factors impeding e-Government in developing country [19]

| Core Factors | Symptoms | Consequences |
|---------------------------------------|--|---|
| Institutional Weakness | Insufficient planning Unclear objectives | Inadequately design system Cost over-runs |
| Human Resources | Shortage of qualifies personnel Lack of professional training | Insufficient support Isolation from sources of technology |
| Funding arrangements | Underestimated project cost Lack of recurring expenditure | Unfinished projects Higher maintenance costs |
| Local environment | Lack of vendor representation Lack of backup system/parts | Lack of qualified technical support Implementation problem |
| Technology and Information changes | Limited hardware/software Inappropriate software | System incompatibility Over-reliance on customer applicatiom |

The e-Government success issue is determined by ICT capability and readiness of government [20]. One of the capabilities of government should be supported their affordability to have ICT budgets and expenditures for e-Government development. To bring good illustration of budgeting, Table 3 show estimation of ICT budgets in few developed and developing countries as follows:

Table 3. Government ICT budgets for developed and developing countries [21]

| Government | India | Philippines | Hongkong | USA | UK |
|--|-------|-------------|----------|--------|--------|
| IT Spending in Million US \$ | 556 | 120 | 250 | 52.000 | 10.000 |
| IT Spending as % of Budget | 2-3 | 0.8 | 1.2 | 13 | 2.4 |
| E-Government Spending as Part of IT Budget (%) | 34 | 75 | - | 0.08 | 5.2 |

To gain the large advantages of e-Government adoption, financial and budgeting issues should be concerned. Developing e-governments system should be in line with ICT infrastructure development that functions to provide and increase the performance of e-Government. In contrast, lack of ICT infrastructure to develop the initiative of e-government is still become the main problem in developing country. One of researcher had studied the conditions of ICT infrastructure in some developing countries as shown in Table 4 [22].

Table 4. Overview ICT Infrastructure in developing countries [22]

| Government | India | Bangladesh | Thailand | Malaysia | China | Philippines |
|---|-------|------------|----------|----------|--------|-------------|
| Fixed Lines and Mobile Telephones (per 1000 people) | 35.5 | 5.0 | 142.6 | 412.3 | 177.6 | 124.4 |
| Personal Computers (per 1000 people) | 4.5 | 1.5 | 24.3 | 103.1 | 15.9 | 19.3 |
| Internet Users | 5.0 M | 100.000 | 2.3 M | 3.7 M | 22.5 M | 2.0 M |

Table 4 shows the conditions of main ICT infrastructure such as fixed lines and mobile telephones, PC and also penetration of Internet. It can be seen that there is kind of difference of ICT Infrastructure among developing countries. The relationship of Internet Access and its Penetration including access cost in some developed and developing countries could be illustrated in Table 5.

Table 5. Internet Access and Penetration [23]

| Correlation of Internet VS Penetration (based on 20 hours of monthly access) | | |
|--|-----------------------------------|-------------------------|
| Country | Access Cost (% of GDP per capita) | Internet Users per 1000 |
| India | 16.82 | 6 |
| South Africa | 5.26 | 35 |
| Malaysia | 4.85 | 90 |
| Singapore | 0.84 | 302 |
| UK | 0.91 | 554 |

Table 5 shows that internet access cost has a positive correlation to the rate of internet users in developing countries. There are gaps between countries that have a lower cost of Internet usage and the countries that have a higher cost of Internet resulted in the number of Internet users [23].

3. Research Methodology

This research evaluated the significance of success factors (CSFs) proposed through its validity [24]. The efficacy will be focused in this study is content validity, defined as the representation of content that should be to evaluate [25]. Content validity should be conducted in the instrument development stage and also judgmental one [26]. Developing instrument had the purpose of understanding the construct that is being measured. The constructs could be obtained from qualitative ways such as literature reviews, interviews, and focus groups. Selecting the domain of constructs will bring undoubtedly research variables, scope and elements of the subject could be obtained.

In the other hand, the instrument judgment stage is based on expert opinion that surveyed with a questionnaire in quantitative ways [27]. In this case, during testing, the validity of an item, an expert gave opinion or agreement according to the measurement item that is being assessed. Content validity is determined by professional or expert and assessed through an expert agreement, not by the researcher [28]. In another word, content validity shows the extent of experts agreement toward item or construct in the instrument being assessed. Involvement of at least five to ten experts in the same domain was valuable to evaluate each item or construct of the instrument [27]. Conducting the content validity become the main activity in testing instrument had been designed. Therefore, a survey method needed to explore expert agreement or opinion about CSFs of e-Government as an item proposed in the instrument. A total number of ten experts suggested had been involved in evaluating the significance of each CSFs of e-Government in Indonesia [27]. The expert's criteria determined was having expertise and experiences in e-Government field. They made their rating on a five-point scale (Likert) from 1 means strongly disagree to 5 means strongly agree for each item in the instrument. The demography of respondents can be shown in Table 6 as follows:

Table 6. The Demographic of Experts

| No | Background | Gender | Education Level |
|-----|--------------------------|--------|-----------------|
| 1. | Academician | Male | Professor |
| 2. | Academician | Male | Ph.D |
| 3. | Academician | Male | Ph.D |
| 4. | Academician | Male | Ph.D |
| 5. | Academician & Practician | Male | Ph.D |
| 6. | Academician & Practician | Male | Ph.D |
| 7. | Practician | Female | Master |
| 8. | Academician & Practician | Male | Master |
| 9. | Practician | Male | Master |
| 10. | Practician | Male | Master |

Based on expert comment or rating quantitatively, the statistical approach used to measure the extent of instrument validity. In this research, we calculated the index following Aiken model (1980, 1985) that widely used in validating items of the instrument [28][29][30][31][33].

The extent of agreement between experts indicated the significance of items, and it was calculated symbolized by V coefficient. V coefficient based on Aiken was formulated [31][32]:

$$V_j = S_j / [n(c-1)] \quad (1)$$

$$S_j = \sum r_{ij} - 1 \quad (2)$$

With n is the number of experts. The coefficient of V had a value from lowest 0 to maximum of 1. According to Aiken Table [31][33], content validity index (V) required of the item is significant if above the cut off value 0.70 ($V > 0.70$). It means if the validity index of the item below 0.70 ($V < 0.70$), an item doesn't have a good content validity or not significant [29][30][31][34]. In the other hand, V Coefficient was confirmed by the extent of consistency of items namely homogeneity reliability. Homogeneity reliability was calculated symbolized by H coefficient. H coefficient based on Aiken was formulated [29][30][31][32]:

$$H_j = 1 - 4S_j / (c-1)(n^2 - k) \quad (3)$$

With n is some experts. In another side, some researchers proposed Cohen's kappa introduced by Jacob Cohen (1960), as a robust method for nominal scale collecting data comparing to Aiken [34]. In this study, we use Aiken since we collect and analyze data based on five points scale.

4. Result And Discussions

Based on Aiken's formula described above, the content validity coefficient (V) measured to indicate how significant each item in the instrument. As said, the content validity is conducted by expert judgment and rely on an expert agreement about significant of items in the instrument proposed. In this research, exploring the expert judgment was conducted using Delphi method. The purpose of Delphi is to combine experts opinion to seek convergence on the specific problem [35]. The result of item validity from Delphi 1st round could be shown in Table 7 as follows:

Table 7. Content Validity of Item (Delphi 1st Round)

| No | Item (CSF) | V Coefficient |
|-----|-------------------------------------|---------------|
| 1. | Participation of User & Stakeholder | 0.925 |
| 2. | Project Plan | 0.825 |
| 3. | System Accessibility | 0.800 |
| 4. | Regular Training | 0.675 |
| 5. | Ease of Use | 0.875 |
| 6. | Website Promotion | 0.525 |
| 7. | Pilot Project | 0.675 |
| 8. | Skills and Expertise | 0.750 |
| 9. | E-Leadership | 0.850 |
| 10. | Project Coordination | 0.900 |
| 11. | Clear Guidance | 0.725 |
| 12. | Funding Continuity | 0.850 |
| 13. | Business Process Reengineering | 0.675 |
| 14. | E-Government Policy and Regulation | 0.825 |
| 15. | Stable Government | 0.650 |
| 16. | Outsourcing strategy | 0.525 |
| 17. | Basic Infrastructure of ICT | 0.850 |
| 18. | ICT Literacy | 0.725 |
| 19. | Organizational Structure | 0.675 |
| 20. | International Cooperation | 0.375 |
| 21. | Privacy & Security | 0.775 |
| 22. | Usefulness | 0.825 |
| 23. | Monitoring and evaluation | 0.900 |
| 24. | Private Partnership | 0.500 |
| 25. | Change Management Strategy | 0.800 |
| 26. | Socio-Cultural | 0.675 |
| 27. | System Modeling | 0.600 |
| 28. | Top Management Support | 0.950 |
| 29. | System Actual Usage | 0.775 |
| 30. | Citizen Relationship Management | 0.675 |
| 31. | Compatibility | 0.775 |
| 32. | Project Management | 0.725 |
| 33. | Information Quality | 0.825 |
| 34. | System Quality | 0.825 |
| 35. | Service Reliability | 0.900 |
| 36. | Trust | 0.850 |
| 37. | Awareness | 0.800 |
| 38. | ICT Governance | 0.850 |
| 39. | Public Satisfaction | 0.775 |
| 40. | Methodology or Approach | 0.700 |
| 41. | E-Transaction and E-Payment | 0.650 |
| 42. | User-Friendly | 0.750 |
| 43. | Gradual Implementation | 0.725 |
| 44. | Re-Usable | 0.700 |
| 45. | Continuous Improvement | 0.825 |
| 46. | Service Innovation | 0.800 |
| 47. | Loyalty | 0.750 |
| 48. | Acknowledgement | 0.650 |
| 49. | Public Intention to Use | 0.700 |
| 50. | Sustainable Revenue | 0.475 |
| 51. | E-Participation | 0.675 |
| 52. | Roadmap | 0.725 |
| 53. | Market Sinergy | 0.600 |
| 54. | Political Pressure | 0.675 |
| 55. | Inter-Governmental Relationship | 0.800 |

| | | |
|-----|--|-------|
| 56. | Tools and Equipment | 0.625 |
| 57. | E-Initiative | 0.700 |
| 58. | Vision | 0.875 |
| 59. | Citizen Empowerment | 0.725 |
| 60. | Knowledge Management | 0.750 |
| 61. | Service Guarantee | 0.825 |
| 62. | Personalization of Service | 0.575 |
| 63. | Empathy | 0.600 |
| 64. | Flexibility of Technology | 0.750 |
| 65. | Alignment of Organization Goal and ICT direction | 0.800 |
| 66. | Good Responsiveness | 0.750 |
| 67. | E-Democracy | 0.675 |

There are 21 items had validity coefficient (V) below the cut off value ($V < 0.70$) so those items (highlighted) was removed from the list and would be included in Delphi 2nd round to obtain the conformity from experts about the significance of items.

Table 8. Content Validity of Item (Dephi 2nd Round)

| No | Item (CSF) | V Coefficient |
|-----|---------------------------------|---------------|
| 1. | Regular Training | 0.825 |
| 2. | Website Promotion | 0.600 |
| 3. | Pilot Project | 0.575 |
| 4. | Business Process Reengineering | 0.725 |
| 5. | Stable Government | 0.625 |
| 6. | Outsourcing strategy | 0.600 |
| 7. | Organizational Structure | 0.750 |
| 8. | International Cooperation | 0.425 |
| 9. | Private Partnership | 0.525 |
| 10. | Socio-Cultural | 0.725 |
| 11. | System Modeling | 0.575 |
| 12. | Citizen Relationship Management | 0.750 |
| 13. | Acknowledgement | 0.725 |
| 14. | Sustainable Revenue | 0.750 |
| 15. | E-Participation | 0.775 |
| 16. | Market Synergy | 0.600 |
| 17. | Political Pressure | 0.675 |
| 18. | Tools and Equipment | 0.575 |
| 19. | Personalization of Service | 0.600 |
| 20. | Empathy | 0.750 |
| 21. | E-Democracy | 0.725 |

Based on Table 8 from 21 items asked, there are 11 items was still invalid based on expert judgment. Therefore, it already showed a stable result of 11 items had no significance of content validity based on Delphi 1st and 2nd round. Thus, total 11 item eliminated from the instrument because they could not meet the minimum requirement ($V < 0.70$). The total 11 items are website promotion, pilot project, stable government, outsourcing strategy, international cooperation, private partnership, system modeling, market synergy, political pressure, tools & equipment and personalization of service.

The content validity will be supported by the level of the constancy of the items called homogeneity reliability. After eliminating 11 invalid items, we got only 56 items that already had good content validity. Therefore, all 56 items would be tested and computed into the homogeneity reliability coefficient (H) as shown in Table 9.

Table 9. Homogeneity Reliability of Item

| No | Item (CSF) | H Coefficient |
|----|-------------------------------------|---------------|
| 1. | Participation of User & Stakeholder | 0.63 |
| 2. | Project Plan | 0.67 |
| 3. | System Accessibility | 0.68 |
| 4. | Regular Training | 0.73 |
| 5. | Ease of Use | 0.65 |
| 6. | Skills and Expertise | 0.70 |
| 7. | E-Leadership | 0.66 |
| 8. | Project Coordination | 0.64 |
| 9. | Clear Guidance | 0.71 |

| | | |
|-----|--|------|
| 10. | Funding Continuity | 0.66 |
| 11. | Business Process Reengineering | 0.73 |
| 12. | E-Government Policy and Regulation | 0.67 |
| 13. | Basic Infrastructure of ICT | 0.66 |
| 14. | ICT Literacy | 0.71 |
| 15. | Organizational Structure | 0.73 |
| 16. | Privacy & Security | 0.69 |
| 17. | Usefulness | 0.67 |
| 18. | Monitoring and evaluation | 0.64 |
| 19. | Change Management Strategy | 0.68 |
| 20. | Socio-Cultural | 0.73 |
| 21. | Top Management Support | 0.62 |
| 22. | System Actual Usage | 0.69 |
| 23. | Citizen Relationship Management | 0.73 |
| 24. | Compatibility | 0.69 |
| 25. | Project Management | 0.71 |
| 26. | Information Quality | 0.67 |
| 27. | System Quality | 0.67 |
| 28. | Service Reliability | 0.64 |
| 29. | Trust | 0.66 |
| 30. | Awareness | 0.68 |
| 31. | ICT Governance | 0.66 |
| 32. | Public Satisfaction | 0.69 |
| 33. | Methodology or Approach | 0.72 |
| 34. | E-Transaction and E-Payment | 0.74 |
| 35. | User-Friendly | 0.70 |
| 36. | Gradual Implementation | 0.71 |
| 37. | Re-Usable | 0.72 |
| 38. | Continuous Improvement | 0.67 |
| 39. | Service Innovation | 0.68 |
| 40. | Loyalty | 0.70 |
| 41. | Acknowledgement | 0.74 |
| 42. | Public Intention to Use | 0.72 |
| 43. | Sustainable Revenue | 0.81 |
| 44. | E-Participation | 0.73 |
| 45. | Roadmap | 0.71 |
| 46. | Inter-Governmental Relationship | 0.68 |
| 47. | E-Initiative | 0.72 |
| 48. | Vision | 0.65 |
| 49. | Citizen Empowerment | 0.71 |
| 50. | Knowledge Management | 0.70 |
| 51. | Service Guarantee | 0.67 |
| 52. | Empathy | 0.76 |
| 53. | Flexibility of Technology | 0.70 |
| 54. | Alignment of Organization Goal and ICT direction | 0.68 |
| 55. | Good Responsiveness | 0.70 |
| 56. | E-Democracy | 0.73 |

Based on table 8 above, all 56 items seems had good homogeneity reliability because they had obtained significant standard ($H > 0.51$). Thus, no more items deleted from the list. In other words, this study got 56 significant items that already valid and reliable based on expert judgment. All the CSFs obtained are the contribution of this study and being state of the art on CSFs research in the domain of e-Government among other researches.

5. Conclusion

Based on the result, the study had obtained the significant CSFs in the e-Government implementation. The content validity and homogeneity reliability of instruments had been tested through expert judgment. The Delphi used in this study eliminated 11 invalid items and resulted in only 56 items that already had good content validity and internal consistency. Those 56 items obtained to bring the picture of CSFs of e-Government that should be adopted by government institutions in Indonesia.

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