

Conceptualising Citizen's Trust in e-Government: Application of Q Methodology

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Abstract: In e-government context, trust plays a vital role in helping citizens overcome perceived risks. Trust makes citizens comfortable sharing personal information, make online government transaction, and acting on e-Government advices. Thus, trust is a significant notion that should be critically investigated to help both researchers and practitioners to understand citizens' acceptance to e-Government. Prior research in trust has focused mainly on consumer's trust in e-Commerce. Most of existing literatures on trust in e-government focus on technical perspective such as PKI. This paper contributes by proposing a conceptual model of citizens' trust in e-Government. The proposed conceptual model of citizens' trust in e-government is integrated constructs from multiple disciplines: psychology, sociology, e-commerce, and HCI. The research is aimed also to develop items in order to measure the theoretical constructs in the proposed model. The pool of items is generated based on literature review. Q-Methodology has been utilised to validate the generated measurement items. The outcome of two Q-sorting rounds resulted in developing a survey instrument for proposed model with an excellent validity and reliability statistical results.

Keywords: e-government, trust, perceived risk, citizens' participation, technology acceptance model

1. Introduction

Electronic commerce, or in short, e-commerce and its sophisticated technologies have enabled governments and companies to provide their products and services for their citizens and customers through web sites. Online services are cheaper, more convenient, and easy to provide. Electronic Government or e-government has been classified as one instance of e-commerce (Schneider, 2003). Many governments around the world have launched their e-government initiatives to provide citizens and organisations with more convenient ways to access government information and services (Turban, King, Lee, Warkentin, & Chung, 2002). Previous research has been carried out to evaluate the quality and quantity of the provided e-government services and the overall adoption of e-government. One factor that plays a vital role in e-commerce adoption, especially e-government, is a mature trust between citizen and the government. Although trust has been recently studied in e-commerce, there is still yet a lack of sufficient research that investigates the trust phenomenon in e-government. Most of the existing online trust literatures focus on e-commerce in particular B2C e-commerce.

The purpose of this paper is twofold. The first purpose is to identify the factors that most likely affect citizens' trust in e-government. This is contextualised by investigation of the elements and components that transact the trust beliefs in electronic services, whether these elements and components are related to technical aspects such as Human Computer Interaction (HCI), or related to business, psychological, sociological, or cultural perspectives. The second purpose is to develop an instrument to measure the theoretical constructs in the proposed model.

2. Literature review and theoretical background

2.1 Overview of e-government

There are a number of e-government definitions in the existing literature. Most definitions of e-government revolve around the concepts of government's employment of technology, in particular web-based application to improve the access and delivery of government services to citizens, business partners, and other government agencies. World Bank defines trust as "the use by government agencies of information technologies (such as Wide Area Networks the Internet, and mobile computing) that have ability to transform relations with citizens, businesses, and other arms of government." (World Bank Group, 2007)

2.1.1 Stages of e-government development

There are various stages of e-government development. According to (Howard, 2001; Lau, 2001), there are four major stages of e-government development:

- **Information Publishing:** this is a basic form of e-government where government posts information on the official government websites. The presented information may include information about available public services, government contract, and government events.
- **Two-way Communication:** in this stage citizens communicate with the government through the Internet and make simple requests. Usually, the information requested is not processed immediately online but sent to the requestor by mail or email.
- **Transaction:** this stage is more sophisticated than previous stages where citizens can conduct all transactions online. Driving licence renewing is one example of these transactions.
- **Integration:** this is the most sophisticated stage of e-government development. In this stage, all government services provided from different departments and agencies are integrated together and accessed through single website called e-government portal.

2.1.2 E-government sectors

The nature of e-Government adoption decision is depending on the degree of the engagement of several parties including: citizens, businesses, and other government agencies. Therefore, the applications of e-Government are categorised according to users' needs and the capacity of ICT. The different users and beneficiaries of e-Government shape the characteristic of e-Government applications. The e-Government applications are classified according to the governmental relationships with a variety of constituents.

E-government has been divided into the following four sectors according to who participates: Government to Government (G2G) for all operations inside or between government agencies, Government to Business (G2B) for all interested participants in institutions or private companies and the government, and Government to Citizen (G2C) which refers to all dealings between citizens and the government (DeBenedictis, Howell, Figueroa, & Boggs, 2002). Some observers, such as Ndou (2004), further identify a fourth sector, Government to Employees (G2E).

Government-to-Citizen (G2C)

The Government to Citizen (G2C) sector refers to all dealings between citizens and the government over online medium (DeBenedictis et al., 2002). G2C e-Government is designed to facilitate citizen interaction with government and is perceived to be the primary goal of e-Government (Seifert, 2008). Using G2C e-Government, citizens transactions with government, such as license renewal, can be less time consuming and easier to carry out.

The citizen demand for G2C e-Government is expected to increase significantly over the next ten years as the youth, who are now growing up in the information age with personal computers and the Internet as routine presence in their life, becomes adults (Seifert, 2008). One example of G2C initiative is GoBenefits.gov which is an American governmental web site that provides a single point of access for citizens to locate and determine potential eligibility for government benefits and services.

Government-to-Business (G2B)

The G2B sector deals mainly with the sale of surplus government goods to the public and the procurement of goods and services. Recently, G2B initiatives received a significant amount of attention as a result of the high enthusiasm of the business sector and the potential for reducing costs through improved procurement practices and increased competition (Seifert & Petersen, 2002). When implemented effectively, G2B e-Government has potential to streamline and improve the consistency of personnel-intensive tasks (Seifert, 2008).

E-Procurement is the main application of G2B e-Government that allows government agencies to reap the benefits being realized in the private sector through electronic means (Fang, 2002). One example of G2B initiative is FedBizOpps.gov which is a web site that is administered by the General Services Administration (GSA), an independent agency of the United States government established

to manage and support basic functions of federal agencies. FedBizOpps.gov is designed to serve as central location for agencies to post procurement notices.

Government-to-Government (G2G)

The G2G sector represents the backbone of e-Government in which governments (federal, state, and local) integrate their internal systems and procedures into a central system (Seifert, 2008). The main aim of G2G e-Government is to facilitate processes if inter-government organisations by streamlining collaboration and coordination.

G2G e-Government involves sharing data and conducting electronic transactions between governmental actors. The main motivating force behind the G2G sector includes the growing attention being paid to improve the efficiency by saving transactions cost, increasing the speed of transactions, reducing the number of personnel necessary to complete a task, and improving the consistency of outcomes (Seifert, 2008). Examples of G2G e-Government include E-Identity, E-Security services, Electronic Document Management, and Process Management Services.

2.2 Research model

In the context of Government-to-Citizen category of e-government, there are two major objectives: providing citizens with effective information access and providing citizens with access to full range of e-government services online (National Research Council, 2002). The basic idea behind e-government is to allow citizens to interact with their government through the internet; for example, they ask questions and receive answers, get updated government regulations, obtain government official documents, fill applications, pay tax and bills, receive payments, and forth. The two forms of citizens' engagement in e-government are receiving e-government information and requesting e-government service (Warkentin, Gefen, Pavlou, & Rose, 2002). The following research model describes how citizens' trust can affect their intention to engage in e-government.

The theoretical research model (see Figure 1) consists of nine constructs that delineate the conceptual model of citizens' trust in e-government. The model attempts to formulate an important number of factors that have been observed to affect citizens' trust in e-government. These factors have been integrated from different models of trust that are existed in the literature. The proposed model applies to Government-to-Citizen (G2C) situation and it delineates the roles of significant factors in the process of trust in e-government. Following is the theoretical review in which each construct is derived.

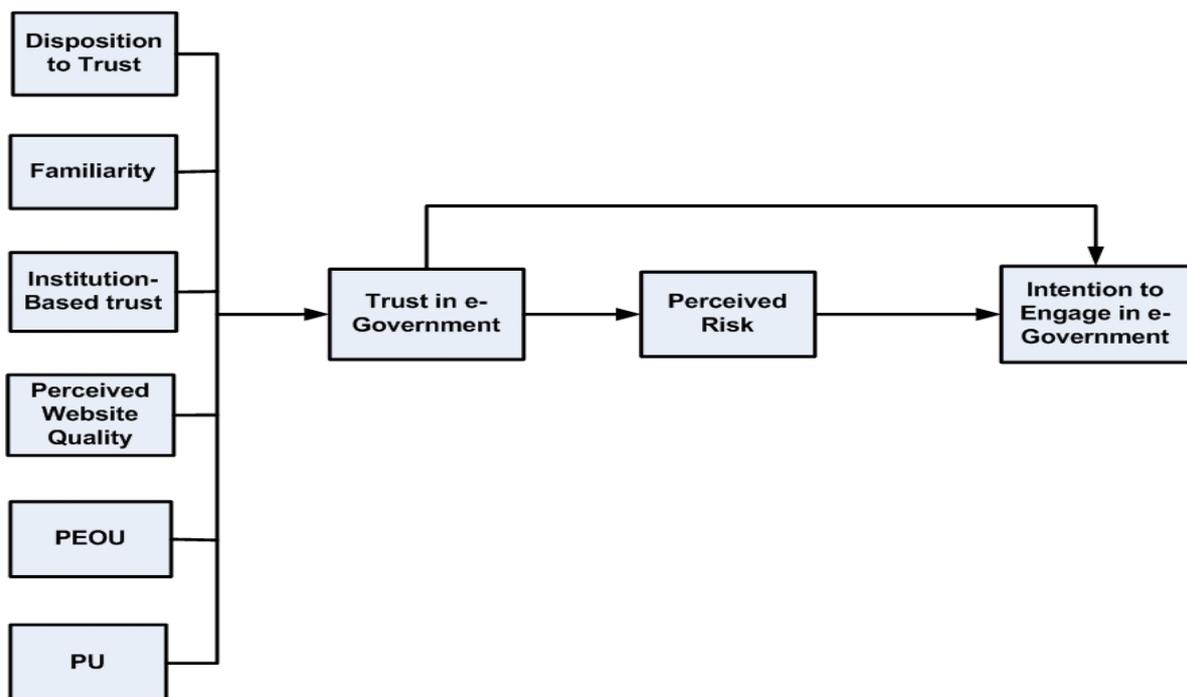


Figure 1: Theoretical research model

2.2.1 Trust in e-government

In this research, trust is defined as an individual's (trustor, here is citizen) belief or expectation that another party (trustee, here e-government) will perform a particular action important to trustor in the absence of trustor's control over trustee's performance (Mayer, Davis, & Schoorman, 1995). Hence, trust indicates that trustor will rely on trust behaviour (Rotter, 1971b). Trust is occurred in uncertain environment (Schlenker, Helm, & Tedeschi, 1973) where the risk is existed (Lewis & Weigert, 1985) and trustor is vulnerable for unfulfilled expectation or harmful outcomes (Zand, 1972). People use trust as mental mechanism to reduce the complexity and uncertainty of living environment (Luhmann, 1979).

Trust has been cited as important and crucial requirement for economic and social interactions (Baier, 1986; Barber, 1983; Dasgupta, 1998; Lewis & Weigert, 1985; Luhmann, 1979; Mayer et al., 1995; McAllister, 1995; Rotter, 1971a). In the context of e-commerce, trust has been also observed as a key value in e-commerce (Gefen, 2000; Gefen & Straub, 2004), and in e-government (Galindo, 2002). Furthermore, trust enables cooperative behaviour (Gambetta, 1988). Hence, Trust beliefs lead for trust behaviour; in this model trust in e-government will lead citizens to engage in e-government (Warkentin et al., 2002).

H1: citizen trust in e-government positively influences intentions to engage in e-government.

2.2.2 Disposition to trust

Individuals have differences in terms of tendency to trust other party (Rotter, 1971a) whether this party is a person, a group, an organisation, or a business. Disposition to trust "is a propensity or tendency to believe in the positive attributes of others in general" (D. H. McKnight, Kacmar, & Choudhury, 2004 p. 36). Disposition to trust has been identified as a construct for trust in many trust models (D. McKnight, Choudhury, & Kacmar, 2002; D. H. McKnight & Chervany, 2001; D. H. McKnight et al., 2004). McKnight and Chervany (2001) proposed two constructs for disposition to trust *Faith in Humanity* and *Trusting Stance*. Faith in humanity is underline assumptions that others are usually upright, well meaning, and dependable. Trusting stance means that one believes that, regardless of other people reliability, one will obtain better outcomes result from dealing with other people; i.e. trust others until they prove trustor is wrong. Research has shown that disposition to trust has a significant impact on trust in online context (D. McKnight et al., 2002; D. H. McKnight et al., 2004; Pavlou & Gefen, 2004). Trust in the web institution is positively affected by disposition to trust because people who trust other generally will trust institutions involving people (McKnight et al., 2004) such as online vendors. Thus, disposition to trust is positively associated with consumer's trust in e-commerce (Y. H. Kim & Kim, 2005). In e-government context, disposition to trust has been argued to increase trust in e-government (Warkentin et al., 2002). This leads to the following hypothesis:

H2: Citizens' disposition to trust is positively associated with trust in e-government.

2.2.3 Familiarity

Familiarity is stage where people use their previous experience (Luhmann, 1979), interactions, and learning to understand what, where, why, and when people do what they do (Gefen, 2000). It has been argued that familiarity is precondition for trust (Luhmann, 1979) and that trust is occurred in a familiar world, and the familiar features of the world may be changed which in turn may impact the possibility of developing trust in human relations (Luhmann, 1988). The Luhmann's note about the impact of changeability of familiarity on trust is useful in understandability of e-government trust because the e-government environment of providing government services for citizens are different than tradition government environment. Therefore, most of citizens are not familiar with e-government environment especially in the early stage of e-government which will influence citizens' trust in e-government.

H3: Citizens' familiarity with e-government positively affects trust in e-government.

2.2.4 Institution-based trust

Institution-based trust is the trustor's confidence that the situation structures are existed to facilitate outcome success of trusting behavior (Pavlou, Tan, & Gefen, 2003) and more impotently to impose sanctions when trust is breached (Humphery & Schmitz, 1998; Lane & Bachmann, 1996). Following

McKnight et al. (2002), institution-based trust is defined as “the belief that needed structural conditions are present (e.g., in the Internet) to enhance the probability of achieving a successful outcome in an endeavor like e-commerce” (p. 339). Institution-based trust is generated when trustor believes that safety, guarantee, insurance and other performance structures are presented to secure a situation (Pavlou et al., 2003; Shapiro, 1987). In economic context, Institution-based trust “proved to be the most resilient,..., expanded and elaborated [trust creating mode]” in impersonal economic environment (Zucker, 1986, p. 96 p. 96). In e-commerce context, institution-based trust has been argued to be best suited for online marketplaces because the secure online transactions (between and buyer and seller) are conducted under the aegis of third party who constitute an *institutional context* (Pavlou & Gefen, 2004).

McKnight et al. (2002) defined two dimensions (sub-constructs) of institution-based trust: *structural assurance* and *situation normality*. Structural assurance is related to structures that existed to promote success such as guarantees, regulation, and legal resources. Situation normality is the belief that success is expected as the environment is normal and in appropriate order. Example of situation normality in internet environment is the expectation that infrastructure of the communication is secure, i.e. security mechanisms and techniques (encryption) are employed to secure the communication channel. Accordingly, the following hypotheses are proposed:

H4a: structure assurance trust positively affects citizens’ trust in e-government.

H4b: situation normality trust positively affects citizens’ trust in e-government.

3. Perceived website quality

Several research studies have been conducted to identify the design elements that communicate trust in e-commerce web sites. Studio Archetype and Sapiient study (1999) is significant research that has investigate trust in e-commerce from HCI perspective. They identified different types of forms that communicate consumers’ trust in an e-commerce website. Navigation and Presentation of the websites have been identified in Studio Archetype and Sapiient study as very important design elements that facilitate the users’ trust in the websites. Based on empirical evidence (Studio Archetype/Sapiient & Cheskin Research, 1999), the following hypotheses are proposed:

H5a: Easiness of navigation of e-government website positively affects citizens’ trust in e-government.

H5b: E-government website presentation positively affects citizens’ trust in e-government.

3.1.1 Technology Acceptance Model (TAM)

Other important components that are assumed to affect citizens’ trust in e-Government are: *Perceived Usefulness (PU)* and *Perceived Ease of Use (PEOU)*. PU and PEUO are two main components in Technology Acceptance Model (TAM) (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989). TAM is an adaptation of the theory of reasoned action (TRA) (Fishbein & Ajzen, 1975). PU is the degree to which the user believes that the using of the system enhances his or her task performance. PEOU is the degree to which the user believes that using the system is easy and free of hard effort. TAM has been applied to the usability of e-commerce websites (Gefen, Karahanna, & Straub, 2003); also several researchers have hypothesised that PEOU and PU are positively affect trust in e-vendor (Chau, Hu, Lee, & Au, 2007; Koufaris, Kambil, & Labarbera, 2001; Pavlou, 2003; Tang & Chi, 2005). In e-government context, the following hypotheses are proposed:

H6a: PEOU of e-government website positively influences citizens’ trust in e-government.

H6b: PU of e-government website positively influences citizens’ trust in e-government,

3.1.2 Perceived risk

Risk is closely connected with trust; if there is no risk, there is no need for trust (Luhmann, 1988). Therefore, trust is manifested with present of risk where the possible damage is greater than advantage that is sought (Deutsch, 1960). Trust “derives from the calculus of gains and losses, weighed by perceived risks” (Rousseau, Sitkin, Burt, & Camerer, 1998, p. p. 398). However, “placing trust means suspending, discounting, bracketing the risk, acting as if the risk were not existent” (Sztompka, 2003 p. 31). Therefore, trust effects risk which in turns affects behaviour, i.e. perceived

risk moderates the relations between trusting belief and intention to trusting behaviour (Gefen, Rao, & Tractinsky, 2003). Accordingly, the following hypotheses are proposed:

H7a: Citizens' trust in e-government negatively affects perceived risk.

H7b: Perceived risk negatively affects intention to engage in e-government.

3.2 Instrument development

The constructs are theoretically based on a comprehensive review of the literature and grounded in existing theories. Multi-item scales were developed or adapted from the literature in order to measure the constructs. The application of multi-item or summated scales is useful for investigating latent constructs (Borsboom, Mellenbergh, & Heerden, 2003; Colton & Covert, 2007) and, if properly developed, multi-item scales will provide meaningful measurement and the measurements derived from them will be accurate and interpretable (Peterson, 2000). Therefore, the theoretical constructs in this research are composed of three or more items (Cronbach & Meehl, 1955). As delineated in the research model (Figure 1), there are 9 major constructs. We developed the scale to measure *intention to engage in e-government* construct. Items to measure the other constructs were adapted from previous empirical research. The adapted items were considerably modified. Following is the discussion of the literature that supports the items in each construct.

3.3 Items generation

Table 1: Pool of items entered in the Q-sort analysis

Construct ID	Construct	Subconstruct/ Dimension	Number of Items
1	Disposition to Trust	Benevolence	3
		Integrity	3
		Competence	3
		Trusting Stance	3
2	Familiarity		4
3	Institution-Based Trust	Structure Assurance Trust	4
		Situation Normality	11
4	Website Design	Navigation	4
		Presentation	5
5	Perceived Ease of Use		5
6	Perceived Usefulness		6
7	Trust in e-Government	Competence	6
		Integrity	7
		Benevolence	4
8	Perceived Risk	Security risk	4
		Performance risk	5
		Time Risk	2
9	Intention to engage in e-Government		8
Total			87

The items for "Trust in E-Government" construct were adapted from: empirical research on consumer trust in the internet (Corbitta, Thanasankit, & Yi, 2003; Sirkka L. Jarvenpaa, Tractinsky, & Vitale, 2000), the empirical research on interdisciplinary typology of trust for e-Commerce (D. McKnight et al., 2002; D. H. McKnight & Chervany, 2001), and the literature of trust building technology in the electronic market (Ba & Pavlou, 2002). The items for "Disposition of Trust" were synthesized from an empirical study on the trust measurement in e-Commerce (D. McKnight et al., 2002), and the literature on the consumer trust relationship in e-Commerce (D. H. McKnight & Chervany, 2001). The items for "Perceived Risk" construct were drawn from empirical studies on conceptualization of trust, risk and their relationship in e-Commerce (Gefen, Rao et al., 2003; Sirkka L. Jarvenpaa et al., 2000), from an empirical work that has investigated the perceived risks as barriers to Internet and e-

commerce usage (Liebermann & Stashevsky, 2002), and from an empirical investigation on the effect of perceived risk on purchase intention in the Internet (L. H. Kim, Kim, & Leong, 2005). The items for “*Familiarity*” construct were primarily based on empirical study on the impact of familiarity on the consumer trust in e-Commerce (Gefen, 2000), and based on the description of the meaning of familiarity in the literature (Luhmann, 1988; Zhang, Ghorbani, & Cohen, 2007). The items for “*Trust in e-Government*” construct were adapted from an empirical research on the trust measurement in e-Commerce (D. McKnight et al., 2002), from an empirical study on the role of trust in e-Commerce (Gefen, 2000), and from an empirical investigation of citizens’ trust in government and its linkage with their satisfaction with e-Government (Welch, Hinnant, & Moon, 2005). The items for “*Institution-Based Trust*” construct (Situation Normality and Structure Assurance) were drawn from previous empirical research on the institution-based trust and its effect on the trust in the online environment (D. McKnight et al., 2002), and from a theoretical exploration of institute-based trust (Zucker, 1986). The items for “*Perceived Website Quality*” construct (Navigation and Presentation) were adapted from an empirical study that have identified e-Commerce virtual design elements that effect consumers’ trust (Stephens, 2004). The items for “*Perceived Usefulness*” and “*Perceived Ease of Use*” constructs were adapted from an empirical research that have investigated the relation between trust and technology acceptance model in the online environment (Gefen, Karahanna et al., 2003). Table 1 shows the number of items in each contrast and sub-construct in the theoretical research model.

3.4 Scale development: Q-Sort method

The Q-Sort method is derived from Q-Methodology, a factor analysis technique. Q-Methodology was developed by Stephenson (1953). It has been used by psychology and social sciences to investigate people’s subjectivity, i.e. their viewpoints. Unlike R-factor analysis which studies the correlation between variables, Q-methodology examines the correlation between individuals (Brown, 1997). In Q-methodology, the items are the sample in the Q-sort and the people who complete the Q-sort are the experimental condition (Cross, 2004). Therefore, Q-methodology examines the correlations between subjects across a sample of items. One of the main application of the Q-methodology is to assess reliability and construct validity of questionnaire items that are being prepared for survey research (Nahm, Solis-Galvan, Rao, & Ragu-Nathan, 2002). Nahm et al. (2002) demonstrated how the Q-sort method can be used to pre-test items after they have being developed or generated based on the literature review and before questionnaire items are the administrated as a survey. The method consists of two stages (Nahm et al., 2002). In the first stage, two independent judges are asked to sort the items of the questionnaire according to different constructs. Based on this stage, the agreement between the two judges (inter-judge agreement) is calculated. In the second stage, items that were classified incorrectly and were found ambiguous in the first stage are reworded or deleted. The two-stage process is repeated continuously until a satisfactory level of agreement is reached.

In this research, items were placed a common pool and were subjected to two sorting rounds by two independent judges in each round. The participants in the Q-sort process (judges) were chosen so they represent the target population of the research and they are experts in the field. Two participants were directors in the e-Government program in Saudi Arabia, one participant was a consultant in the e-Government program in Saudi Arabia, and one participant was a manager of IT departments in a government ministry. Participants were grouped in pairs. Each pair composed two independent judges in each round. The judge were asked to sort a list of items into groups, each group represents one of the 9 constructs. The differences and similarities among sorted items are used as an indicator for the constructs validity.

3.4.1 Q-sorting procedures

The research model and its 9 constructs with their definition were presented to the judges. Items, that were generated to measure the constructs, were printed on individual 3 by 5 inch cards. After randomly shuffling the cards (items), each judge was given these cards and asked to sort them into categories. Each category represents one of the 9 constructs. Additional to the nine constructs, a “*Not Applicable*” category was included to make sure the judges will not force any items into a particular category. Each round consisted of different pairs of judges. Judges were allowed to ask any question either related to the sorting procedure or related to the research model and constructs.

3.4.2 Q-sort evaluation

In order to evaluate and assess both the validity and reliability of the instrument, three evaluation criteria were used to assess the Q-sort: the inter-judge agreement level, Cohen’s Kappa Index (Cohen, 1960), and Moore and Benbasat’s “Hit Ratio” (Moore & Benbasat, 1991). The inter-judge agreement level is calculated by counting how many items that both judges agree to place into a particular category. Then, the number of agreed items is divided by the total items number to get the percentage of the inter-judge agreement. The second measure is Cohen’s Kappa index which is “the proportion of joint judgement in which there is agreement after chance is excluded” (Nahm et al., 2002, p. 115). For instance, assume that two judge independently classified a set of N components as either acceptance or rejectable. After the classification was finished, we can construct the following table (Nahm et al., 2002):

		Judge 1		Totals
		Acceptable	Rejectable	
Judge 2	Acceptable	X ₁₁	X ₁₂	X ₁₊
	Rejectable	X ₂₁	X ₂₂	X ₂₊
Totals		X ₊₁	X ₊₂	N

The Cohen’s Kappa index can be calculated as following:

$$k = \frac{N_i * X_{ii} - \sum_i (X_{i+} X_{+i})}{N^2 - \sum_i (X_{i+} X_{+i})}$$

Where:

N_i: total number of items

x_{ij}: number of items agreed on by two judges

X_{i+}: number of items in the ith row

X_{+i}: number of items in the ith column

Previous research has considered score of Kabb index greater than 0.65 to be acceptable (S. L. Jarvenpaa, 1989; Landis & Koch, 1977; Todd & Benbasat, 1993). The third measure is Moore and Benbasat’s “Hit Ratio” which measures how many items were correctly placed in the intended category by the judges. The “Hit Ratio” is computed by counting all items that were correctly sorted into intended theoretical construct by each judge, and then divide them by twice the total number of items.

3.4.3 First sorting round

The first round consisted of 87 items for the nine constructs. The judges in this round were a director in the e-Government program in Saudi Arabia and a manager of IT department in a government ministry. In this round, the inter-judge raw agreement scores averaged 80% (Table 2) and the initial overall placement ratio of items within the target constructs was 75% (Table 3) as 131 of 174 items were correctly classified.

Table 2: Inter-judge scores: first sorting round

Judge 2	Judge 1											
	Construct	1	2	3	4	5	6	7	8	9	NA	
1	10											
2		4										
3			1	4				1				
4					6	3						
5						3						
6							4				2	
7				3				11	1			
8									9			
9								1		7		
NA											0	
Total Items: 87		Number of Agreement: 70					Agreement Ratio: 80%					

Table 3: Items placement ratios: first sorting round

Theoretical Categories	Actual Categories												Total	%
	Construct	1	2	3	4	5	6	7	8	9	NA			
1	22										2	24	92%	
2		8										8	100%	
3			2	17				11				30	57%	
4					12	6						18	67%	
5					1	8	1					10	80%	
6							8				4	12	67%	
7				8				24	2			34	71%	
8			2	2					18			22	82%	
9								2		14		16	88%	
Total Items Placement: 174		Number of Hits: 131					Overall Hit Ratio: 75%							

The results of the first round indicate some confusion among some constructs. In order to understand this confusion, the off-diagonal items in Table 3 were examined to look for clusters. On the Institution-Based Trust construct, 11 of the 13 misclassified items are in the Trust in e-Government construct. This is expected since in both constructs there are items that are related to the trust beliefs. A similar effect appears in the Trust in e-Government construct, where 8 of the 10 misclassified items are in the Institution-Based Trust construct. This misplacement of the items confirms the confusion between Trust in e-Government construct and Institution-Based Trust construct, enforcing the need for further clarification between these two constructs in the next round. Another cluster appears in the Perceived Website Quality construct, where 6 misclassified items were placed in the Perceived Ease of Use construct. This is understandable from the fact the ease of the quality of the website promotes and enhances the ease of use. On the Perceived Risk construct, there are two clusters; one on the Familiarity (2 out of 4 misclassified items were placed in this construct) and one on the Institution-Based Trust (2 out of 4 misclassified items were placed in this construct). Similarly, two misclassified items in the Trust in e-Government construct were placed in the Perceived Risk construct. This confusion may be due to the strong link between risk perception and trust, which demands for further clarification of the items that suppose to measure these construct in the next round. On the Intention to Engage in e-Government construct, two misclassified items were placed in the Trust in e-Government construct. Another cluster found in the Institution-Based Trust, where 2 out of 13 misclassified items were placed under the Familiarity construct. On the Perceived Ease of Use construct, there are two clusters; one on the Perceived Website Quality construct (1 out of 2 misclassified items was placed in this construct) and one on the Perceived Usefulness construct (1 out of 2 misclassified items was placed in this construct). Finally, 6 items were classified as not applicable; 2 items from Disposition to Trust construct and 4 from the Perceived Usefulness construct.

Cohen's Kappa for this round was computed as:

$$K = \frac{87 * 70 - 131}{87^2 - 131} = 0.80$$

Following the guidelines of Landis and Koch (1977) for interpreting the Cohen's Kappa, the value of 0.80 indicates an excellent level of agreement beyond chance for the judges in the first round. This value is same as the value of raw agreement (Table 2). The item placement ratios averaged 75%. The lowest item placement ratio value was 57% for the Institution-Based Trust construct, indicating a low degree of constructs validity. Also, the Perceived Website Quality, Perceived Usefulness, and the Trust in e-Government constructs had a low value of item placement ratio: 67%, 67%, and 71% respectively. On the other hand, several constructs, namely Familiarity, Disposition to Trust, Intention to Engage in e-Government, Perceived Risk, and Perceived Ease of Use obtained 100%, 92%, 88%, 82%, and 80% of item placement ratio respectively, indicating a high degree of constructs validity.

In order to identify the cause of misclassifications in round one, the individual judge classification for each item were examined. An examination of the off-diagonal entries in the placement matrix (Table 3) was conducted. The ambiguous items that had been fitted in more than one category or fitted in no category were careful analysed. The analysis led to the rewording of ambiguous items including 11 items belonging to Institution-Based Trust, 3 items belonging to Perceived Website Quality construct, 2 items belonging to Perceived Risk construct, one item belonging to Trust in e-Government construct, and one item belonging to Intention to Engage in e-government construct. The analysis led also to deleting the too indeterminate items including 5 items belonging to Trust in e-Government construct, 2 items belonging to Disposition to Trust construct, 2 items belonging to Perceived Usefulness construct, and 2 items belonging to Perceived Ease of Use construct. Overall, 11 items were deleted, and 18 items were reworded. One additional item suggested by two judges was added to the Perceived Ease of Use construct.

3.4.4 Second sorting round

The second round consisted of 77 items for the nine constructs. The judges in this round were a director in the e-Government program in Saudi Arabia and a consultant in the e-Government program in Saudi Arabia. In this round, the inter-judge raw agreement scores averaged 91% (Table 4), an 11% improvement of the previous round. The overall placement ratio of items within the target constructs was 88% (Table 5), a 13% improvement from round one, as 131 of 174 items were correctly classified.

Table 4: Inter-judge scores: second sorting round

		Judge 1										
		Construct	1	2	3	4	5	6	7	8	9	NA
Judge 2	1	9										
	2		4									
	3			12				1				
	4				7							
	5				1	4						
	6						4					
	7							9	1	1		
	8								10			
	9									7		
	NA											0
	Total Items: 77		Number of Agreement: 70					Agreement Ratio: 91%				

Table 5: Items placement ratios: second sorting round

Theoretical Categories	Actual Categories												
	Construct	1	2	3	4	5	6	7	8	9	NA	Total	%
	1	18									1	19	95%
	2		8									8	100%
	3			27				6			2	35	77%
	4				15							15	100%
	5				3	8						11	73%
	6						8				2	10	80%
	7							18	2	2		22	82%
	8								20			20	100%
9									14		14	100%	
Total Items Placement: 154				Number of Hits: 136				Overall Hit Ratio: 88%					

In the second round, the changes done on items in round one had resulted in a very good improvement of the measures. However, a further examination of the off-diagonal entries in the placement matrix (Table 5) is needed in order to improve potential reliability and construct validity. The analysis of the placement matrix showed that there is a relatively small cluster around the Institution-Based Trust construct. A closer investigation of the items causing this cluster indicates that those items have words such as "confidence" and "rely" which are related to trust, causing a slight confusion between Institution-Based Trust and Trust in e-Government constructs. The analysis led to reword the items so the difference between trust in the Internet in general (Institution-Based Trust) and trust in e-Government in particular is distinguishable. Additionally, 3 misclassified items in the Perceived Website Quality construct were placed in the Perceived Ease of Use construct. A closer look to the items causing the confusion revealed that items that have words like "easier" and "easy" caused a slight confusion between Perceived Website Quality and Perceived Easy of Use constructs. The analysis led to reword two items in Perceived Ease of Use so it is clear to distinguish between ease of searching and requesting e-Government services and the features and characteristics of e-Government websites quality.

Cohen's Kappa for this round was computed as:

$$K = \frac{77 * 70 - 136}{77^2 - 136} = 0.91$$

Following the guidelines of Landis and Koch (1977) for interpreting the Cohen's Kappa, the value of 0.91, a 11% improvement from round one, indicates an excellent level of agreement beyond chance for the judges in the second round. At this point, we decided to stop the Q sorting round two, with Cohen's Kappa of 0.91, the average placement ratio of 88%, and the inter-judge raw agreement of 91%, indicating high level of reliability and construct validity. See Appendix A for the complete items list.

4. Summary and conclusions

In this paper a conceptual model of citizens' trust in e-Government is proposed. The model consists of nine theoretical constructs which delineate the concept of citizens' trust in e-Government. An instrument to measure these constructs is developed also in this research. A pool of 87 items was generated. Then Q-methodology was utilized to ensure the constructs validity and reliability. Two Q-sorting rounds were conducted to validate the instrument. After the analysis of the Q-sorting, 77 items remained and are reported in Appendix A. This instrument can be used to investigate citizens' trust in e-Government. The future direction for this research is to administer a large scale survey for user of e-Government.

5. Appendix A. measures

Disposition to Trust

1. In general, people really do care about the well-being of others.
2. The typical person is sincerely concerned about the problems of others.
3. Most of the time, people care enough to try to be helpful, rather than just looking out for themselves.
4. In general, most folks keep their promises.
5. I think people generally try to back up their words with their actions.
6. Most people are honest in their dealings with others.
7. A large majority of professional people are competent in their area of expertise.
8. I usually trust people until they give me a reason not to trust them.
9. I generally give people the benefit of the doubt when I first meet them.
10. My typical approach is to trust new acquaintances until they prove I should not trust them.

Familiarity

1. I am familiar with looking for government services on the Internet.
2. I am familiar with conducting online translation with government on the Internet.
3. I am familiar with the e-Government web sites.
4. I am familiar with communicating with government agencies and departments through their official web sites.

Institution-Based Trust

1. I feel good about how things go when I do purchasing or other activities on the Internet.
2. I am comfortable making purchases on the Internet.
3. I feel that most Internet vendors would act in a customers' best interest.
4. If a customer required help, most Internet vendors would do their best to help.
5. Most Internet vendors are interested in customer well-being, not just their own well-being.
6. I am comfortable relying on Internet vendors to meet their obligations.
7. I feel fine doing business on the Internet since Internet vendors generally fulfil their agreements.
8. I always feel confident that I can rely on Internet vendors to do their part when I interact with them.
9. In general, most Internet vendors are competent at serving their customers.
10. Most Internet vendors do a capable job at meeting customer needs.
11. I feel that most Internet vendors are good at what they do.
12. The Internet has enough safeguards to make me feel comfortable using it to transact personal business.
13. I feel assured that legal and technological structures adequately protect me from problems on the Internet.
14. I feel confident that encryption and other technological advances on the Internet make it safe for me to do business there.
15. In general, the Internet is now a robust and safe environment in which to transact business.

Website-Quality

1. Most of the e-Government web sites are easy to navigate.
2. Most of the e-Government web sites' contents are easily accessible.
3. Most of the e-Government web sites are intuitive.
4. Most of e-Government web sites provide sufficient information to search for the relevant government services.
5. Most of the e-Government web sites are easy to read.
6. Most of e-Government web sites are visually pleasing.
7. Most of e-Government web sites are consistent throughout the site.
8. Most of e-Government web sites are professionally designed.
9. Most of the e-Government web sites show how users can contact and communicate with them.

PEOU

1. Most of the e-Government web sites are easy to use.
2. It is easy to learn how to interact with e-Government web sites.
3. Most of e-Government web sites are flexible to interact with.
4. Communication with the state government is easier through its official websites.

PU

1. I perceived that using the e-Government web sites enables citizens to search for government services and conduct government transactions faster.
2. I perceived that using the e-Government web sites can enhance the effectiveness of citizens' transactions with government.
3. Most of e-Government web sites are useful for searching government services.
4. Most of e-Government web sites are useful for conducting government transactions.

Trust in e-Government

1. I believe that e-Government web sites are competent and effective in providing government services.
2. Citizens can always predict performance of most e-Government web sites from their past experience with the web sites.
3. Most e-Government web sites exhibit care, concern, honesty and goodwill to their citizens, thus providing a basis to advance the citizens relationship.
4. I believe most e-Government web sites will perform to the outmost of the citizens' benefit.
5. I believe that most e-Government web sites are truthful in their dealings with the citizens.
6. I would characterize e-Government as honest.
7. I believe that most e-Government web sites would keep their commitments.
8. I believe that e-Government web sites are sincere and genuine.
9. I believe that e-Government web sites are trustworthy.
10. I believe that most e-Government web sites would act in the citizens' best interest.
11. If the citizens required help, e-Government web sites would do their best to help them.
12. I believe that e-Government web sites are interested in the citizens well-being, not just their own.

Perceived Risk

1. Using e-Government web sites to transact with government departments and agencies I perceive that it is not secure to send sensitive information.
2. When using credit card to pay for government services through e-Government web sites I feel that credit card details are likely to be stolen.
3. I would feel insecure sending sensitive information via e-Government web sites.
4. Overall, it is not safe to transmit sensitive information over e-Government web sites.
5. As I consider transacting with government departments and agencies via e-Government web sites, I worry about whether they will perform as they are supposed to.
6. If I were to transact with government departments and agencies via e-Government web sites, I would be concerned that they would not provide the level of benefits that I would be expecting.
7. I am not confident about the ability of e-Government web sites to perform as expected.
8. Considering the possible problems associated with e-Government web sites performance, a lot of risk would be involved with searching and requesting government services via e-Government web sites.
9. It would be too risky to rely on the information provided in e-Government web sites.
10. Using e-Government web sites to search and request government services could lead to an inefficient use of my time.
11. Using e-Government web sites to search and request government services will take too much time or be a waste of time.

Intention to Engage in e-Government

1. How likely is it that you would request government services via e-Government web sites?
2. How likely is it that you would continue visiting e-Government web sites?
3. I would be willing to provide credit card information to pay for government services via e-Government web sites.
4. I can always rely on information provided in e-Government websites.
5. I would be willing to provide my government identification number to e-Government web sites.
6. I would be willing to provide information like my name, address, and phone number to e-Government websites.
7. I would be willing to pay to access information on e-Government web sites.
8. I will follow the procedures and advices provided in e-Government web sites.

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