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A MATURITY MODEL TAKING RETURN ON INVESTMENT FOR E-GOVERNMENT PROJECTS

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Abstract: Information and Communication Technology application are taking front stage in all government areas, for many reasons. But these applications needs huge investment towards operation and maintenance, the results of these applications are mixed with more failure and partial success. So the time has come to measure the maturity level and return on investment of these projects. In literature many maturity models have been proposed to assess e-government applications. In order to assess electronic services provided to the citizens, an appropriate e-government maturity model should be selected. This paper aims at comparing various e-government maturity models and purposes a maturity models keeping in view a new return on investment models.

Key word: E-government, E-governance, Maturity Models, Index, KPI

INTRODUCTION

Application of Information Technology (IT) helps the organizations in becoming more competitive and is an essential ingredient for business survival, and Government has no exception to this. Worldwide the potential that IT to support government processes has been recognized worldwide and there is no universally accepted definition, One of the objective to link various services with concern department for better citizen satisfaction, which also helps to increase efficiency of service delivery, encourage citizen participation and increase transparency of administrative processes [1]. IT application has made the governance better for both Government and public, resulted large scale implementation in developing country. The E-governance can be defined by “Establishing a Networked Government for greater transparency and accountability in delivery of public services to facilitate moral & material progress of all citizen” [2] E-governance is the application of electronic means to improve the interaction between government and citizens; and to increase the administrative effectiveness and efficiency in the internal government operations. Further, it is the application of information technology to the Government processes to bring Simple, Moral, Accountable, Responsive, and Transparent (SMART) to the governance system [3-4-5-6-7](Budhiraja, 2003; Rajashekar, 2002 in Jain and Ramani, 2005; Heeks, 2001; Harris, 2004, e-Governance concept paper, Government of India). The strategic objective of e-governance is to support and simplify governance for e-governance community comprised of citizens, civil society organizations, private companies, government lawmakers, and regulators on networks [8](Tapscott and Agnew, 1999). E-

Governance is defined as the process of enabling transactions between concerned groups and the government through multiple channel by linking all transaction points, decision points, enforcing/implementation points and repositories of data using information and communication technologies to improve the efficiency, transparency, accountability and effectiveness of a government [9] (Bhatnagar 2004) . The simple objective of e-governance is to support and simplify governance for egovernance community comprised of citizens, civil society organizations, private companies, government lawmakers, and regulators on networks [10](Tapscott and Agnew, 1999 in Jain and Ramani, 2005). Governments have been engaged in deploying Information, Communication, and Technology (ICT) s for several decades to increase the efficiencies and effectiveness of their function. Planning and Monitoring was the focus area for early application [9] Many large projects have been undertaken and there have been prominent failures, they are either total failure, in which the system is never implemented or is implemented but immediately abandoned; or they are partial failure [10] and supported by [9]. The reasons for failure are many. On one hand government is increasing the investment one the other hand time has come to calculate the return on investment of these projects [11]. On the other hand research has also pointed out need for measurement maturity level of these projects.

In broader sense E-government facilitates the process of information management, deliver services and participation of citizens, businesses and communities and [12]. In e-government, the focus is to deliver public services and promote citizen participation using ICT [13](Al-Nuaim, 2011). E-government implies servicing citizens in public sector via ICT. There are many definitions of e-government in the literature. The most which was cited in most Literature is: “Electronic government refers to government’s use of technology, particularly web-based Internet applications to enhance the access to and delivery of government information and service to citizens, business partners, employees, other agencies, and government entities” [14].(Layne, Lee 2001).

E-government is perceived as a tool to increase citizens’ trust and confidence in their governments [15–18]. It can simply be considered an additional service channel, among many, that citizens can use to interact with public administration and government entities [19, 20]. Some authors contend that e-government constitutes only a subset (though a major one) of e-governance. According to these authors, e-governance is a broader concept and includes the use of ICT by government and civil society to promote greater participation of citizens in the governance of political institutions, e.g., use of the Internet by politicians and political parties to elicit views from their constituencies in an efficient manner, or the publicizing of views by civil society organizations which are in conflict with the ruling powers [21,22] (Howard, 2001 and Bannister and Walsh, 2002). It is clear that considerable confusion exists in explaining e-government and e-governance.

LITERATURE REVIEW

e-Government is the need of the hour, as many Governments worldwide are taking steps towards enabling their services though computer enabled medium, in order to increase their citizen satisfaction and Electronic government has become a powerful administrative tool for governments around the world [23],[24],[25](Dawes & Pardo, 2002; Fountain, 2001;

UN & ASPA, 2002). Authors have pointed out evaluating the readiness of individual public agencies to execute specific e-Government programs and directives are a key ingredient in the successful expansion of e-Government. To satisfy this need, a model called the eGovernment Maturity Model (eGov-MM) was developed, integrating the assessment of technological, organizational, operational, and human capital capabilities, under a multi-dimensional, holistic, and evolutionary approach [26-27], (Iribarren et al., 2008; Solar, Astudillo, Valdes, Iribarren, & Concha, 2014). E-Government has been deployed in different ways in different country, in this context Researchers want to track this; practitioners want to benchmark where they stand in respect to others, resulted in the development of e-government maturity models[28] (Heeks 2015). A maturity model is a method to measure the maturity of the processes of an organization, by which key performance indicator are also identified, on return it improve quality and process [29] (Raja 2012). A maturity model is an enumeration of attributes for a sequence of maturity levels [30](Philip, 2002).

Several models has proposed like Layne and Lee Model [14], Extended Layne and Lee Model [31](Andersen , & Henriksen, 2006) used in Denmark for assessing maturity, United Nations maturity model to measure UN member countries [32], Innovative four stage model by Hiller and Belanger five stage model [33] , six stage maturity model by Almazan and Gil-Garcia used in Mexico [34] (Almazan & Gil-Garcia ,2008). Cisco best practices three stage maturity model [35](Cisco , 2007), Gartner's four phases of e-government model by [36] (Baum and Maio, 2000), four stage maturity model of e-government used in US federal state [15] (West, 2004), five stage maturity model of e-government used in municipal e-government initiatives in the US (Moon ,2002) , three stage maturity model in World Bank [37] (Toasaki, 2003), Deloitte and Touche developed a six stage maturity model of e-government used in the Australia, Canada, New Zealand, the United Kingdom [38] [38](Deloitte & Touche, 2000), Howard developed a three stage maturity model of e-government [21] (Howard 2001). [39] (Shahkooh et al. 2008) developed a five stage maturity model of e-government, [40](Lee & Kwak 2012) proposed a five stage maturity model of e-government which focus on open government and the use of social media and Web 2.0 tools., five stage maturity model [41] (Siau and Long,2005), [42] (Wescott 2001) developed a six stage maturity model keeping in view Asia-Pacific region. [43] (Chandler & Emanuels 2002) developed a four stage maturity model, [44] (Kim and Grant, 2010) developed a five stage maturity model ,[45] (Chen et al. ,2011) proposed a three stage maturity model of e-government based on theoretical research based on authors' experience in China's regional e-government , [46] (Windley, 2002) a four stage maturity model of e-government. The model was applied to the 'Utah.gov' state portal in the US.[47] (Reddick, 2004) developed a two stage maturity model of e-government and was applied in the municipal e-government in the American cities. [48] (Rohleder & Jupp 2003) developed a five stage maturity model of e-government, which was applied to many countries for ranking. The UK National Audit Office developed a five stage model [49] (NAO, 2002) and [50] Netchaeva, I. (2002) also proposed a five stage model. Many author in literature had also made attempt to compare different models and detailed reported. [53] (Allah, 2014). However, in those studies the authors did not provide weaknesses and strengths of each maturity model. Besides that, the authors did not compare the maturity models between them based on some criteria such as stages focus, features and names etc.

Moreover, the fact of missing many e-government maturity models from literature could yield into missing best practices in their new maturity models [53] (Allah, 2014). A detailed comparative maturity model was also discussed, and concluded that there are difficulties with the most popular models, [28] (Heeks, 2015).

RESEARCH GAP

In literature many author has proposed models related to e-government, [25] (Valdés et al. , 2011), [53] Fath-Allah et al (2014) has highlighted overview of the models and compared 25 different models. As per literature Layne & Lee four-stage model is mostly cited of all e-government papers. The same model was modified by various author like [31] Andersen & Henriksen 2006 and revisited (e.g. Lee 2010). Drawing on this past literature but also additional insights, three key challenges to the Layne & Lee model pointed out by [28] Heeks 2015, as argued it model for mostly for US and proposed a Manchester e-Government Maturity Model seeks to incorporate the responses to three challenges. Most of the models described above are discussed about various stages of the e-Governance maturity models keeping specific country or application. More over e-Governance system are different for different application, for example an office automation system many not have a “catalog or online presence” still then in can be called as a e-governance system, as it automate the internal work of the organization and it does not have any relationship with public. And also these papers are lacking with respect to KPI (key Performance Indicator) to measure and represent the level of a e-governance projects. Hence there is a need for a measurement models for establishing the maturity level, which will help in establishing the maturity level irrespective of application or country.

PROPOSED MODEL

Generally all e-governance application are different due to difference in its applicability and user base. Some applications are interface with in a network and some are web enabled. But general feature of all applications same like provision for information availability, on line transaction, vertical and Horizontal Integration. But the levels of maturity are different for different applications. In this modified basic Lee Maturity model each stage of the basic maturity model has been associated with key performance indicator are tabulated in Table-1 and each KPI is being measured in the scale of 1-10. Generally e-governance applications are either web enabled or works in a local area network, which in situational. Each KPI are generally non measurable in quantitative terms and can be measured in terms of scale data by an expert of any e-governance related project. The score again being so received are added to get a composite score which is divided with total score. These score so obtained will be E-Governance Maturity Value EGMV_t, obtained at a particular time gives a maturity level and can be compared with other similar project wrt its value for benchmarking or improvement. The score so obtained may vary from time to time and also depend upon the expert knowledge and information about the application.

Table-1 Key Performance Indicator

	Web enabled /Locally enabled applications	Score Measured in the scale of 1-10
Information/ services availability	Availability of link/ content Availability of Updated information Attractiveness of the system Convince or Easy of operation, user friendliness Reliable Support	
Online Transaction	No of Transaction available Convince or Easy of operation User friendliness or Simplicity Facility in use Reliability Support	
Vertical Integration	Level of vertical integration available Convince or Easy of operation User friendliness or Simplicity Facility in use Reliability Support	
Horizontal Integration	Level of vertical integration available Convince or Easy of operation User friendliness or Simplicity Facility in use Reliability Support	
	Total score	

yyyyyyy \sum

$$ROI_t = \frac{\sum_{i=1, j=1}^{10,3} (x_{ij})_t \times w_i}{e_i \sum_{i=1}^3 (Y_{\max})_i \times w_{y_i}}$$

Where, E-Governance Maturity Index EGMVt (at time t)

Xij: values through corresponding factors and data sources

Wi: weight of corresponding factor

ei : investment criteria

Yi : investment factors

w_{yi} : weight of various investment factor

t : time in year

Xi1 : data provided by citizen

Xi2 : data provided by decision maker

Xi3 : data provided by employee

X1j : value of Convenience or Easy of operation in scale of 1-10

CONCLUSION

Information and Communication Technology applications in the government process are inevitable, which need financial investment. So there is a need for measurement of the maturity level to justify this investment. As discuss there is an issue for implementation of these models does not specify detailed KPI for measurement and at the same time it is not simple. The proposed modified model focuses on the measurement issue with the help of with Key Performance Indicator for its effective implementation of e-governance application. The proposed model can be gives a scope for validation, improvement and applications in different areas of ICT applications for e-governance related projects.

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