2007

IT Investment Evaluation as a Socio-Political Process: Determinants to Managerial Adoption and Use

Qing Hu
Florida Atlantic University, qhu@fau.edu

Elisabeth Frisk
Goeteborg University, elisabeth@ituniv.se

P. Hallikainen
petri.hallikainen@hse.fi

T. Eikebrokk
tom.eikebrokk@hia.no

Tero Paivarinta
Agder University College, Tero.Paivarinta@hia.no

See next page for additional authors

Authors
Qing Hu, Elisabeth Frisk, P. Hallikainen, T. Eikebrokk, Tero Paivarinta, and A. Nurmi

IT INVESTMENT EVALUATION AS A SOCIO-POLITICAL PROCESS: DETERMINANTS TO MANAGERIAL ADOPTION AND USE

Hu, Qing, Florida Atlantic University, 777 Glades Road, Boca Raton, FL 33431, USA, qhu@fau.edu

Frisk, Elisabeth, IT-University in Göteborg, Forskningsgången 6, 417 56 Göteborg, Sweden and Viktoria Institute, Hörselgången 4, 417 56, Göteborg, Sweden, elisabeth@ituniv.se

Hallikainen, Petri, Helsinki School of Economics, P.O. Box 1210, 00101 Helsinki, Finland, Petri.hallikainen@hse.fi

Eikebrokk, Tom Roar, Agder University College, Serviceboks 422, 4604 Kristiansand, Norway, Tom.Eikebrokk@hia.no

Päivärinta,Tero, Agder University College, Serviceboks 422, 4604 Kristiansand, Norway, Tero.Paivarinta@hia.no

Nurmi, Antti, Helsinki School of Economics, P.O. Box 1210, 00101 Helsinki, Finland, antti.nurmi@hse.fi

Abstract

Researchers have long recognized that IT investment evaluation is a complex socio-technical process. Some scholars even consider it as a socio-political process based on the argument that evaluations are conducted from the vantage points of the stakeholders. While anecdotal evidences of these arguments are plenty, empirical support based on large samples and rigorous methodologies are rare in the current IT evaluation literature. In this study we present the results of a structural equation analysis of a socio-political model of using survey data collected from 312 Swedish companies. Our results show that organizational power and political factors play a significant role in forming the managers' intention to conduct formal IT investment evaluation, which in turn predicts the actual use of the formal evaluation methods and frameworks. While perceived usefulness still significantly influences intention, as previously reported, the power and political factors are shown to influence the action directly with or without the mediation of intention, supporting the strong influence of organizational politics in the IT investment evaluation process.

Keywords: IT Investments, Return on Investment, Formal Evaluation Methods.

1 INTRODUCTION

The essential role of information technology (IT) in strategies and operations of information-age organizations has led to significant increases in IT investments over the last two decades worldwide. Some studies have estimated the annual IT investment over two trillion US dollars worldwide by governments and private industries (Hu and Quan, 2006). However, whether such huge investments in IT have paid off as intended is still being debated among scholars and practitioners. Despite the significant improvement over IT investment project management and evaluation theories and practices over the years, still a majority of the projects are considered as failures in terms of delivering intended benefits to organizations (Ward and Daniel, 2006). What have complicated the matter even more is the fact that studies have consistently shown that less than half of the organizations use some sort of formal evaluation methods to justify the initial IT budgets (Norris, 1996; Lin and Pervan, 2003; Love et al., 2005), and only about 50% of the organizations conduct formal post-implementation evaluation to determine the actual payoff of these projects (Seddon et al., 2002). If an organization does not evaluate and coordinate its IT

investment projects, it may not be able to realize full benefits from IT investments (Ward and Daniel, 2006). Hence, we pose the question why so many organizations have not conducted formal pre- and/or post-implementation evaluations for IT investment projects while others have?

From the theoretical perspective that IT investment evaluation is more a social than a technical process, Hu et al. (2006) find that it is the managers' awareness, perceived usefulness, and self-efficacy of the formal evaluation methods influence most significantly on the intention of managers to use them in practice based a large scale survey and structural equation analysis of the data. However, a growing number of scholars have argued that IT investment evaluation is a complex socio-political process based on the argument that evaluations are conducted based on the vantage points of the various stakeholders (e.g., Smithson and Hirschheim, 1998; Wilson and Howcroft, 2005; Klecun and Cornford, 2005). This socio-political argument of IT investment evaluation is in fact consistent with the long standing view of the role of power and politics in the implementation and use of information technology in organizations (Markus, 1983; Jasperson et al., 2002).

We draw upon the prior research on different viewpoints of IT investment evaluation practices and focus our attention to the socio-political perspectives. We adopt the stance from above that IT investment evaluation is not simply an issue of methods and mechanisms, but a consequence of interactions between organizational power, politics, and human cognition about the benefit and cost of conducting formal evaluations. This study builds on prior research that puts the human agency in the center of the IT investment evaluation phenomenon, as opposed to the technicality or mechanism of evaluation in traditional approach. In the remainder of the paper, we develop our research model and hypotheses based on the extant literature and present the results of structural equation modeling using survey data collected from organizations in Sweden across various industries and sizes. Discussion on the implications of the findings and future research directions are also presented.

2 THEORETICAL DEVELOPMENT

2.1 Socio-Political View of IT Investment Evaluation

Academic recommendations and ideas for IT investment evaluation have so far been dominated by rational, objective, and quantitative perspectives (Wilson and,Howcroft, 2005) which overemphasize the use of formal, functional, and generic evaluation methods (Serafeimidis and Smithson, 2000; Jones and Hughes, 2001). In contrast, a growing number of researchers have become critical of this approach, recognizing that evaluation of IT investments, including the adoption of various evaluation methods and frameworks, is a complex process of social construction, influenced by different social, technical, and political mechanisms in the context surrounding the evaluation activities (e.g. Jones and Hughes, 2001; Serafeimidis and Smithson, 2000, Wilson and Howcroft, 2000). The growing criticism of the traditional approach to IT investment evaluation research has led to increased interest in three alternative perspectives that might increase our understanding of how socio-political interactions influence IT investment evaluation: the *interpretivist evaluation approach* (Hirschheim and Smithson, 1999; Jones and Hughes, 2001), the *benefits management approach* (Ward et al., 1996; Ward & Daniel, 2006), and the *critical evaluation approach* (Klecun & Cornford 2005, Berghout and Remenyi. 2005). These perspectives recognize that different organizational and social contexts are both influencing and being influenced by the same cultural beliefs, norms, and values that characterize these contexts. These influences can be partially attributed to different perceptions of success and failure or to different interests from relevant stakeholders (Wilson and Howcroft, 2000).

Recognizing that IT investment evaluation is influenced by complex social and political factors, in this study we focus our attention on the social theories that can explain the adoption and use of formal IT investment evaluation methods. One such theory that has gained broad acceptance in the organizational and IS literature is the theory of planned behaviour (TPB) by Ajzen (1991) which evolved from the theory of reasoned action (TRA) (Ajzen and Fishbein, 1980). TPB posits that human behaviour on whether or not to perform a certain action is determined by his or her intention to perform the action of

interest. This behavioural intention is in turn determined by cognitive, social and political, and environmental antecedents: attitude towards the behaviour (ATB), subjective norm (SN), and perceived behavioural control (PBC). ATB refers to a person's judgment on whether it is good or bad to perform the behaviour of interest; SN is a person's perception of the social pressure to perform or not perform the behaviour in question; and PBC refers to the perceived capability of performing the behaviour (Ajzen, 1991).

While the evaluation process in itself may involve a number of stakeholders, we assumed that the decision whether to adopt particular evaluation approaches still mainly lies on the shoulders of the business and IT managers who are in charge of initiating, evaluating, approving, and assessing IT investment projects in organizations. We draw on the TPB to formulate our basic research model and focus on important cognitive and socio-political antecedents to the intention to evaluate using formal methods. Cognitive factors represent important antecedents that should capture the unique characteristics of the cognitive processes that influence the formulation of the business and IT managers' perceptions on, and opinions of, the value of implementing formal IT evaluation processes in their organizations. Table 1 shows an overview of constructs in different categories. In essence, we argue that the adoption and implementation of a formal IT investment evaluation process is similar to adopting and implementing other technological innovations. Socio-political factors represent a decomposition of the normative belief structure of the TPB into relevant social reference groups consistent with the interpretivist and benefits management perspectives in order to capture important socio-political antecedents to intention. This decomposition into relevant social groups is based on prior empirical studies (e.g. Oliver and Bearden, 1985) who claim that a monolithic normative structure could in fact cancel out the influence from specific reference groups. Taylor and Todd (2001) suggest that the most relevant reference groups for individual behavior in organizations are superiors, peers and subordinates and found that a decomposed normative belief structure including such groups performed better than the traditional TPB as well as the TAM in predicting the intention to use information technology. This is also supported by Burt (1987) who identified structurally equivalent peers (i.e. professionals in similar roles) as important sources of adoption decisions.

From this vantage point of view, we develop the antecedents based on the literature of technology acceptance, with the consideration of the fact that unlike adopting a new technological innovation, adopting formal IT investment evaluation does not necessarily create tangible values to an organization and its perceived benefits could be easily manipulated due to organizational politics. To identify the cognitive and socio-political antecedents, we draw on the technology acceptance model (TAM) (Davis, 1989; Venkatesh et al., 2003), computer user behaviour studies (Pavlou and Fygenson, 2006), and the decomposed theory of planned behavior (Taylor and Todd, 1995). An extensive literature review yielded six antecedents, including perceived usefulness, perceived ease of use, perceived political benefits, influence from superiors, influence from peers, and influence from professional networks. These six antecedents and the TPB model form our conceptual model, as shown in Figure 1.

Construct	**Category**	**Description**	**References**
Perceived Usefulness (PUE)	Cognitive Factors	The degree to which a person believes that using a system would enhance job performance	Davis, 1989; Davis et al., 1989; Venkatesh and Davis, 1996
Perceived Ease of Use (PEU)	Cognitive Factors	The degree to which a person believes that using a system would be free of effort	Davis, 1989; Davis et al., 1989; Venkatesh and Davis, 1996
Perceived Political Benefits (PPB)	Power & Political Factors	The degree to which use of an innovation is perceived to enhance one's image in one's social system	Moore and Benbasat, 1991
Perceived Influence from Supervisors (ISP)	Power & Political Factors	The degree to which important supervisors are perceived to expect a certain behavior from the individual	Astley and Sachdeva, 1984; Taylor and Todd, 1995; Jasperson et al., 2002
Perceived Influence from Peers (IPP)	Power & Political Factors	The degree to which important peers are perceived to expect a certain behavior from the individual	Bloomfield and Coombs, 1992; Taylor and Todd, 1995; Jasperson et al.,

			2002;
Perceived Normative Influence from Profession (INP)	Power & Political Factors	The degree to which one's profession is perceived to expect a certain behavior from the individual	Taylor and Todd, 1995
Intention to Use Formal IT Evaluation (ITE)	Intent to Use	A person's degree of willingness to try to perform a behavior	Ajzen, 1991; Davis, 1989, Pavlou and Fygenson, 2006
Actual Use of Formal IT Evaluation (USE)	Actual Use	A person's actual behavior	Davis, 1989; Ajzen, 1991

Table 1: Construct Description

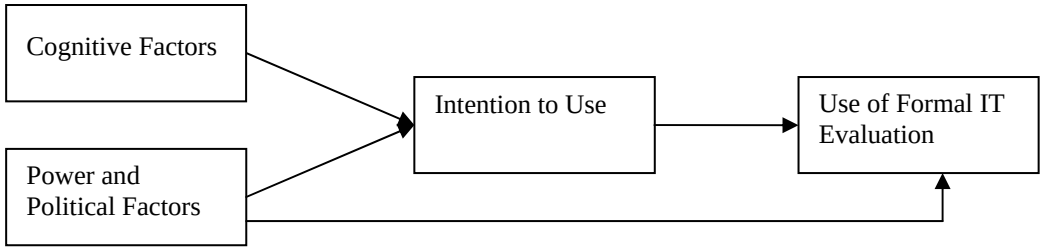

Figure 1: Conceptual Model

2.2 Research Hypotheses Development

Two cognitive antecedents were adopted from the TAM model (Davis, 1989) which assumes that intention to use computer technology can be predicted from perceptions of the usefulness and ease of use of the technology. Perceived usefulness describes the extent to which the user believes that using the technology would enhance his or hers job performance, whereas perceived ease of use is defined as the extent to which the user believes that using the technology is free of physical or mental efforts. We believe that these cognitive factors would also influence on the intention to adopt formal IT evaluation methods. Hence, we forward the following hypotheses:

H1: Perceived usefulness positively influences mangers' intent to use formal evaluation methods for IT investment projects.

H2: Perceived ease of use positively influences managers' intent to use formal evaluation methods for IT investment projects.

H3: Perceived ease of use positively influences managers' perceived usefulness of formal evaluation methods for IT investment projects.

The most common conceptualization of social influence in the IS literature is an individual's compliance towards overt social pressure. Empirical studies have traditionally grouped different sources of social influence together into a general concept of subjective norm with the possible risk of loosing information about the contrasting influence from different stakeholders or social reference groups. In this study, we delineate various sources of social influence based on the broader literature on human and organizational behavior in social environments. We take into account the degree of the perceived authoritative influence by the relevant social groups on individuals in our model. Our implementation of the conceptualization of relevant social groups was drawn from Taylor and Todd (1995) and Burt (1987) in terms of superiors and peers. Consequently, we believe that IT managers or IT professionals would perceive the views on formal evaluation from three sources of overt social influence: higher level managers (ISP), peers (IPP) and profession (INP) and take these into consideration in their intentions to use and actual use of formal evaluation methods. Hence, we forward the following hypotheses:

H4: Perceived favorable views on formal evaluation from the professional network positively influence managers' intent to use formal evaluation methods for IT investment projects.

H5: Perceived favorable views on formal evaluation from peers positively influence managers' intent to use formal evaluation methods for IT investment projects.

H6: Perceived favorable views on formal evaluation from higher level managers positively influence managers' intent to use formal evaluation methods for IT investment projects.

In the literature of organizational power and politics, it is well recognized that superiors can influence the behavior of the subordinates directly via coercive mechanism, without necessarily being mediated by the behavioral intension construct. Therefore, we propose:

H7: Perceived favorable views on formal evaluation from higher level managers positively influence the level of actual use of formal evaluation methods for IT investment projects in an organization.

The socio-political context is forwarded here as an important basis for sources of influence on evaluation behavior, consistent with the interpretivist and benefits management perspectives. We believe there are several different socio-political factors that could influence intention to use formal methods for IT investment evaluation both directly as a result of compliance to perceived power and political pressure from relevant reference groups, and/or indirectly as a result of identification or internalization (for a discussion of overt and covert social influence, see Venkatesh et al., 2003, p.451). We created the construct of perceived political benefits (PPB) in terms of one's social and political image to represent the social influence mechanism based on identification and different from compliance and internalization (Kelman, 1958). As a mechanism for unobtrusive social influence, PPB's influence on actual use of formal methods for evaluation is believed to be both direct and mediated by the intention to use. Hence:

H8: Perceived political benefits positively influence managers' intent to use formal evaluation methods for IT investment projects.

H9: Perceived political benefit positively influence the level of actual use of formal evaluation methods for IT investment projects in an organization.

The relationship between behavioral intention and the actual behavior of an individual has been well established in numerous studies based on TAM and TBP theories in the IS literature. Thus it is natural that we propose:

H10: Managers' intent to use formal evaluation methods for IT investment projects positively influences the level of actual use of formal evaluation methods for IT investment projects in an organization.

The operationalization of the conceptual model with the hypothesized relationships among the constructs is shown in Figure 2 as the research model of this study.

3 RESEARCH METHOD AND DATA

The survey instrument was developed based on the theoretical constructs in our research model, plus a number of additional measures for demographical, organizational characteristics, and formal IT investment evaluation usage, and other theoretical constructs that are not used in this research model. All items were implemented as reflective measures of the latent constructs. Each construct uses at least three items, and some with four, using 5-point Likert scales. The original question items were prepared in English for reviewing by the members of the research team. After a number of iterations, they were finalized and translated into Swedish, Finnish, and Norwegian for use in these countries.

The question items were then reviewed in each country by a small number of colleagues and students and modifications were made based on the feedback received. The questionnaire was then pilot tested and refined with the help of 20 half-time students enrolled in the IT management program at the IT-University of Göteborg, Sweden. Apart from studying, these students also held similar positions in their respective organizations as those to whom the survey was intended. The subjects in the pilot group had a minimum of 5 years working experience. This procedure enhanced the relevance and accuracy of the questionnaire. After the pilot test, the questionnaire was refined again and items deemed to be irrelevant, redundant, or vague were modified or replaced. The entire questionnaire was then posted on web survey sites in Sweden, Finland, and Norway respectively. In this study, only the Swedish data were used due to the relatively small sample size of the data sets from the other countries.

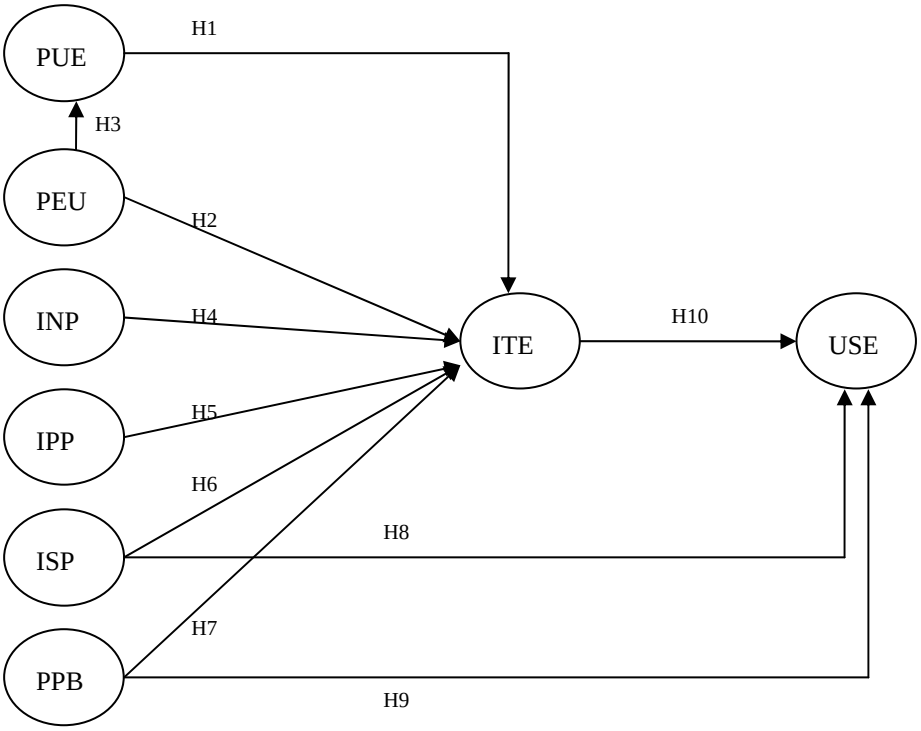

Figure 2: Research Model of Socio-Political Influence on IT Investment Evaluation

In the beginning of May 2005, invitations for participating in the study were e-mailed to members of the "Dataföreningens panel" in Sweden. "Dataföreningen" is an independent organization directed towards the working with professionals in the industries with special interest in IT-related areas. The organization has approximately 30.000 members. A special group of members of the organization, "Dataföreningens panel", consists of 2.765 members with different occupations related to IT. We sent out email invitations to approximately 1.332 members identified as managers, CIOs, IT-strategists, consultants and project leaders. After the initial round, three reminders were sent during a period of four weeks. Approximately 421 e-mails were returned for various reasons (i.e. the addresses were no longer relevant, the respondents had changed occupation, or the respondents were no longer relevant for the survey), which reduced the actual population of respondents to 911. In the end, a total of 320 responses were collected from the web site of which 312 were deemed usable for data analysis, resulting in an effective response rate of 34%.

4 RESULTS AND ANALYSES

4.1 Summary Statistics of Responses

Respondents were from a cross section of industries and held a variety of titles. About one quarter was identified as CIOs or IT managers and over half chose other job titles. Service and manufacturing made up the majority of the industries. The average size of the organizations was over 5.700 employees with average annual revenue of 3.4 billion SEK and IT budget of over 101 million SEK. It is reasonable to infer that the majority of the survey respondents were from medium to large industrial organizations.

In the online survey, we also included questions that collected data on how the responding organizations used formal evaluation methods, what formal evaluation methods were used, for what type of IT investment projects, and other related information. Summary statistics have shed some light on these interesting issues. For example, about one third of all respondents report that their organizations use formal methods for all types of IT investment projects, and another one third indicated that their organizations rarely use any formal methods. This is consistent with the findings of prior surveys with a slight improvement in terms of the use of formal evaluation methods. In terms of how formal the

evaluation process is, about 39% of the respondents indicated that formal techniques and procedures were used while the other 61% reported using informal evaluation methods, such as meetings and managerial decisions. Note that in terms of formal evaluation methods and techniques used, only 22% indicated that commonly known formal methods such as ROI, NPV, IRR, and payback were used while over 51% indicated that Cost/Benefit analysis was used, suggesting the popularity of this particular method.

4.2 Assessment of the Measurement Model

Convergent validity of the measurement instrument is assessed based on item loading and cross loading values. Following the procedure of Gefen and Straub (2005), these values are computed based using SPSS with the latent constructor scores produced by PLS. The results are showing in Table 5. As it can be seen, the data demonstrate reasonable degree convergent validity of the instrument: measurement items intended for specific latent construct load well above 0.7 threshold value suggested in the literature, and the cross loadings are smaller than the loadings to their assigned constructs.

	PUE	PEU	PPB	ISP	IPP	INP	ITE	USE
PUE1	**0.825**	0.309	0.567	0.394	0.558	0.470	0.300	0.216
PUE2	**0.884**	0.450	0.637	0.386	0.547	0.500	0.376	0.247
PUE3	**0.872**	0.515	0.545	0.377	0.539	0.501	0.336	0.269
PUE4	**0.870**	0.364	0.537	0.365	0.544	0.462	0.325	0.225
PUE5	**0.826**	0.434	0.485	0.313	0.458	0.414	0.335	0.185
PEU1	0.452	**0.927**	0.348	0.206	0.361	0.400	0.227	0.220
PEU2	0.514	**0.959**	0.401	0.270	0.408	0.460	0.290	0.263
PEU3	0.378	**0.864**	0.277	0.262	0.296	0.424	0.207	0.196
PPB1	0.555	0.296	**0.858**	0.290	0.440	0.391	0.274	0.265
PPB2	0.504	0.390	**0.855**	0.327	0.404	0.407	0.323	0.285
PPB3	0.560	0.231	**0.762**	0.330	0.378	0.347	0.274	0.165
ISP1	0.428	0.209	0.405	**0.913**	0.592	0.542	0.374	0.429
ISP2	0.421	0.234	0.434	**0.936**	0.575	0.566	0.398	0.444
ISP3	0.369	0.283	0.275	**0.935**	0.506	0.508	0.391	0.413
ISP4	0.368	0.270	0.292	**0.932**	0.518	0.514	0.384	0.401
IPP1	0.542	0.326	0.460	0.553	**0.872**	0.566	0.328	0.378
IPP2	0.576	0.349	0.472	0.460	**0.878**	0.565	0.330	0.299
IPP3	0.546	0.352	0.419	0.602	**0.903**	0.611	0.324	0.369
IPP4	0.495	0.342	0.375	0.455	**0.848**	0.611	0.342	0.289
INP1	0.318	0.376	0.223	0.408	0.498	**0.735**	0.217	0.259
INP2	0.526	0.335	0.482	0.461	0.540	**0.808**	0.295	0.252
INP3	0.451	0.417	0.376	0.503	0.575	**0.855**	0.300	0.397
ITE1	0.305	0.210	0.249	0.228	0.229	0.215	**0.864**	0.472
ITE2	0.316	0.227	0.304	0.309	0.288	0.263	**0.924**	0.547
ITE3	0.406	0.264	0.364	0.515	0.448	0.398	**0.878**	0.634
USE1	0.316	0.252	0.325	0.512	0.467	0.417	0.588	**0.886**
USE2	0.217	0.214	0.262	0.344	0.306	0.304	0.543	**0.916**
USE3	0.176	0.198	0.194	0.346	0.229	0.291	0.559	**0.881**

Table 5: Item Loadings and Cross Loadings

A measure of internal consistency of the scales is the composite reliability computed in conformance with Werts et al. (1974). Compared to Cronbach's alpha which provides a lower bound estimate of internal consistency, composite reliability is a more rigorous estimate for reliability (Chin and Gopal, 1995). A composite reliability greater than .5 would indicate that at least 50% of the variance in a measurement is captured by the trait variance and that the variance captured by the measures is greater than that captured by the errors. The recommended values for reliability are above .70 (Werts et al., 1974; Gefen et al., 2000) and for strong reliability - above .80 (Koufteros, 1999). Cronbach’s alpha and other

reliability measures were generated using SPSS, and factor loading statistics, average variance extracted (AVE) and the composite reliability statistics were generated or calculated using PLS, shown in Table 6. It can be seen that all reliability statistics indicate a strong measurement model for this study.

Constructs	Items	Mean (STD)	Loadings (t-stats)	Cronbach's Alpha	Composite Reliability	AVE
PUE	PUE1	3.764 (0.910)	0.825 (34.513)	0.908	0.932	0.732
	PUE2	3.760 (0.956)	0.872 (43.367)			
	PUE3	3.409 (0.993)	0.870 (44.497)			
	PUE4	3.741 (0.994)	0.884 (59.261)			
	PUE5	3.550 (1.037)	0.826 (32.639)			
PEU	PEU1	2.997 (0.929)	0.927 (49.687)	0.906	0.941	0.842
	PEU2	2.990 (0.918)	0.959 (173.470)			
	PEU3	2.716 (0.930)	0.864 (37.277)			
PPB	PPB1	3.629 (0.911)	0.858 (36.235)	0.768	0.865	0.682
	PPB2	3.495 (0.917)	0.855 (33.499)			
	PPB3	3.776 (0.927)	0.762 (14.176)			
ISP	ISP1	3.112 (1.139)	0.913 (52.613)	0.947	0.962	0.862
	ISP2	3.003 (1.131)	0.936 (74.513)			
	ISP3	2.853 (1.165)	0.935 (99.023)			
	ISP4	2.923 (1.188)	0.932 (101.302)			
IPP	IPP1	3.319 (1.013)	0.872 (45.488)	0.898	0.929	0.767
	IPP2	3.444 (1.005)	0.878 (44.087)			
	IPP3	3.102 (1.023)	0.903 (70.084)			
	IPP4	3.166 (1.018)	0.848 (27.480)			
INP	INP1	2.716 (1.009)	0.735 (13.771)	0.720	0.842	0.641
	INP2	3.169 (1.101)	0.808 (22.304)			
	INP3	2.875 (1.029)	0.855 (31.419)			
ITE	ITE1	2.527 (1.284)	0.864 (33.938)	0.867	0.919	0.791
	ITE1	2.383 (1.160)	0.924 (72.505)			
	ITE1	2.796 (1.277)	0.878 (61.195)			
USE	USE1	2.546 (1.458)	0.886 (61.816)	0.870	0.923	0.800
	USE2	2.064 (1.241)	0.916 (63.214)			
	USE3	2.093 (1.225)	0.881 (42.439)			

Table 6: Summary of Assessment Statistics of Measurement Model

Discriminant validity of the measurement model refers to the extent to which measures of the different model constructs are unique and is generally assessed by testing whether the correlations between pairs of dimensions are significantly different from unity (Anderson and Gerbing, 1988). Thus discriminant validity is supported if the correlations between constructs are not equal or close to 1.00 within the 95% confidence intervals (Bagozzi, 1991). The highest value of the correlations in this study is .673 between INP (influence from profession) and IPP (influence from peers), which is expected. The discriminant validity of the measurement can also be verified based on the square root of the AVE of each constructs. According to Gefen and Straub (2005), the square root of AVE for each construct should be greater than the levels of correlations involving that construct. As it is shown in Table 7 in bold numbers, this condition is easily satisfied in our model.

	PUE	PEU	PPB	ISP	IPP	INP	ITE	USE
PUE	**0.856**							
PEU	0.494	**0.918**						
PPB	0.647	0.378	**0.826**					
ISP	0.427	0.268	0.380	**0.928**				
IPP	0.616	0.391	0.493	0.590	**0.876**			
INP	0.549	0.467	0.464	0.574	0.673	**0.801**		
ITE	0.393	0.267	0.353	0.417	0.378	0.343	**0.889**	
USE	0.269	0.249	0.295	0.455	0.381	0.382	0.632	**0.894**

* Bold numbers in the diagonal row are square roots of the AVEs of the constructs

Table 7: Discriminant Validity Measures of Measurement Model

4.3 Structural Equation Analysis with PLS

After the validity of the measurement model was confirmed, the structural analysis of the research model was conducted using PLS-Graph 3.0. Comparing to the co-variance based LISREL, PLS is a variance based statistical tool that does not necessarily require sound theoretical basis for the model and therefore is especially suitable for exploratory analysis (Gefen et al., 2000). Following the PLS conventions, a bootstrap procedure was used to generate 200 random data sets from the original data set. The bootstrap samples were then used by PLS to generate the model statistics, including the path coefficients, the t-statistics, and the R^2 for the endogenous (dependent) variables. The most significant results are shown in Figure 3. Overall, as indicated by the R^2 values, about 24% of the variances in the construct "intention to use formal evaluation methods" (ITE) are explained by the independent variables, which is relatively low but not uncommon among studies that use PLS. What is remarkable is that about 44% of the variances in the construct "actual use of formal evaluation methods" (USE) are explained by the independent variables of the model. It is also notable that the intention construct (ITE) indeed strongly determines the actual use construct (USE) with path coefficient 0.530 significant at $p < 0.01$ level, the strongest path in the whole model, confirming the fundamental argument of the TPB and TAM that intention highly influences behavior.

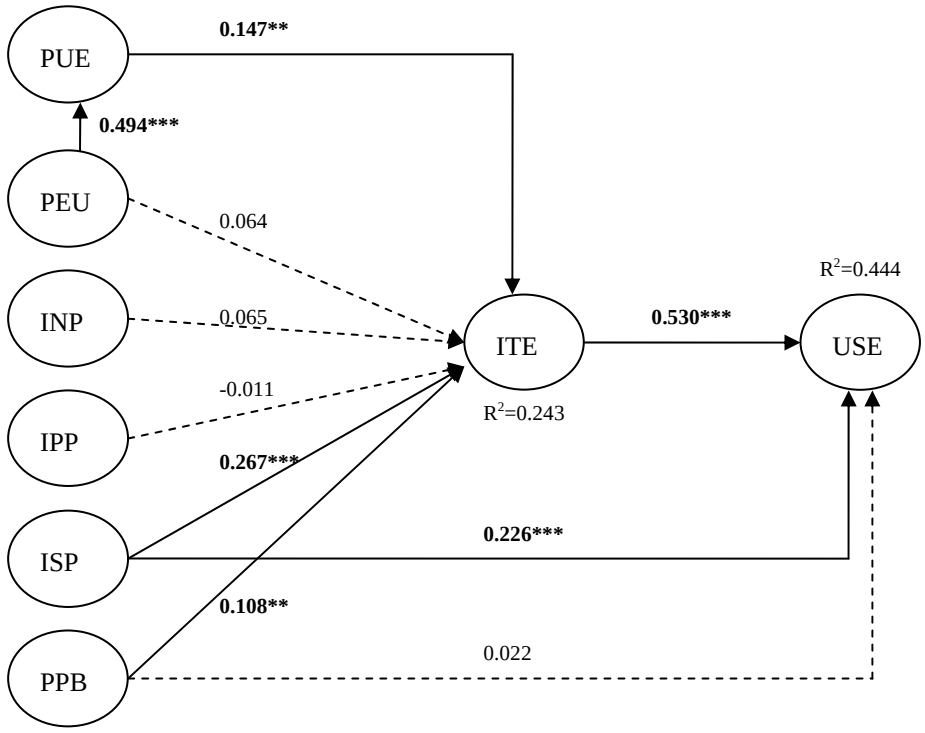

*Figure 3: PLS Estimated Path Coefficients (** p<0.05, *** p<0.01)*

Another interesting finding is that the power of the superior over the behavior of a subordinate in the adoption and use of formation IT investment evaluation is strongly supported: the superior (ISP) not only can influences the behavioral intention of the subordinates (ITE) ($p < 0.01$), he or she can in effect force the use directly (USE) ($p < 0.01$), regardless whether the subordinate has the intension to do so. On the other hand, the construct of perceived political benefits (PPB) is found to influence only the intention of an individual (ITE). However, the significant level of this path is only at $p < 0.05$. We consider it as a significant path because the exploratory nature of this study and the construct. The hypothesized direct influence on actual use of formal evaluation methods (USE) is not supported. Similarly, influences from professionalism (INP) and peers (IPP) on the behavioral intention (ITE) of the managers are found to be minimal and insignificant. Among the cognitive factors, only the perceived usefulness (PUE) is found to have a significant influence on the behavioral intention (ITE) and the influence of the perceived ease of use (PEU) is insignificant. This is consistent with the majority of studies using the TAM model where

perceived ease of use in general is less significant than perceived usefulness. On the other hand, the relationship between PEU and PUE is significant and strong (0.494, $p < 0.01$), suggesting that ease of use of formal evaluation methods can enhance the perceived usefulness of these methods, that in turn leads to stronger intention to use the methods.

5 DISCUSSION AND CONCLUSIONS

In this paper we have explored the determinants to the intention and actual use of formal IT evaluation methods in organizations. Previous research has shown that individual cognitive factors can be used to explain the adoption of technologies or methods (e.g Venkatesh et al., 2003, Hu et al., 2006). However, in organizational context individual behavior are also strongly influenced by the perceived power of different organizational actors. Thus, if the use of formal IT evaluation methods is seen politically beneficial for key stakeholders within in organization, there will be a strong motivation for formal evaluation methods to be adopted. We tested and showed that Perceived Political Benefits and Perceived Influence from Supervisors are significant determinants of intention to use formal evaluation methods. In addition, our results suggest that influence from supervisors can directly motivate subordinates to actually use of these methods. Our results validate what has been suspected in the interpretivist and benefits management streams of IT investment evaluation research (Jones and Hughes, 2001; Wilson and Howcroft, 2005, Ward and Daniel, 2006), and suggest new constructs to be considered for the mainstream of IT investment evaluation research.

Our findings can inform the interpretivist approach by providing empirical confirmation for the hitherto exploratory findings on the suggested significance of socio-political influences for the adoption and selection of evaluation methods. However, the results indicate simultaneously some prerequisites for managerial adoption of any such interpretive approach. First, a culture of interpretive evaluation most likely needs to be shared by top management, (indicated by the prominent significance of the ISP factor). Secondly, awareness of political benefits, which can be gained from active evaluation, seems, indeed, to enhance the intent to evaluate among the respondent managerial stakeholders of our inquiry. In summary, our results thus suggests that the advocates of the interpretivist approaches need to adopt a political agenda in favor of demonstrating the political benefits of evaluation in itself for the top management while simultaneously activating other influential stakeholders to become aware of their contextual interests and to explicate them in relation to particular IT investments. Then, according to our results, those stakeholders would likely be motivated to adopt and use evaluation practices and measures for their purposes.

Our results can provide insight for the proponents of the benefits management approach as well. The idea of explicitly addressed benefit ownership gains strong empirical support as a predictor of actual benefits evaluation (and thus coordinated realization) practice. That is, our results suggest that the realization process of a predicted benefit, when documented according to explicit measures, needs to appear politically beneficial to the appointed “benefit owner” as well. In case that the benefit owner does not personally benefit from the IT solution in question, the proponents of organizational benefits realization may thus want to consider other explicitly defined incentives for the benefit owner to keep his or her interest in the matter. Moreover, our results predict that the benefits management approach appear significantly more adopted when senior executives are involved from start, who may then require the middle managers to provide with explicit benefit follow-ups. If the attention from the executive level fades out during the project, it is less likely that the line management or IT/IS management would conduct evaluations (and subsequent corrective actions). To summarize, it seems that evaluation in connection to the benefits management approach should be facilitated by executive-level interest until the benefits realization is evaluated and by explicitly defined incentives for the benefit owners to evaluate. These issues need to be highlighted perhaps more than plain “educational” or “profession-initiated” efforts to increase awareness of easy-to-use but relevant benefits identification and evaluation techniques.

In addition to the theoretical contributions, our results also have managerial implications. Given our results, managers must acknowledge the political nature of IT evaluation and use the power and political channels to effect and justify the use of formal evaluation methods. Sometimes IT evaluation can be a political tool to gain more power in organizations rather than just to be able to make better IT

investments. It has been suggested that managers should recognize the relevant social groups (Wilson and Howcroft, 2005) that may have negative or positive influence on the adoption of IT solutions. Our results suggest that managers should be able to analyze the political consequences and power shifts (Markus, 1983) that are caused by the adoption and implementation of formal IT evaluation methods. If the managerial stakeholders or individuals in power resist change towards more formal methods, then it is unlikely that any evaluations will be conducted.

Our study has some limitations, which should be taken into consideration for future research. First, the suggested variables were able to explain less than 50% of the dependent variable of actual use of formal IT evaluation practices in organizations, and only 24% of the intention to adopt such practices. This leaves us two alternatives to speculate for the future research. There may be other significant exogenous variables which we have not captured in the model. On the other hand, a part of the unexplained variance could be attributed to contextual factors which might not be captured by the statistical analyses looking at large samples. Second, we have assumed that "the management" is the key stakeholder which makes the decision whether to adopt an evaluation method or not. Hence, our results may appear less valid in organizational contexts with flatter or non-existent managerial power structures. Third, our sample consists of relatively large organizations, in which division of labor and decision-making structures allow separation of senior executives and middle managers who operationalize the evaluation if it is done in the first place. In the future, we could hypothesize that in smaller organizations (especially in entrepreneurial firms) and IT investment projects the political and power factors as the main predictors for evaluation may vanish as the decision-making and control structures become flatter.

References

Ajzen I (1991) The theory of planned behavior. Organizational behavior, and human decision processes, 50(2), 179-211.

Ajzen I and Fishbein M (1980) Understanding Attitudes and Predicting Social Behavior. Prentice Hall, New Jersey.

Anderson JC and Gerbing SW (1988) Structural equation modeling in practice: A review and recommended two-step approach. Psychological Bulletin 103(3), 411-423.

Astley W G and Sachdeva P S (1984) Structural sources of intraorganizational power: a theoretical synthesis. The Academy of Management Review 9(1), 104-113.

Bagozzi R (1991) Structural equation models in marketing research. In First Annual Advanced Research Techniques Forum (Neil W, ed.), American Marketing Association, Chicago.

Berghout E and Remenyi T (2005). The Ten years of the European Conference on IT Evaluation: Retrospectives and perspectives for possible future research. Electronic Journal of Information Systems Evaluation, 8 (2), 81-98

Bloomfield B P and Coombs R (1992) Information technology, control and power: the centralization and decentralization debate revisited, Journal of Management Studies, 29(4), 459-484.

Burt R S (1987) Social contagion and innovation: cohesion versus structural equivalence. The American Journal of Sociology, 92(6), 1287-1335.

Chin W and Gopal A (1995) Adoption intention in GSS: Importance of beliefs. DATA BASE for Advances in Information Systems 26(2-3), 42-64.

Davis FD (1989) Perceived usefulness, perceived ease of use, and user acceptance of information technology. MIS Quarterly 13(3), 319-339.

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.

Gefen D, Straub DW and Boudreau MC (2000) Structural equation modeling and regression: Guidelines for research practice. Communications of AIS, 4, Article 7.

Gefen D and Straub DW (2005) A practical guide to factorial validity using PLS-Graph: Tutorial and annotated example. Communications of AIS, 16, 91-109.

Hirschheim R and Smithson S (1999) Evaluation of information systems: a critical assessment. In Beyond the IT Productivity Paradox (Willcocks L and Lester S, eds), Wiley, Chichester.

Hu Q and Quan J (2006) The Institutionalization of IT Budgeting: Evidence from the Financial Sector. Information Resources Management Journal. 19(1), 84-97.

Hu Q, Frisk E, Eikebrokk TR, Hallikainen P, Päivärinta T, Nurmi A (2006), IT Investment Evaluation: Why Hasn't It Become an Organizational Routine? In *Proceedings of the 14th European Conference on Information Systems (ECIS),* Gothenburg, Sweden, June 12-14, AIS.

Jasperson J, Carte T A, Saunders C S, Butler B S, Croes H J and Zheng W (2002) Review: Power and information technology research: a metatriangulation review. MIS Quarterly, 26(4), 397-459.

Jones S and Hughes J (2001) Understanding IS evaluation as a complex social process: A case study of a UK local authority. European Journal of Information Systems 10, 189-203.

Kelman HC (1958) Compliance, Identification, and Internalization: Three Processes of Attitude Change. Journal of Conflict Resolution, 2(1), 51-60

Klecun E and Cornford T (2005) A critical approach to evaluation, European Journal of Information Systems 14, 229-243.

Koufteros XA (1999) Testing a model of full production: a paradigm for manufacturing research using structural equation modeling. Journal of Operations Management 17, 467-488.

Lin C and Pervan G (2003) The practice of IS/IT benefits management in large Australian organizations. Information & Management 41, 13-24.

Love PED, Irani Z and Edwards DJ (2005) Researching the investment of information technology in construction: An examination of evaluation practices. Automation in Construction 14, 569-582.

Markus ML (1983) Power, Politics, and MIS Implementation. Communications of the ACM, 26(6), 430-444.

Moore GC and Benbasat I (1991) Development of an Instrumentt to Measureth the Perceptions of Adopting an Information Technology Innovation. Information Systems Research, 2(3), 192-222.

Norris GD (1996) Post-investment appraisal. In Investing in Information Systems (Willcocks L, ed.), Chapman and Hall, London, 193-223.

Oliver, RL and Bearden W (1985) Crossover effects in the theory of reasoned action. Journal of Consumer Research, 12, 324-340.

Pavlou PA and Fygenson M (2006) Understanding and predicting electronic commerce adoption: An extension to theory of planned behavior. MIS Quarterly 30(1), 115-143.

Sauer, C (1993) Why Information Systems Fail: A Case Study Approach. Alfred Waller, Oxforshire.

Seddon PB, Graeser V and Willcocks L (2002) Measuring organizational IS effectiveness: An overview and update of senior management perspective. DATA BASE for Advances in Information Systems 33(2), 11-28.

Serafeimidis V and Smithson S (2000) Information systems evaluation in practice: a case study of organizational change. Journal of Information Technology 15, 93–105.

Smithson S and Hirscheim R (1998) Analyzing information systems evaluation: another look at an old problem. European Journal of Information Systems 7(3), 158-174.

Taylor S and Todd PA (1995) Understanding information technology usage: A test of competing models. Information Systems Research 6(3), 144-176.

Venkatesh V and Davis F D (2000) A theoretical extension of the technology acceptance model: four longitudinal field studies. Management Science, 46(2), 186-204.

Venkatesh V and Davis FD (1996) A model of the perceived ease of use: Development and test. Decision Sciences 27(3), 451-481.

Venkatesh V., Morris MG., Davis, GB., and Davis, FD (2003). User acceptance of information technology: Toward a unified view. MIS Quarterly, 27(3), 425-478.

Ward JM, Taylor P and Bond P (1996) Evaluation and realization of IS/IT benefits: An empirical study of current practice. European Journal of Information Systems 4, 214-225.

Ward J and Daniel E (2006) Benefits Management. Delivering Value from IS & IT Investments. Wiley & Sons, Chichester.

Werts CE, Linn, RL and Joreskog KG (1974) Interclass reliability estimates: Testing structural assumptions. Education and Psychological Measurement 34, 25-33.

Wilson M and Howcroft D (2000). The politics of IS evaluation: a social shaping perspective. Proceedings of the twenty first international conference on information systems (ICIS). Brisbane, Australia.

Wilson M and Howcroft D (2005) Power, politics, and persuasion in IS evaluation: a focus on ‘relevant social groups’. Journal of Strategic Information Systems 14(1), 17-43.