

The Relationship between Transparency and E-government: An Empirical Support

Emad A. Abu-Shanab

MIS Department, IT College
Yarmouk University, Irbid, Jordan
abushanab@yu.edu.jo

Abstract. E-government requires more attention from researchers to investigate the factors that predict the success of such initiative. This study used secondary data from international reports to investigate the relationship between transparency and e-government development. Two measures used for transparency: the corruption perception index (CPI) and the open budget index (OBI) and were regressed to see their prediction power for e-government readiness index (EGRI). Both relationships were significant and indicated a high prediction power of the e-government development level. Data analysis, discussion, conclusion, and future work are depicted at the end of this work.

1 Introduction

The introduction of e-government concept to improve public service and government's performance is encouraging more and more countries to embrace this initiative and adopt ICT and web 2.0 technologies for this purpose. But the political side of e-government is not well researched in the literature and thus needs more attention from researchers. Abu-Shanab [Ab13] proposed a framework that included four dimensions of e-government: improving public service, improving government entities performance, e-democracy and citizens' participation, and social development and the digital divide.

Transparency is a measure that contributes to better administration of public work and open government, where public information is communicated to the public. Finally, better transparency means less corruption and better accountability. This study empirically supports the relationship between transparency and e-government. The following section will review the literature, and then data and data analysis will be discussed. Finally, conclusions and future work will be presented.

2 Literature Review

Electronic government (e-government) can be defined as using ICT and the Internet capabilities to provide public service, improve government's performance, and open participation and empowerment channels to serve political or democratic reasons. This definition is summarized from the previous research on e-government [Ba04], [EY06], [Wo07], [Yi07], [PNM10], [Ab12]. E-government concept expanded into many areas

like improving government's performance and empowering citizens to participate in the democratic process. There has been an increasing effort towards a holistic approach to governance for sustainable development, which requires strategic national planning to ensure efficacy, transparency, responsiveness, participation, and inclusion in the delivery of public services utilizing a notion of sustainable development for the people [Un12].

2.1 Transparency in general

Transparency is the open communication between citizens and governments. It is the effective knowledge [Ce11] with relevant information to citizens' needs [CP09]. Many deployed laws across the world are related to transparency like the right to information, open access of e-government information, or the use of ICT and the Internet to promote public information. Research indicated that transparency has a major role in reducing uncertainties for governments [BMT12]. Also, the increased level of transparency (fiscal transparency) is associated with lower public debt and deficit [AL06].

Transparency is not easy to implement and adhere to, it requires training public officers to respond to information requirements. Kimball explored the legal requirements in all American States and concluded that only ten states mandate training on how to legally respond to public records requests with differential levels [Ki11]. The training effort increases open government compliance, and eliminates the fearful responses custodians have to requests, which empowers public custodians to respond with confidence in accordance with the law. Similarly, Rao asserted that training must be conducted for employees to guarantee that information is valid with new processes and activities conducted seamlessly [Ra11]. The relationship between transparency and open government is emphasised by more than one research [HGBCCHP12], [LK12].

A study of the Spanish legislations indicated insufficient guarantee to transparency and citizens' right to information. The author emphasized the contribution of the Spanish E-government Act to citizens' right to information, the accessibility and security of information, and the contribution of electronic tools to diffusion of information [Ce11]. Transparency does not mean conformance of information published on websites, where different types of information are published when comparing countries' websites [Ar11].

2.2 Relationship between e-government and transparency

Transparency, participation and collaboration were the three major dimensions identified by Obama's administration for the successful open government [GR12]. An open government maturity model was proposed by Lee and Kwak [LK12], where five stages were proposed: initial conditions, data transparency, open participation, open collaboration, and ubiquitous engagement.

A review of the literature conducted by Armstrong [Ar11] concluded that publishing more public information will improve public leaders' image of trust. A wide empirical test utilized students' responses on a survey distributed in paper (614), online (1819),

and digital telephone (403), tried to explore their opinions regarding transparency and the increasing reliance on Internet information [CP09]. The authors concluded that publishing relevant information on e-government websites will improve transparency and raise more funding and public support to e-government projects. Their findings proclaim that accessibility will influence e-participation through a gap between those who access information online and those who don't [Similar to findings of: BTRF12].

Research proclaimed that e-government and social media will enhance transparency through additional steps like: develop measures for transparency, develop transparency readiness index, evaluate existing systems for portability and expansion, reuse rather than reinvent, and create and invest in collaborative pilot projects [BJG10]. Analysis of 75 European websites concluded that social media tools utilized by governments and the use of ICTs are enhancing transparency levels but not e-participation [BTRF12], which means that governments are failing to engage with citizens through a two-way effective dialog. Open e-government concept was investigated through a survey of CIOs and concluded that open e-government is not a fad, but a necessity to meet citizens' demand for more openness, transparency, and accountability [GR12].

A study investigated the role of Gangnam's e-government applications in Korea using a set of interviews that explored dimensions like: citizen-centric culture, transparency, responsiveness, citizens' trust, reducing corruption, and abuse of power [AB11]. Results showed that (46.2%) somewhat agreed that e-government applications increased transparency (20.1% strongly agreed), and (41.5%) somewhat agreed that e-government applications dramatically reduced corruption (18.8% strongly agreed). Transparency and efficiency gains depend on the objectives of the program, where many conditions need to be met like an incremental implementation approach, a long term perspective and an alignment between the e-government objectives and the complex details of using XBRL/SBR implementation process [Ch12]. Transparency is how organizations make information about internal works, decision processes and procedures available. Pina et al. [PTR10] allege that citizens expect ICTs to increase transparency, empowering them to monitor government performance, where the Internet can be a vital tool to increase interactivity. Websites analyzed are predominantly non-interactive, which limits e-government potential to transform the relationships between citizens and government.

A study by Lollar [Lo06] proposed few measures for transparency and government openness and they are: bidding information, new employment information, price information, grievance box and accusation box. The authors concluded that e-government has played a massive role in improving transparency. In this study, we propose a definition for e-transparency as *"the utilization of ICT tools, the Internet and web 2.0 tools to enhance public information provision provided to citizens/businesses regarding the operations, budget, and political process conducted by the governments."* Enhancing information provision means providing valid, accurate, timely, relevant and comprehensive information needed by citizens and customized to their needs.

2.3 How can transparency fight corruption?

Transparency is a public request by all parties involved in e-government. Many systems are claimed to improve transparency and public entities efficiency like the Korean procurement services and On-Nara business process system [Io11]. Others asserted that transparency will not be achieved through the availability or mere downloading of data sets [HGBCCHP12]. They proclaimed that data must be reliable and valid and should enable citizens to do something they find valuable and important.

The relationship between transparency and good governance is difficult to quantify and estimate based on the many factors influencing such relationship and the complexity of data involved [BO10]. Citizens and legislators are important sources of demand for fiscal transparency [WD12]. Transparency can fight corruption through many mechanisms like: making corruption actions more risky, providing incentives to public officials, making it easy to select honest officials, making officials more accountable, and help maintain norms of integrity and trust [KW08]. Transparency alone is not enough to fight corruption as the availability of information for open access is not sufficient for people and officials to hold governments accountable [KW08]. Such step needs some power to take an action on information and put officials accountable to their actions.

What makes this study important is that previous empirical studies focused on secondary data, but on the national level or on a sub-measure. A study in Latin America utilized a wide survey of indices that contained four information dimensions: content (macroeconomic, social, budgetary, and economic and financial), characteristics, electronic presentation formats, and access [DHO12]. Authors concluded that LA countries are harnessing transparency of economic and financial information online. Most ministries are allowing free access to information specially the state budget. Finally, certain countries are disclosing information more than the others. Rao proposed an integrated system for employee information to improve internal operations and efficiency of public entities [Ra11]. Transactions between governments and employees will be done automatically through this system. The availability of employee information for government entities is important for the success of transparency and e-government.

The previously mentioned European website analysis concluded to a list of measures in two distinct dimensions: financial accountability measures and website related measures. The website related measures were divided into four dimensions: transparency, interactivity, usability, and web maturity [PTR10]. Results indicate that financial figures and reports can be consulted everywhere and at any time through the Internet, which indicates an improvement in transparency and financial accountability and reduction of dissemination costs. ICTs do not promote financial accountability beyond legal requirements, but in most cases the Internet has made it easier for citizens to locate and access official information and to conduct transactions. McNeal and Hale proclaimed that e-disclosure is a vital component of transparency and will be influenced by two major factors: the regulatory and political environments. Also, e-government might not have direct relationship with e-disclosure of campaign financing information [MH10].

3 Data and data analysis

This study utilized secondary data available through international reports published by well established organizations. For e-government, the United Nations e-government report was used, where data is reported for the overall e-government development (readiness) index. The latest data set was used for the year 2012 [Un12]. The index used (EGRI) is a 0-1 index, with 1 representing the highest level of development. Four sub-measures also were reported: web index, human capital index, infrastructure index, and e-participation index. For transparency measure, and as reported by Transparency International, the measure used for transparency represents the degree countries are clean from corruption [Ti11]. Based on that, the Corruption Perception Index (CPI) was used and it consists of numbers ranging from 0-10. The measure uses a value of 10 to present a corruption-free country (best status). The data used for this test included all countries of the world for both measures (EGRI & CPI), and they included 177 countries.

The major objective of this study is to investigate if any correlation exists between the two measures (EGRI & CPI). A set of bivariate correlations between CPI and the EGRI and its constituents. The result is demonstrated in Figure 1, where all correlations were significant at the 0.001 level. Also for the purpose of mapping the relationship between the two major variables, a regression analysis was conducted, with EGRI as the dependent variable and regressed on the CPI as the independent variable. The model showed a very strong predictive power with an adjusted R2 value equal to 0.582, and an $F_{1,172} = 242.332$, $p < 0.001$. The regression equation which includes the coefficients of the CPI and the constant is presented in the following: $EGRI = 0.192 + 0.075 * CPI$

Based on the objective of this study and as corruption is the major indicator representing transparency levels, we tried to search for other measures that also contribute to the country's level of transparency. Another measure reported by an international institution is the Open Budget Index (OBI) published by International Budget Partnership. This measure consists of sub-measures related to publishing budgetary information [Ib10]. The most recent data available in 2010 included only 92 countries, and thus the data used for this test is the common for both the EGRI and the OBI.

Measure description	EGRI	WI	HCI	II	EPI
E-Readiness Index (EGRI)	1.000				
Web Measure (WI)	0.901	1.000			
Human Capital (HCI)	0.851	0.608	1.000		
Infrastructure (II)	0.943	0.798	0.722	1.000	
E-Participation (EPI)	0.753	0.890	0.467	0.657	1.000
CPI-2011 (CPI)	0.765	0.712	0.524	0.807	0.586

All Correlations are significant at the 0.001 level [N ranges = 173-177]

Figure 1: The Pearson Correlations Matrix (For Corruption data)

The set of bivariate correlations between CPI and the EGRI and its constituents are shown in Figure 2. All correlations were significant at the 0.001 level. Also for the purpose of mapping the relationship between the two major variables, a regression analysis was conducted, with EGRI as the dependent variable and regressed on the OBI

as the independent variable. The model showed a very strong predictive power with an adjusted R2 value equal to 0.446, and an $F_{1,90} = 74.261$, $p < 0.001$. The regression equation is presented in the following: $EGR = 0.257 + 0.005 * OBI$.

Measure description	EGR	WI	HCI	II	EPI
E-Readiness Index (EGR)	1.000				
Web Measure (WI)	0.917	1.000			
Human Capital (HCI)	0.887	0.692	1.000		
Infrastructure (II)	0.942	0.826	0.752	1.000	
E-Participation (EPI)	0.765	0.890	0.537	0.676	1.000
OBI-2010 (OBI)	0.672	0.664	0.552	0.630	0.492

All Correlations are significant at the 0.001 level [N ranges = 92-93]

Figure 2: The Pearson Correlations Matrix (For Budget data)

4 Conclusion and Discussion

This study used secondary data available from international reports to investigate the relationship between transparency and e-government development. Two measures used and tested separately for transparency: corruption perception index (CPI) and open budget index (OBI). When regressing e-government readiness index (EGRI) on each of the two measures, significant support for the objectives of this research was confirmed. Results indicated that the more countries are clean from corruption and publish the budget information, the more e-government projects will prosper and the country will be ready for embracing such phenomenon. Using secondary data will improve the validity of research as researcher and re'pondents' biases are minimized. Also, this research is the first to test such relationship using global data (previous research used perceptual data and students subjects). Finally, future research requires that all possible factors predicting the success chances of e-government projects are explored because of the importance such projects. Also, this study needs further exploration to test for future years and try to propose a framework for more factors. Also, it is surprising that a measure for transparency does not exist, so it is important to propose a measure for transparency that sums more than one measure related to this important concept.

This work is the first to explore the relationship between e-government readiness and transparency using secondary data and supporting more than one conceptual assumption in the area. Previous research assumed such link, but did not support it through any type of empirical testing. Researchers in the area of e-government and political and public administration are encouraged to validate such result in the future and search for other factors that influence the success of e-government projects.

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