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E-GOVERNMENT ADOPTION RESEARCH: A META-ANALYSIS OF FINDINGS

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Abstract

The purpose of this paper is to undertake a meta-analysis of findings reported in existing research on adoption and diffusion of e-government. Usable data relating to e-government adoption research were collected from 112 papers out of 779 research articles identified from the ISI Web of Knowledge database and journals dedicated to electronic government research. The findings indicate that there are some variables such as: perceived ease of use, perceived usefulness, intention to use, attitude, satisfaction, actual use, subjective norm, and perceived behavioral control, which are common and drive the research from citizens as well as from employees' perspective. The meta-analysis of the existing e-government adoption studies found that the majority of the construct relationships demonstrated the significant range of average summative correlation, and effect size, but the influence of 'facilitating condition', and 'perceived risk' on 'intention to use' and of 'service quality' on 'satisfaction' was found as non-significant. The broader analysis of the e-government adoption and diffusion research also reflects that although a large number of theories and theoretical constructs were borrowed from the reference disciplines, their utilization by e-government researchers appears to be largely random in approach. The paper also acknowledges the theoretical contributions, limitations and suggests further research directions.

Keywords: E-Government, Citizen, Meta-Analysis, Diagrammatic Representation, Theoretical Constructs

1 Introduction

Electronic government (also well-known as e-government) refers to the use of information technology (IT) to advance the competence, effectiveness, intelligibility, and accountability of public governments (Kraemer and King, 2003). The implementation of e-government systems has been attracting increasing amounts of research interest, and is believed to represent one of the most significant IT implementations and organizational challenges of the next decade (Warkentin et al., 2002; Marche and McNiven, 2003). Over the past few years, although, a small but emerging body of scholarly literature on e-government has emerged (Norris and Lloyd, 2006), it appears to run the risk of not achieving its maturity (Gronlund, 2005b). Despite the significant impact of e-government systems on public administrations, organizations, individuals, and society, to date, only a few methodical and comprehensive studies have been undertaken on this subject (Jaeger, 2003; Kraemer and King, 2003). Moreover, the research themes, as well as the research approaches and perspectives employed in the study of e-government implementations, exhibit significant diversity, making it difficult to reach conceptual clarity on the subject (Gronlund, 2005a). Although, the ongoing trends of different e-government applications being explored in various countries across the globe, the authenticity and consistency of the various theoretical approaches being used in the e-government research is yet to be investigated. Neither any study has, yet, established collective representation of constructs to investigate the ongoing trend of the e-government research in the context of citizens, employees, or organizations, nor any such attempt has been made toward performing the meta-analysis of the existing empirical studies to visualize the performance of the constructs and their relevance in the e-government adoption research. Hence, in order to understand the use and advancement of research models and cumulative performance of the relationships between the constructs, the aim of this study is to undertake a meta-analysis of findings reported in existing research on adoption and diffusion of e-government. The aim of the study is achieved by representing the combined diagrammatic representations explicitly for citizens, finding the number of significant and non-significant relationships between the constructs for this category, gathering the sample size for such studies for latter performing the meta-analysis and to identify their overall performance.

The paper is structured as follows: the methodology of the study is described in section 2. Section 3 presents the findings with a combined diagram considered from individual models from studies used for citizen adoption of e-government. This is followed by presenting a table of sample size and the meta-analysis for all such studies. A brief discussion of the findings are then presented in section 4. Finally, section 5 of the study presents conclusions including theoretical contribution, limitations, and suggestions for future research directions.

2 Methodology

Our exploration began with a search for articles related to e-government - this was accomplished by developing an appropriate set of keywords and phrases such as 'electronic government', 'e-government', 'e-Gov', 'eGov', 'digital democracy', 'online government', 'adoption', 'acceptance', 'usage', 'implementation', 'impact', and 'diffusion' in all possible permutations and combinations, (taking into consideration the logical AND, and OR as appropriate) and conducting a corresponding search of the online journal database called ISI Web of Knowledge[®] and journals dedicated to e-government. As a result, a total of 434 usable articles were found fully accessible. It was further observed that 112 of them used a range of different constructs to investigate e-government scenarios. In addition, it was visualized that 70 of them used different theories, models or frameworks in their original or altered form to support their research models. The subsequent analysis of these 70 studies further indicated that only 58 of them could finally be used for meta-analysis because only these number of research studies showed the appropriate correlation values (e.g. Pearson correlation, β -value etc.) required for performing meta-

analysis. Moreover, 45 studies were found deemed relevant for a cumulative diagrammatic representation for e-government adoption research as this diagram only considered the constructs used for the citizen's perspective leaving apart studies based on professional's and organizational context.

After showing the separate diagrammatic representation for citizen, we gathered the details of the relationships between all independent and dependent constructs with the sources divided under significant or non-significant groups. With the correlation coefficients collected between each pair of constructs from various studies we then estimated the single cumulative value between all such constructs to know the prospective trend of convergence or divergence. We used the trial version of the *Comprehensive Meta-Analysis* software (from the website www.meta-analysis.com) to perform the meta-analysis.

3 Findings

Figure 1 portrays the combination of all individual constructs and their concerned relationships which were considered for examining e-government related issues. The analysis of the diagram indicates that the construct *intention to use* (N=120) was found as the most commonly used dependent variable followed by *attitude* (N=42), *trust* (N=18), *perceived usefulness* (N=15), *satisfaction* (N=15), *actual use* (N=11), and *perceived ease of use* (N=9) as some other frequently used variables across different studies. It also signifies certain constructs such as *perceived ease of use* (N=15), *perceived usefulness* (N=14), and *attitude* (N=9) as the most commonly used independent variables as well. Some of the independent variables such as *uncertainty*, *time efficiency*, *perceived reliability*, *perceived privacy*, *perceived empathy*, *perceived lack of need*, and *perceived quality* have been used only once and are under-represented. Similarly, there are certain dependent variables which have been used only once in a particular study and were never used again such as *internet use web information*, *internet use web transformation*, *internet competence*, *website usefulness*, *structural assurance of the internet*, *motivators*, *future use*, *government online services*, and *perceived net benefit* to name a few.

[Legend for Figure 1: AG: Age; ANX: Anxiety; ATT: Attitude; AU: Actual Use; BA: Broadband Access; BEH: Behavior; BI: Behavioral Intention; CA: Computer Anxiety; COM: Compatibility; COMP: Complexity; CS: Computing Support; CT: Cost; DC: Declining Cost; DMA: Digital Media Access; DME: Digital Media Experience; DMP: Digital Media Preference; DPC: Declining Physiological Condition; DT: Disposition to Trust; ED: Education; EE: Effort Expectancy; EI: External Influence; EGA: E-Government Adoption; EPE: External Political Efficacy; FC: Facilitating Conditions; FD: Future Development; FI: Family Influence; FP: Family Position; FRI: Friend Influence; FU: Future Use; GEN: Gender; HO: Hedonic Outcome; IC: Internet Competence; ICU: Intention to Continue Using; IE: Internet Experience; II: Interpersonal Influence; IMG: Image; INC: Income; IPC: Internal Political Efficacy; IQ: Information Quality; ISP: Internet Safety Perception; IU: Internet Use; IUWI: Internet Use Web Information; IUWT: Internet Use Web Transformation; KS: Knowledge Services; MT: Motivators; OB: Optimism Bias; PBC: Perceived Behavioral Control; PC: Perceived Credibility; PCN: Perceived Concerns; PE: Performance Expectancy; PER: Persuasion; PET: Previous E-Government Transaction; PEOU: Perceived Ease of Use; PES: Perceived Ease of Obtaining Subscription; PHC: Preference for Human Contact; PI: Personal Innovativeness; PIN: Primary Influence; PLN: Perceived Lack of Need; PK: Perceived Knowledge; PNB: Perceived Net Benefit; POT: Perceived Organizational Trustworthiness; PQ: Perceived Quality; PR: Perceived Risk; PRM: Performance; PRT: Perceived Trust; PSOA: Perceived Strength of Online Authentication; PSON: Perceived Strength of Online Non-Repudiation; PSOP: Perceived Strength of Online Authentication; PT: Perceived Trustworthiness; PTR: Propensity to Trust; PU: Perceived Usefulness; RA: Relative Advantage; RFC: Resource Facilitating Conditions; RS: Resource Savings; SA: Self-Actualization; SAI: Structural Assurance of the Internet; SE: Self-Efficacy; SI: Social Influence; SIN: Secondary Influence; SK: Skills; SN: Subjective Norm; SO: Social Outcome; SP: Societal Position; SQ: Service Quality; SRQ: Service Quality; SS: Supply Services; SSI: Secondary Source's Influence; STS: Satisfaction; SYQ: System Quality; TA: Trusting Attitude; TB: Trusting Beliefs; TBS: Trusting Bases; TC: Technology Characteristics; TEF: Trust of the E-Filer; TEG: Trust in E-Government; TEGA: Trust in E-Government Agent; TEGW: Trust in E-Government Website; TFC: Technology Facilitating Conditions; TG: Trust of the Government; TI: Trust of the Internet; TIN: Trusting Intention; TRN: Training; TRST: Trust; TT: Trust in Technology; UB: Use Behavior; UO: Utilitarian Outcome; US: User Satisfaction; WQ: Website Quality; WU: Website Usefulness; YIE: Years of Internet Experience]. [Types of Relationship Indicator: +: Significant; x: Non-Significant; and *: Mixed Relationship]

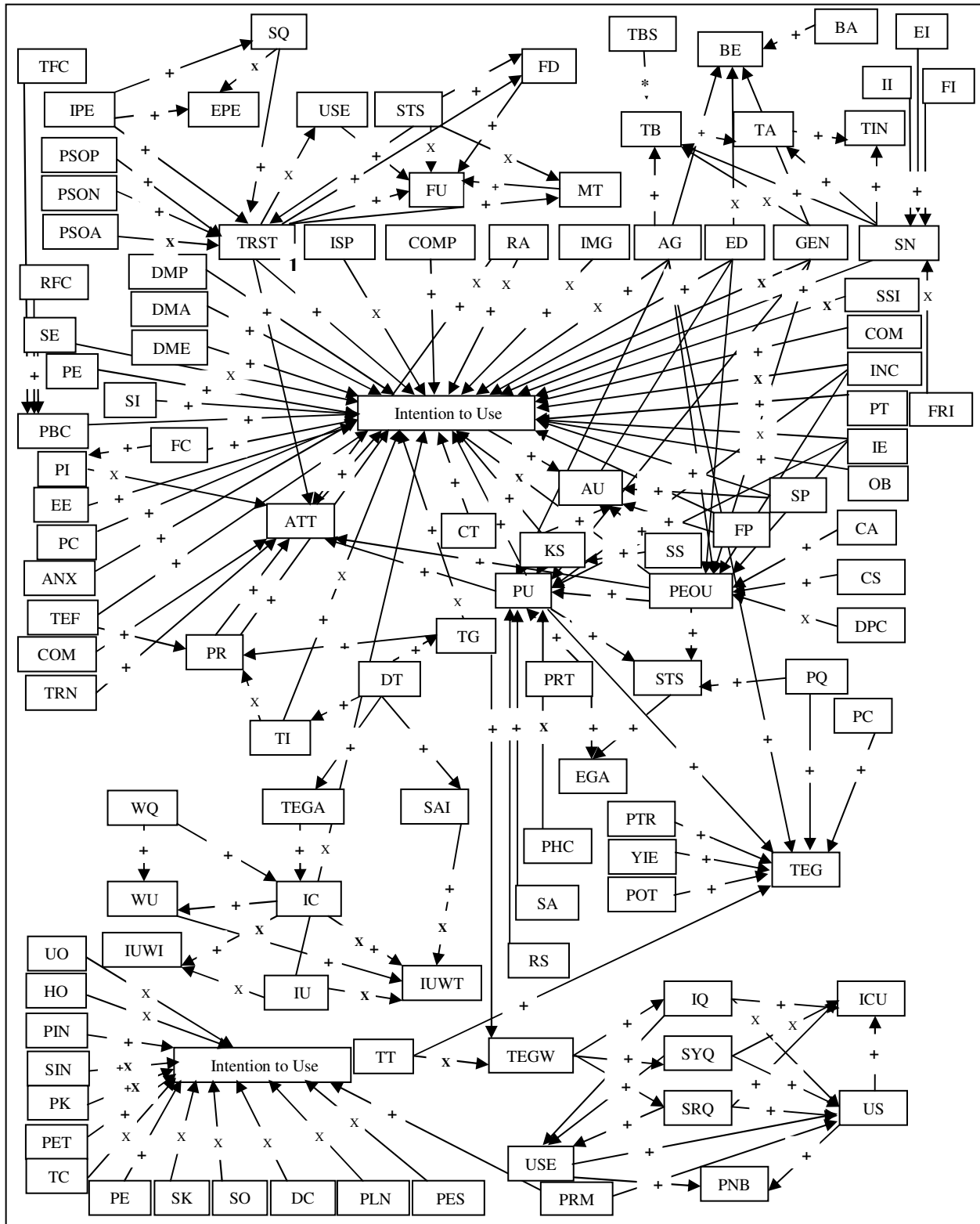


Figure 1. Combined constructs' diagram for citizens

To represent a detailed account of significant and non-significant relationships between constructs across various studies, a table (Table 1) for citizens has been included. Table 1 represents the details of all such

relationships between the constructs which have been analyzed by three or more studies as significant or non-significant or both. The table indicates that *attitude*, *intention*, and *perceived usefulness* constitute a set of dependent variables which were largely investigated against a range of independent variables. The analysis of the highly intense 13 relationships between constructs indicates that the number of significant (N=50) relationships is way ahead of the non-significant (N=11) relations. Further it was also analyzed that a study by van Dijk et al. (2008) found significant as well as non-significant relationships between a pair of variables such as attitude-intention, age-intention, education-intention, and performance expectancy-intention used under two different models.

[Legend for Table 1: Y= Significant relation; N= Non-significant relation; *= Both; 01: Attitude-Intention; 02: Age-Intention; 03: Education-Intention; 04: Relative Advantage-Intention; 05: Performance Expectancy-Intention; 06: Effort Expectancy-Intention; 07: Perceived Usefulness-Attitude; 08: Perceived Usefulness-Intention; 09: Perceived Ease of Use-Intention; 10: Perceived Ease of Use-Perceived Usefulness; 11: Social Influence-Intention; 12: Primary Influences-Intention; 13: Facilitating Condition Resources-Intention]

Study	01	02	03	04	05	06	07	08	09	10	11	12	13
Al-Shafi and Weerakkody (2009)	N						Y	Y		Y			
Belanger and Carter (2010)		Y	N										
Carter (2008)								Y	Y				
Carter and Belanger (2005)				N					Y				
Carter and Schaupp (2009)					Y						Y		
Chiang (2009)							Y			Y			
Colesca and Dobrica (2008)										Y			
Dwivedi and Weerakkody (2007)							Y						
Dwivedi et al. (2007a)									Y			Y	Y
Dwivedi et al. (2007b)	Y											Y	Y
Hung et al. (2006)	Y						Y						
Hung et al. (2007)					Y	Y					Y		
Hung et al. (2009)	Y						Y						
Khoumbati et al. (2007)				N					Y			Y	Y
Lau (2004)	Y						Y						
Lean et al. (2009)				*				Y					
Li et al. (2008)	Y												
Phang et al. (2006)		N	Y					Y	Y	Y			
Tang et al. (2009)								Y					
van Dijk et al. (2008)	*	*	*		*	Y							
Wang and Shih (2009)					Y	Y					Y		
Yeow and Loo (2009)					Y	Y					Y		

Table 1. Constructs' Relationship with Significance

Table 2 represents the sample size of all those studies (N=58) which were represented in the diagrams and latter on considered for the meta-analysis. There were six studies (Al-Shafi and Weerakkody, 2009; Dwivedi et al., 2007b; Lau and Kwok, 2007; Reddick, 2006; Reddick, 2008; Seyal and Pijpers, 2004) which used relatively smaller sample of sample size less than or equal to 100 whereas the same number of studies (Chai et al., 2006; Fu et al., 2006; Hung et al., 2006; Krell and Matook, 2009; Kunstelj et al., 2009; van Dijk et al., 2008) used a fairly larger sample of more than 1000.

Source	Sample Size	Source	Sample Size
Fu et al. (2006)	27208	Wang and Shih (2009)	244
Chai et al. (2006)	4933	Dwivedi et al. (2007a)	237
van Dijk et al. (2008)	1225	Khoumbati et al. (2007)	237
Hung et al. (2006)	1099	Belanger and Carter (2008)	214
Krell and Matook (2009)	1050	Teo et al. (2009)	214
Kunstelj et al. (2009)	1028	Lau (2004)	198
Kim and Holzer (2006)	895	Parent et al. (2005)	195

Gotoh (2009)	824	Hung et al. (2009)	186
Colesca (2009)	793	Sahu and Gupta (2007)	163
Sun et al. (2006)	631	Chu et al. (2008)	158
Shareef et al. (2009)	545	Gumussoy and Calisir (2009)	156
Yeow and Loo (2009)	500	Lean et al. (2009)	150
Colesca and Dobrica (2008)	481	Lee and Rao (2009)	150
Li et al. (2008)	443	Phang et al. (2006)	139
Lu et al. (2010)	422	Dwivedi and Weerakkody (2007)	138
Tang et al. (2009)	385	Vathanophas et al. (2008)	124
Belanger and Carter (2010)	372	Boyer-Wright and Kottemann (2008)	122
Dwivedi and Williams (2008)	358	Wang and Liao (2008)	119
Sambasivan et al. (2010)	358	Sang et al. (2009)	112
Pinho and Macedo (2008)	351	Sang et al. (2010)	112
Floropoulos et al. (2010)	340	Carter (2008)	105
Kim and Lee (2006)	322	Carter and Belanger (2005)	105
Ojha et al. (2009)	310	Casalo et al. (2008)	103
Chiang (2009)	281	Seyal and Pijpers (2004)	100
Carter and Schaupp (2009)	260	Lau and Kwok (2007)	87
Schaupp and Carter (2010)	260	Reddick (2006)	72
Schaupp et al. (2010)	260	Dwivedi et al. (2007b)	70
Wang (2002)	260	Al-Shafi and Weerakkody (2009)	54
Hung et al. (2007)	244	Reddick (2008)	23

Table 2. Summary of sample size of the relevant studies

Table 3 presents the correlation results through meta-analysis for those 23 relationships for all such key constructs which hold the corresponding relationships three or more times from a set of 58 studies. The results show that the combined impact of relationships between facilitating condition and perceived risk with intention, and service quality with satisfaction were not found significant whereas all other relationships were seen quite significant. The analysis also revealed that *PEOU-Intention* was the largely explored relationship for the meta-analysis in terms of the number of studies followed by *PU-Intention*, *PEOU-Usefulness*, *Attitude-Intention*, *Subjective Norm-Intention*, *PBC-Intention*, *RA-Intention*, and *PE-Intention*. The homogeneity test for the random effects model is performed for testing the null hypothesis (King and He, 2006). The Q test assesses whether a set of single studies are homogenous and only informs about the presence or absence of heterogeneity (Huedo-Medina et al., 2006). The non-significance of the heterogeneity test (e.g. p(Heterogeneity) values) illustrated in Table 3 represents a lack of homogeneity for the set of specific relationships (e.g. PI-BI, FCR-BI, COMP-BI, JR-PU, and SYQ-STS etc.) across the different studies considered for meta-analysis.

I.V.	D.V.	#	TSS	AVG(β)	p(ES)	Z-Val	95% L(β)	95% H(β)	HOM(Q)	p(HETR)
PEOU	BI	14	29848	0.175	0.000	4.058	0.091	0.257	117.846	0.000
PU		12	29163	0.469	0.000	5.135	0.304	0.606	420.466	0.000
ATT		11	4946	0.448	0.000	5.015	0.286	0.585	406.381	0.000
SN		9	29957	0.279	0.000	5.809	0.188	0.366	99.726	0.000
PBC		7	2306	0.357	0.000	5.286	0.231	0.472	54.348	0.000
EE		7	2896	0.125	0.046	1.992	0.002	0.245	59.153	0.000
RA		6	1026	0.205	0.000	3.803	0.101	0.306	14.100	0.015
PE		6	2733	0.683	0.011	2.554	0.192	0.901	1270.980	0.000
SI		6	1671	0.258	0.000	7.066	0.188	0.325	10.981	0.052
TRST		6	1222	0.204	0.005	2.834	0.064	0.336	28.795	0.000
PR		6	55508	0.032	0.178	1.347	-0.015	0.079	59.173	0.000
FC		4	1618	-0.615	0.320	-0.994	-0.972	0.603	2456.799	0.000
PI		3	544	0.235	0.000	5.466	0.152	0.314	2.036	0.361

FCR		3	544	0.276	0.000	6.542	0.196	0.352	0.090	0.956
COMP		3	534	0.169	0.007	2.707	0.047	0.286	3.646	0.162
PEOU	PU	12	30234	0.439	0.000	7.658	0.337	0.531	234.817	0.000
JR		3	348	0.199	0.001	3.244	0.080	0.312	2.609	0.271
PU	ATT	7	2378	0.395	0.000	4.102	0.215	0.550	119.499	0.000
COMP		7	2458	0.327	0.000	4.774	0.197	0.445	57.129	0.000
PEOU		5	1848	0.246	0.007	2.683	0.068	0.409	42.956	0.000
IQ	STS	4	1304	0.356	0.000	5.289	0.230	0.470	16.376	0.001
SYQ		4	1304	0.191	0.000	4.463	0.108	0.271	6.204	0.102
SEQ		4	1304	0.480	0.126	1.532	-0.145	0.831	396.975	0.000
BI	AU	4	842	0.371	0.007	2.696	0.106	0.587	51.442	0.000

Legend: #: Number of Studies; ATT: Attitude; AU: Actual Use; AVG: Average; BI: Behavioural Intention; COMP: Compatibility; D.V.: Dependent Variable; EE: Effort Expectancy; ES: Effect Size; FC: Facilitating Condition; FC: Facilitating Condition Resources; H(β):Higher (β); HOM (Q): Homogeneity Test (Q); IQ: Information Quality; I.V.: Independent Variable; JR: Job Relevance; L(β): Lower(β); p(HETR): p(Heterogeneity); PBC: Perceived Behavioral Control; PE: Performance Expectancy; PEOU: Perceived Ease of Use; PIN: Primary Influence; PR: Perceived Risk; PU: Perceived Usefulness; RA: Relative Advantage; SEQ: Service Quality; SI: Social Influence; SN: Subjective Norm; STS: Satisfaction; SYQ: System Quality; TRST: Trust; TSS: Total Sample Size; Val: Value

Table 3. Zero Order Correlation Coefficient (Adapted from King and He, 2006)

4 Discussion

Looking at the combined diagram in context of citizens indicates that the central variables used for TAM including PEOU, PU, and *intention to use* happen to be commonly used constructs across such research studies. Many researchers have also found that *perceived usefulness* and *perceived ease of use* explained a large portion of the variance for intention to use IT (Davis et al., 1989; Gefen et al., 2000). In context of e-government research, a high level of usefulness is likely to increase the user adoption of e-government systems (Sang et al., 2009). The other reason for these constructs of the TAM being used so frequently might be due to its parsimonious nature with extensively validated survey instrument and measure for undertaking data collection. Some other more frequently used constructs come from few well known models. For example, almost all the constructs of UTAUT have been used quite regularly. TAM and UTAUT are technology acceptance models and fit well into the e-government adoption research. Moreover, the common outcome of any adoption and diffusion research ends with intention to use and actual usage of that technology. This also applies to e-government adoption research. Surprisingly, the *intention to use to actual use* mapping is not used by majority of the studies and needs a further investigation. It was also observed that there were some independent variables such as *uncertainty, time efficiency, price savings, perceived reliability, perceived privacy, perceived empathy, declining cost, perceived lack of need, perceived quality, perceived concerns, and perceived organizational trust* are although under-represented have the great potency to be explored in the impending e-government adoption research as they might be extremely useful in uncovering citizens' intention to use certain e-government application and services. Similarly, the under-represented dependent variables such as *internet competence, structural assurance of the internet, motivators, future use and perceived net benefit* might be of great relevance and can work as decisive factors toward using certain e-government services.

The table for citizens' constructs indicates that PU and PEOU have all significant relationships with *intention to use* while PEOU also works as an indirect antecedent for deciding the *intention to use* and thus it can affect indirectly the acceptance through PU (Davis et al., 1992) measuring all relationships as significant. A study by van Dijk et al. (2008) considered the impact of *attitude, age, and education* as significant as well as non-significant because of the two models: structural equation modeling and

separate correlation model applied to the same sample resulting in two different outcomes. Similarly, in a research study by Belanger and Carter (2010), *education* was measured non-significant with *intention to use* because they collected data from a group of students in a university. Moreover, a small variance of diversity in educational qualification for the non-significant impact might result into the non-significance, they added. Hence, except for the specific reasons majority of the relations were found significant indicating the consistent pattern. As far as employee's constructs are concerned, the PEOU-Intention relationship is almost equally balanced with its significant as well as non-significant impacts. This fetches a clear signal that easiness of use of any e-government service is no more the only deciding factor behind using the specific e-government system. A study from Gumussoy and Calisir (2009) presenting the similar case where users use e-reverse auction technology because of the functions it performs for them rather than finding the ease of use of technology a significant factor (Gumussoy and Calisir, 2009). A study by Sang et al. (2010) argued that the lack of support from the top management could be a potential factor behind negative implications of intention to using the technology even if its *ease of use* is at the acceptable level. The further research studies should look into such aspects in details to draw some more accurate outcome.

The sample sizes for the various studies provided in Table 2 are one of the required and mandatory inputs for presenting the meta-analysis of the constructs. Some of the studies represented in the table considered a data sample of less than 100, which might be a concern for getting the unbiased combined correlation values for the constructs. The meta-analysis for majority of constructs resulted in the acceptable summative correlation. However, the combined correlations between *facilitating conditions* and *perceived risk* with *intention to use* and *service quality* with *satisfaction* were non-significant even though there was less number of non-significant relations than significant in each of these three pairs of constructs. The meta-analysis technique is less ideal in certain situations because it forces to eliminate those studies that do not report first-order correlations or chi-squares for example. As a matter of fact, the findings of some studies could not be considered further for the meta-analysis (Tornatzky and Klein, 1982). The future research studies should look after some alternative method for finding the combined correlation for constructs which might not be limited to certain inputs as it required within the meta-analysis approach. Moreover, the analyses from this study also indicate that there are diverse set of theories, models, and constructs being used for various studies. However, there is a clear lack of some generic e-government adoption research model.

5 Conclusions

The purpose of this study was to undertake a meta-analysis of findings reported in existing research on adoption and diffusion of e-government. The aim of the study was achieved by representing the combined diagrammatic representations discretely for citizens, identifying the number of significant and non-significant relationships between the constructs, collating the sample size for such studies for performing the meta-analysis in order to determine the overall impacts of a particular construct. The following prominent points can be drawn from the findings and discussion of the study:

- *Intention to use* (N=120) was most widely used dependent variable in the context of citizen's adoption of e-government services. This is followed by some other variables including *attitude* (N=42), *trust* (N=18), *perceived usefulness* (N=15), *satisfaction* (N=15), *use* (N=11), and *perceived ease of use* (N=9).
- *Perceived ease of use* (N=15), *perceived usefulness* (N=14), and *attitude* (N=9) were visualized as some of the highly used independent variables as well in the context of citizen's adoption of e-government services.
- The analysis of the largely investigated 13 relationships between a pair of constructs, it was found that the number of significant relationships (N=50) is almost five times more than the number of non-significant relationships (N=11).

- The summative correlations for *PU-Attitude*, *Attitude-Intention*, *PBC-Intention*, *PU-Intention*, *PEOU-PU*, *PE-Intention*, *Intention-Use*, and *IQ-Satisfaction* were found quite acceptable with positive significance whereas the influence of *facilitating condition*, and *perceived risk* on *intention* and *service quality* on *satisfaction* was found as non-significant.
- The sample sizes required for significance in terms of most relationships were modest. Six studies (Al-Shafi and Weerakkody, 2009; Dwivedi et al., 2007b; Lau and Kwok, 2007; Reddick, 2006; Reddick, 2008; Seyal and Pijpers, 2004) used relatively smaller sample of size less than or equal to 100 whereas the same number of studies (Chai et al., 2006; Fu et al., 2006; Hung et al., 2006; Krell and Matook, 2009; Kunstelj et al., 2009; van Dijk et al., 2008) used a fairly larger sample size of more than 1000.

5.1 Theoretical Contribution

This study has a substantial contribution for the researchers. The researchers can gain a reasonable idea about the various type of variables to be opted for citizen's adoption of e-government services. The frequently and under-represented variables can guide the researchers to make a careful decision about the appropriate selection of variables. The meta-analytic trends of constructs can work as a guideline for the researchers to opt for and use certain constructs in the studies relating to e-government adoption.

5.2 Limitations and Future Research Directions

The first limitation is in the terms of some more studies which could have been included in the analysis were not accessible through the researchers' library. Secondly, this study does not take into consideration the moderating variables in the combined diagrammatic representation. Lastly, this study has not examined the impact of moderating variables separately on the independent-dependent variable's relationship to see its comparison with the one without moderating variables. This would have provided some more precise meta-analysis. These limitations of this study can be proved to be a step toward the future research directions. More papers which could not be accessed because of their privileged access rights might be taken into consideration in future research to explore more toward some specific meta-analysis trend. The consideration of moderating variables might bring in some more elaborative and detailed diagrammatic representation as well. The future research can also diagnose the collective reliability of the constructs considered for the meta-analysis.

References

- *Al-Shafi, S. and Weerakkody, V. (2009). Implementing Free Wi-Fi in Public Parks: An Empirical Study in Qatar. *International Journal of Electronic Government*, 5(3), 21-35.
- *Belanger, F. and Carter, L. (2008). Trust and risk in e-government adoption. *Journal of Strategic Information Systems*, 17(2), 165-176.
- *Belanger, F. and Carter, L. (2010). The Digital Divide and Internet Voting Acceptance. *Fourth International Conference on Digital Society*, 307-310.
- *Boyer-Wright, K. M. and Kottemann, J. E. (2008). High-level factors affecting availability of online government services worldwide. *Electronic Government, an International Journal*, 5(4), 375-389.
- *Carter, L. (2008). E-government diffusion: A comparison of adoption constructs. *Transforming Government: People, Process, and Policy*, 2(3), 147-161.
- *Carter, L. and Belanger, F. (2005). The utilization of e-government services: Citizen trust, innovation and acceptance factors. *Information Systems Journal*, 15(1), 5-25.
- *Carter, L. and Schaupp, L. C. (2009). Relating Acceptance and Optimism to E-File Adoption. *International Journal of Electronic Government*, 5(3), 62-74.
- *Casalo, L. V., Cisneros, J., Guinaliu, M. and Orus, C. (2008). Effects of a virtual citizen community: The case of Expo Zaragoza 2008. *Electronic Government, an International Journal*, 5(2), 131-145.

- *Chai, S., Herath, T. C., Park, I. and Rao, H. R. (2006). Repeated Use of E-Gov Web Sites: A Satisfaction and Confidentiality Perspective. *International Journal of Electronic Government Research*, 2(2), 1-22.
- *Chiang, L. (2009). Trust and security in the e-voting system. *Electronic Government, an International Journal*, 6(4), 343-360.
- *Chu, P-Y., Yeh, S-C. and Chuang, M-C. (2008). Reengineering municipality citizen electronic complaint system through citizen relationship management. *Electronic Government, an International Journal*, 5(3), 288-309.
- *Colesca, S. E. (2009). Understanding Trust in e-Government. *Engineering Economics*, (3), 7-15.
- *Colesca, S. E. and Dobrica, L. (2008). Adoption and use of e-government services: The case of Romania, *Journal of Applied Research and Technology*, 6(3), 204-217.
- Davis, F. D., Bagozzi, R. P. and Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, 35(8), 982-1003.
- Davis, F. D., Bagozzi, R. P. and Warshaw, P. R. (1992). Extrinsic and intrinsic motivation to use computers in the workplace. *Journal of Applied Social Psychology*, 22(14), 1111-1132.
- *Dwivedi, Y. K. and Weerakkody, V. (2007). Examining the factors affecting the adoption of broadband in the Kingdom of Saudi Arabia. *Electronic Government, an International Journal*, 4(1), 43-58.
- *Dwivedi, Y. K. and Williams, M. D. (2008). Demographic Influence on UK citizens' e-government adoption. *Electronic Government, an International Journal*, 5(3), 261-274.
- *Dwivedi, Y. K., Khan, N. and Papazafeiropoulou, A. (2007b). Consumer adoption and usage of broadband in Bangladesh. *Electronic Government, an International Journal*, 4(3), 299-313.
- *Dwivedi, Y. K., Khoumbati, K., Williams, M. D. and Lal, B. (2007a). Factors affecting consumer's behavioral intention to adopt broadband in Pakistan. *Transforming Government: People, Process and Policy*, 1(3), 285-297.
- *Floropoulos, J., Spathis, C., Halvatzis, D. and Tsiouridou, M. (2010). Measuring the success of the Greek Taxation Information System. *International Journal of Information Management*, 30(1), 47-56.
- *Fu, J. R., Farn, C. K. and Chao, W. P. (2006). Acceptance of electronic tax filing: A study of taxpayer intentions. *Information & Management*, 43(1), 109-126.
- Gefen, D., Straub, D. W. and Boudreau, M. (2000). Structural equation modeling and regression: Guidelines for research practice. *Communications of the Association for Information System*, 4(7).
- *Gotoh, R. (2009). Critical factors increasing user satisfaction with e-government services. *Electronic Government, an International Journal*, 6(3), 252-264.
- Gronlund, A. (2005b). State of the art in e-government research: Surveying conference publications. *International Journal of Electronic Government Research*, 1(4), 1-25.
- Gronlund, A. (2005a). What's in a field- exploring the e-government domain? In *Proceedings of the 38th Hawaii International Conference on System Sciences*.
- *Gumussoy, C. A. and Calisir, F. (2009). Understanding factors affecting e-reverse auction use: An integrative approach. *Computers in Human Behavior*, 25(4), 975-988.
- Huedo-Medina, T., Sanchez-Meca, J., Marin-Martinez, F. and Botella, J. (2006). Assessing heterogeneity in meta-analysis: Q statistic or I2 index? *CHIP Documents*, Paper 19.
- *Hung, S. Y., Chang, C. M. and Yu, T. J. (2006). Determinants of user acceptance of the e-Government services: The case of online tax filing and payment system. *Government Information Quarterly*, 23(1), 97-122.
- *Hung, S. Y., Tang, K. Z., Chang, C. M. and Ke, C. D. (2009). User acceptance of intergovernmental services: An example of electronic document management system. *Government Information Quarterly*, 26(2), 387-397.
- *Hung, Y. H., Wang, Y.S. and Chou, S. C. T. (2007). User Acceptance of E-Government Services. *Pacific Asia Conference on Information Systems*.
- Jaeger, P. T. (2003). The endless wire: E-government as global phenomenon. *Government Information Quarterly*, (20), 323-331.

- *Khoumbati, K., Dwivedi, Y.K., Lal, B. and Chen, H. (2007). Broadband adoption in Pakistan. *Electronic Government, an International Journal*, 4(4), 451-465.
- *Kim, C. and Holzer, M. (2006). Public Administrators' Acceptance of the Practice of Digital Democracy: A Model Explaining the Utilization of Online Policy Forums in South Korea. *International Journal of Electronic Government Research*, 2(2), 22-48.
- *Kim, S. and Lee, H. (2006). The impact of organizational context and information technology on employee knowledge-sharing capabilities. *Public Administration Review*, 66(3), 370-385.
- King, W. R. and He, J. (2006). A meta-analysis of the technology acceptance model. *Information & Management*, (43), 740-755.
- Kraemer, K. L. and King, J. L. (2003). Information technology and administrative reform: Will the time after e-government be different? Irvine, CA7 CRITO, University of California.
- *Krell, K., and Matook, S. (2009). Competitive advantage from mandatory investments: An empirical study of Australian firms. *Journal of Strategic Information Systems*, 18(1), 31-45.
- *Kunstelj, M., Jukic, T. and Vintar, M. (2007). Analysing the demand side of e-government: What can we learn from Slovenian users? In M. A. Wimmer, J. Scholl and A. Gronlund (Eds.): *Electronic Government, Proceedings*, 46(56), 305-317.
- *Lau, A. S. M. (2004). Strategies to encourage the adoption of G2C e-government services in Hong Kong. *Electronic Government, an International Journal*, 1(3), 273-292.
- *Lau, A. S. M. and Kwok, V. W. S. (2007). How e-government strategies influence e-commerce adoption by SMEs. *Electronic Government, an International Journal*, 4(1), 20-42.
- *Lean, O. K., Zailani, S., Ramayah, T. and Fernando, Y. (2009). Factors influencing intention to use e-government services among citizens in Malaysia. *International Journal of Information Management*, 29(6), 458-475.
- *Lee, J. and Rao, H. R. (2009). Task complexity and different decision criteria for online service acceptance: A comparison of two e-government compliance service domains. *Decision Support Systems*, 47(4), 424-435.
- *Li, X., Hess, T. J. and Valacich, J. S. (2008). Why do we trust new technology? A study of initial trust formation with organizational information systems. *Journal of Strategic Information Systems*, 17(1), 39-71.
- *Lu, C. T., Huang, S. Y. and Lo, P. Y. (2010). An empirical study of on-line tax filing acceptance model: Integrating TAM and TPB. *African Journal of Business Management*, 4(5), 800-810.
- Marche, S. and McNiven, J. D. (2003). E-government and e-governance: The future isn't what it used to be. *Canadian Journal of Administrative Sciences*, 20(1), 74-86.
- Norris, D. F. and Lloyd, B. A. (2006). The Scholarly Literature on e-Government: Characterizing a nascent Field. *International Journal of Electronic Government Research*, 2(4), 40-56.
- *Ojha, A., Sahu, G. P. and Gupta, M. P. (2009). Antecedents of paperless income tax filing by young professionals in India: An exploratory study. *Transforming Government: People, Process, and Policy* 3(1), 65-90.
- *Parent, M., Vandebeek, C. A. and Gemino, A. C. (2005). Building citizen trust through e-government. *Government Information Quarterly*, 22(4), 720-736.
- *Phang, C. W., Sutanto, J., Kankanhalli, A., Li, Y., Tan, B. C. Y. and Teo, H. H. (2006). Senior citizens' acceptance of information systems: A study in the context of e-government services. *IEEE Transactions on Engineering Management*, 53(4), 555-569.
- *Pinho, J. C. and Macedo, I. M. (2008). Examining the antecedents and consequences of online satisfaction within the public sector: The case of taxation services. *Transforming Government: People, Process and Policy*, 2(3), 177-193.
- *Reddick, C.G. (2006). Information resource managers and E-government effectiveness: A survey of Texas state agencies. *Government Information Quarterly*, 23(2), 249-266.
- *Reddick, C.G. (2008). Collaborative management and e-government: A survey of state government CIOs. *Electronic Government, an International Journal*, 5(2), 146-161.

- *Sahu, G. P. and Gupta, M. P. (2007). Users' Acceptance of E-Government: A study of Indian central Excise. *International Journal of Electronic Government*, 3(3), 1-21.
- *Sambasivan, M., Wemyss, G. P. and Rose, R. C. (2010). User acceptance of a G2B system: A case of electronic procurement system in Malaysia. *Internet Research*, 20(2), 169-187.
- *Sang, S., Lee, J. D. and Lee, J. (2009). E-government adoption in ASEAN: The case of Cambodia. *Internet Research*, 19(5), 517-534.
- *Sang, S., Lee, J. D. and Lee, J. (2010). E-government adoption in Cambodia: A partial least squares approach. *Transforming Government: People, Process, and Policy*, 4(2), 138-157.
- *Schaupp, L. C. and Carter, L. (2010). The impact of trust, risk and optimism bias on E-file adoption. *Information Systems Frontiers*, 12(3), 299-309.
- *Schaupp, L. C., Carter, L., and McBride, M. E. (2010). E-file adoption: A study of US taxpayers' intentions. *Computers in Human Behavior*, 26(4), 636-644.
- *Seyal, A. H. and Pijpers, G. G. M. (2004). Senior government executives' use of the internet: A Bruneian scenario. *Behaviour & Information Technology*, 23(3), 197-210.
- *Shareef, M. A., Kumar, U. and Kumar, V. (2009). Identifying critical factors for adoption of e-government. *Electronic Government, an International Journal*, 6(1), 70-96.
- *Sun, S., Ju, T. L. and Chen, P. (2006). E-government impacts on effectiveness: A survey study of an e-official-document system. *Electronic Government, an International Journal*, 3(2), 174-189.
- *Tang, H., Chung, S. H. and Se, C. W. (2009). Examining the impact of possible antecedents on service usage: An empirical study on Macao e-government. *Electronic Government, an International Journal*, 6(1), 97-109.
- *Teo, T. S. H., Srivastava, S. C. and Jiang, L. (2009). Trust and Electronic Government Success: An Empirical Study. *Journal of Management Information Systems*, 25(3), 99-131.
- Tornatzky, L. G. and Klein, K. J. (1982). Innovation Characteristics and Innovation Adoption-Implementation: A Meta-Analysis of Findings. *IEEE Transactions on Engineering Management*, 29(1), 28-43.
- *van Dijk, J., Peters, O. and Ebbers, W. (2008). Explaining the acceptance and use of government Internet services: A multivariate analysis of 2006 survey data in the Netherlands. *Government Information Quarterly*, 25(3), 379-399.
- *Vathanophas, V., Krittayaphongphun, N. and Klomsiri, C. (2008). Technology acceptance toward e-government initiative in Royal Thai Navy. *Transforming Government: People, Process, and Policy*, 2(4), 256-282.
- *Wang, Y. S. (2002). The adoption of electronic tax filing systems: An empirical study. *Government Information Quarterly*, 20(4), 333-352.
- *Wang, Y. S. and Liao, Y. W. (2008). Assessing e-Government systems success: A validation of the DeLone and McLean model of information systems success. *Government Information Quarterly*, 25(4), 717-733.
- *Wang, Y. S. and Shih, Y. W. (2009). Why do people use information kiosks? A validation of the Unified Theory of Acceptance and Use of Technology. *Government Information Quarterly*, 26(1), 158-165.
- Warkentin, M., Gefen, D., Pavlou, P. A. and Rose, G. M. (2002). Encouraging citizen adoption of e-government by building trust. *Electronic Markets*, 12(3), 157-162.
- *Yeow, P. H. P. and Loo, W. H. (2009). Acceptability of ATM and Transit Applications Embedded in Multipurpose Smart Identity Card: An Exploratory Study in Malaysia. *International Journal of Electronic Government*, 5(2), 37-56.

[Note: *: indicates all those 58 studies which have been used for meta-analysis]