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Exploring the Link between IT Culture and Perceptions of Individual Benefits Realized: An Empirical Analysis

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Research-in-Progress

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Abstract

Individual IT culture (IITC) represents the measure of an individual's exposure to, and experiences with IT at a given point in time. The resulting IT culture archetype from this measure can be classified as representing either the proactive, passive or refusal attitudinal group. Within the IS literature, previous studies have demonstrated how the knowledge of IT culture archetypes enhances our understanding of IT usage, and poses broader implications for strategic IT management within organizational settings. In this paper we argue that despite these studies, the role IT culture plays in facilitating actual benefit outcomes from IS/IT usage has remained largely unexplored. Thus, in the present study we test the extent to which the presence of particular IT culture archetypes influence the likelihood that benefits are realized among individuals within an organizational context. The implications for research and practice are also discussed.

Keywords: IT culture, Individual benefits realized, Binomial logistic regression

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Introduction

Recent years have been signified by unprecedented increase in IS/IT investments as organizations are becoming increasingly reliant on IS/IT to facilitate more robust business processes. However, realizing benefits from IS/IT continues to pose a myriad of challenges, not the least of which are cultural problems. Research has effectively portrayed how culture greatly affects the successful realization of benefits from IS/IT investments (Melville et al. 2004; Leidner and Kayworth, 2006; Ravishankar et al. 2011) and how individuals' dispositions (values, assumptions and behaviors) are to a large extent shaped by culture (Straub et al. 2002; Walsh and Kefi, 2008). Besides the realization of benefits by individuals in an organization, represents a critical path to the realization of organizational-level benefits (DeLone and McLean, 1992; Devaraj and Kohli, 2003). As a result, managerial practices may not be transferable across individuals, and manifestations of culture at the individual-level must be taken to account to maximize benefit realized from IS/IT investments. Furthermore, business leaders so far have no clear guidance on how to ensure that employees realize benefits from IS/IT investments. Within the IS literature, there is little insight on how individuals' cultural dispositions to IT may influence perceptions of individual benefits realized within organizational settings.

The reason for this gap may be due to the fact that IS-culture studies have generally utilized either national or organizational culture as their theoretical lenses (Leidner and Kayworth, 2006), and these lenses do not give a clear understanding on the cultural dispositions that influence IS phenomena at the individual-level. According to Lee et al. (2007), technology features appropriate for users with one set of cultural dispositions may not be appropriate for users with different dispositions. This distinction in cultural value may not be clearly highlighted from their national or organizational differences, but may be more likely due to personally held cultural values about IT that have developed over time and due to different exposures to IT. This process of becoming more familiar with IT has been termed technological acculturation (Straub et al. 2002). Walsh and Kefi (2008) have conceptualized a similar term – '*individual IT culture*' (IITC) - as a measure of an individual's IT acculturation at a given point in time. So while investigations utilizing national and organizational culture have guided our understanding of individual behaviors to an extent, we would argue that these studies are limited in their attempt to delineate how individuals' cultural dispositions may fully influence IS phenomena. IT culture has also been defined as the set of IT related visible or audible behaviors, IT related values, and IT related underlying assumptions shared by a group (Walsh et al. 2010, p. 259). We therefore draw on IT culture as a theoretical lens since our focus is on assessing the impact of culture on benefits realized at the individual level. Consequently, this study seeks to address the following research question:

To what extent do IT culture archetypes influence the likelihood that benefits are realized among individuals in an organization?

Given the research objective of our study, we test a model that accounts for both constructs and takes into consideration the organizational conditions in which the IS/IT is used. In the next section, a theoretical background on IT culture and individual benefits realized is presented. Thereafter, we develop the hypotheses for our study. Subsequently, we discuss our research methodology, followed by a presentation of our findings. Lastly, we discuss the results of our study, and consider its implications for organizations.

Theoretical Background

IT Culture

Culture has been defined as "*the collective programming of the mind which distinguishes the members of one human group from another*" (Hofstede 1980) and values are regarded to be important in

investigating culture (Kluckhohn, 1951). Culture is a constantly changing phenomenon which changes not only across geographic regions but also over time (Taras et al. 2011). An individual's cultural disposition is therefore shaped through a continuous acculturation process resulting from their membership of a country, an organization or one or more groups e.g. occupation, religion etc. Hence in a bid to understand the impact of culture, Martin (1992) opines that interpretations of culture should occur at three levels i.e. integration; differentiation; and fragmentation. The integration perspective views the entire organization as an embodiment of one unified culture. However according to Guzman and Stanton (2009), *"in terms of insights about conflicts or collaborations, an organization, society, or group does not need to reflect a single, unified archetypal pattern"*. Therefore, interpretations of cultural dispositions need to be delineated across various subcultures within the organization i.e. the differentiation perspective (Martin, 1992). This perspective represents the notion that various subcultures that make up an organization have clearly distinct dispositions that differentiate them one from the other. The fragmentation perspective addresses not only distinct subcultural differences, but also acknowledges the irreconcilable cultural differences between subcultures and the organization as a whole.

IT culture represents a differentiated perspective of culture such that it assesses how the exposure and experiences a group of individuals share about IT uniquely identifies them from others. These subcultural differences are expressed in the unique needs and motivations to use IT and individuals who share similar features in this way represent an IT cultural archetype (Walsh et al. 2010). Using a grounded theory approach, Walsh et al. (2010) identified nine distinct IT culture archetypes in their study, namely: studious; passionate; dangerous; interested; disciplined; frightened; disenchanted; constrained; and dodger, which could be further classified into three attitudinal groups (i.e. proactive, passive and refusal) based on IT use. Individuals in the proactive attitudinal group were found to have the most positive attitudes towards IT and they comprised of the studious, dangerous, passionate and interested IT culture archetypes. Passive individuals were less positive and must be compelled to use IT (p. 266) while users in the refusal group tend to avoid IT use at all cost (p. 267). Their study portrayed how IT managers could influence the migration of less supporting user profiles of IT to more supporting profiles through a cultural learning process facilitated by providing customized trainings to meet the peculiar needs of the archetypal patterns identified.

Similarly, Kaarst-Brown and Robey's (1999) used an ethnographic study to uncover five archetypal patterns existing in two large insurance organizations. The archetypal patterns identified were: revered; controlled; demystified; integrated; and fearful IT cultural archetypes. Using these cultural archetypes, their study showed the need for IT managers to integrate different IT archetypal needs into their strategies to ensure the successful alignment of IT to business needs. More recently, Walsh (2014) has used mixed-method grounded theory to propose a strategic path to study IT use through individuals' IT culture and needs. In this study, IITC is found to be positively associated with the presence of global IT needs, meaning that highly acculturated individuals are likely to express more need to incorporate IT into their day-to-day lives compared to less acculturated individuals. Two other forms of IT needs (situational and contextual) were also explored. Situational IT needs relate to a specific IT, while contextual IT needs relates to a particular context (e.g. work, university etc.). One key finding of this study was that highly acculturated users of IT who could have been seen as 'ambassadors' may have high situational IT needs which if not met, may result in them acting out 'nemesis-type' characters that hinders successful implementation of organizational IT.

While the aforementioned studies demonstrate the usefulness of IT culture to inform various IS phenomena, a very significant gap exists that this research seeks to fill. In that none of the existing studies have attempted to investigate the association between IT culture and actual benefit outcomes. The studies mentioned above have investigated their links to IT use, and strategic IT management. However, we would argue that the ultimate goal of IT usage is to realize benefits. Currently, limited insights exist on how variations in IT culture may influence benefits outcomes, and no empirical evidence investigating the causal link exists in the current IT culture literature. In the next section, we discuss the benefits outcome we will be using for our study and then present the hypotheses for our study.

Individual Benefits Realized

The term 'individual benefits' refers to *"the effect of information on the behavior of the recipient"* (DeLone and McLean, 1992) and the rationale is based on their IS success model, which was developed to assess the success of an IS/IT system through the direct and interactive effects of service quality,

information quality, use and user satisfaction. Building on their work, researchers have used a wide range of measures to investigate individual impacts for a variety of IS/IT systems. For instance, Staples et al. (2002) examined the relationship between users' pre-implementation expectations and their perceived benefits based on post-implementation experience in using a central cataloguing system at work. Perceived net benefits was evaluated by taking into account all benefits from the use of an IS/IT, less all costs attributed to the system. Wu and Wang (2006) have measured perceived benefits in their empirical test of a success model for knowledge management systems. Their study showed that information quality rather than system quality was found to influence perceived benefits from knowledge management systems, with 54% variance explained. Hwang and Xu (2008) demonstrated how employees' use of a data warehouse led to increased levels of efficiency and effectiveness (i.e. individual benefits), and subsequently, organizational benefits such as cost reduction, increased revenues and improved business processes. This link between individual and organizational benefits realized underscores the importance of managing IT usage at individual level to ensure intended benefits are ultimately realized (Ward and Elvin 1999).

Some other studies have drawn from other IS theories to measure impacts from IS use at individual level. Shih (2004) used the technology acceptance model (TAM) to develop an extended TAM model that predicts perceived performance resulting from Internet usage. Perceived performance was used to evaluate the extent to which outcomes of a decision making process or problem solving via the web application actually improved performance in their job. Their model explained 47% variance in perceived performance. Morris and Venkatesh (2010) developed and tested a model assessing how ERP system implementation affects the relationship between employees' job characteristics and their job satisfaction. Job satisfaction was defined as the level of positive emotional response following an employee's appraisal of the job as fulfilling or congruent with the individual's personal values. The aforementioned studies demonstrate the variety of ways individual benefits have been investigated in the IS literature. For our study, we are interested in capturing the extent to which individual users perceive increased benefits following the use of an IS/IT system in their job role. Dhillon (2005) defines benefits as the difference between the desired outcome and the current situation. Benefits which are sought are thus the outcomes of business changes, which have been brought about by the introduction and use of IT especially during post adoption phases of IT-enabled change. Some researchers have acknowledged that the uneven nature of usage among individuals may cause them not to benefit equally from IS/IT (e.g. Jurison, 1996); and the individuals' technological acculturation has been cited as one of the reasons for such variations (Walsh et al. 2010). Because IT usage has been linked to the realization of benefits (Burton-Jones and Grange 2012), we would expect IT acculturation among organizational members to explain why variation in individual benefits realized exist. Therefore, IT culture should shape perceptions of individual benefits realized. Following from this discussion, we present the hypotheses for our study in the next section.

Hypotheses

IT Culture and Individual Benefits Realized

Within the broader IS literature, individuals' exposure to, and experiences with IT have been used as a potential explanatory variable to predict acceptance and usage of IT within work settings (Robins and Webster, 1999; Loch et al. 2003). In Loch et al. (2003), the authors examined the extent to which technological culturation affects the acceptance of the Internet among users in the Arab world. Technological culturation was defined as the *"cultural exposure and the experiences that individuals have with technology"* (pg. 46). Hill et al. (1998) portrayed how knowledge workers based in Arab countries, (but who previously studied in western countries) exhibited a more positive attitude towards technology and often perceived technology as beneficial to their organization. Agarwal and Prasad (1999) identified individuals' experiences with IT as a key variable in understanding their acceptance of technology. Taylor and Todd (1995) used the Technology Acceptance Model (TAM) to portray how usage decisions differed between experienced and inexperienced users of IT. According to the authors, experienced users can draw on past experiences of using a particular IT to inform their subsequent usage behavior with the IT. Thus, the more technological experience an individual has, the more likely s/he has a positive disposition to IT usage.

Walsh et al. (2010) found that individuals in the proactive attitudinal group were found to have the most exposure to IT because IT has become part of their day-to-day lives (i.e. a global need). Thus, they are

more likely to identify opportunities to maximize IT resources within their job role (pg. 263 – 265). The characteristic of this group is similar to those of individuals in the early adopters' category. Rogers (1995) identified individuals in this group as those who tend have cognitive understanding of IT. They are also able to properly evaluate its usefulness to fulfill required goals. For Agarwal and Prasad, (1999), these individuals *"have more positive beliefs about new technologies"* which may have been transferred from a prior experience. An individual who accepts and integrates IS/IT into their daily work such as proactive group individuals do should ultimately facilitate the realization of benefits within their job roles and for the organization at large (Devaraj and Kohli 2003). Based on Walsh et al's (2010) study, proactive group individuals participate voluntarily in new IT projects. They show initiative and mastery of IS/IT to accomplish their goals, while also supporting IT implementation within organizations.

This study argues that due to the high levels of IT acculturation in these individuals, they should have a positive effect on the perception of individual benefits realized because they are able to identify opportunities, take action on them, and persevere even in the face of setbacks (Bateman and Crant, 1993). Based on above discussion, we hypothesize that:

H1: *Within an organization, the presence of more IT culture archetypes in the proactive attitudinal group is likely to increase the perception of benefits realized by individuals in that organization.*

Compared to those in the proactive group, individuals who fall into the passive attitudinal group (i.e. constrained, disenchanted, frightened, and disciplined) *"must be compelled to use IT"* (Walsh et al. 2010). They need to be encouraged because *"unless forced by urgent situational or contextual IT needs, they will only use the IT tools they know to the minimum degree necessary"* (pg. 266). Thus, their exposure to IT is motivated by the need to fulfil specific tasks (situational) which may arise within certain contexts. In general their exposure and experiences with IT compared to individuals in the proactive group is limited. With regard to the impact on individual benefits realized, a passive individual's propensity to use IT is expected to be lower than that of a proactive individual. Within organizational settings, such individuals are likely to initially distance themselves from IT use thus making the intended impacts of technology less likely within their job (Beaudry and Pinsonneault, 2010). As result, expected benefits from IS/IT are not maximized; thus, we hypothesize that:

H2: *Within an organization, the presence of more IT culture archetypes in the passive attitudinal group is likely to increase the perception of benefits realized by individuals in that organization. However, it should be noted that we would not expect the strength of the positive relationship to be as strong for hypothesis 2, as it is for hypothesis 1.*

Measures

All measures were based on a seven-point Likert scales ranging from "strongly disagree" (1) to "strongly agree" (7). IT culture was measured as a first-order reflective, second-order formative construct consisting of needs and motivational measures (Diamantopoulos et al. 2008). To develop the items for our questionnaire, we utilized six dimensions to measure our latent variable – IT Culture. The instrument has been verified by von Stetten et al. (2011) and Walsh (2014). To capture perceptions of individual benefits realized, we used a combination of existing items - from Davis (1989) and Moore and Benbasat (1991) – and new measures (See table 1). The case organization chosen for our main study was a council within the UK. As with other organizations of this nature, councils are known to implement a wide range of IS for use in several departments. Respondents were asked to select their main application from a list and then answer six questions based on the extent to which they perceived benefits had been realized from its use. Finally, we incorporated five control variables: gender; age; position; duration of use; and education. All five control variables were added based on prior research on IT culture (See Igbaria and Baroudi, 1995; Morris and Venkatesh, 2010; Walsh et al. 2010; Tams et al. 2014).

We carried out a pre-test for issues such as wording, likelihood of obtaining good response rates, and ensured resulting data satisfied the requirements of analytical techniques to be carried out (MacKenzie et al. 2011). Data was then collected between April and May 2016, and the final sample included 270 responses. We then checked for non-response bias and common method bias. Of the 270 usable responses, 246 were returned during the period the survey was administered, and a further 24 were obtained after a further two weeks extension. We used Kolmogorov-Smirnov (K-S) to test the null hypothesis that the sample distribution of the two groups differ statistically. The lack of significance indicated that the two independent groups are statistically similar, thus we assumed non-response should

not be a problem in our study (Armstrong and Overton, 1977). We tested our quantitative data for common method bias using Harman's single-factor test (Harman, 1976).

Constructs	Items	
Intrinsic motivation	INTMOTKNO1	I find some aspects of IT interesting
	INTMOTKNO2	IT interests me
Primary needs	PRIM1	When I'm using my IT device, I don't see time passing by and I find it hard to stop
	PRIM2	I find it hard to control the time that I spend on IT devices (e.g. computer, smartphones, or tablets etc.)
Power needs	POW1	I like to show that I have good knowledge of IT, as this allows me to be more respected by the people I know
	POW2	Being good with IT gives me a feeling of superiority that I like
Self-accomplishment needs:	ACC1	I obtain satisfaction when I improve mastery of apps or software that I use
	ACC2	Mastering new apps or software gives me satisfaction
Extrinsic motivation	EXMOTID1	IT use improves the quality of my work
	EXMOTID2	Using an IT device allows me to have exchanges with people with whom I work
Affiliation needs:	AFF1	Using an IT device allows me to have exchanges with people with whom I like
	AFF2	I need IT to communicate and socialize with people
Individual benefits Realized	INDBENEFIT 1	The main IT application I use in my job role has made me more productive
	INDBENEFIT 2	The main IT application I use has made it easier for me to achieve the results I want to fulfil my job tasks
	INDBENEFIT 3	Overall, I am satisfied with my experience when using the main IT application
	INDBENEFIT 4	Using the IT application has made me knowledgeable in order to carry out my job-related activities more effectively
	INDBENEFIT 5	Using the IT application has helped me to broaden the skills needed to carry out my job activities.
	INDBENEFIT 6	Using the IT application has enabled quicker access to the information I need for my job role

Table 1: Constructs and Item Measures

The largest variance explained by one factor was 27.28% indicating common method bias was unlikely in our study (Podsakoff et al. 2003). Table 2 shows each constructs' AVE square root (in bold) was greater than inter-construct correlations, therefore discriminant validity was met. All formative constructs for the IT culture latent variable had acceptable VIFs (Diamantoupoulos et al. 2008) (i.e. VIF<3.33; bootstrap with 1000 samples). All VIF were between 1.243 – 1.554 and significant at $p \leq 0.001$, indicating that multicollinearity would not be a problem. The cross loadings and composite reliability of all constructs was higher than the recommended cut-off of 0.7; the variance extracted was also well above the recommended cut-off. As a result, our constructs demonstrated adequate reliability and validity.

In order to test our hypotheses, we first clustered our dataset with a view to investigating the number of distinct IT cultural archetypes present. A more detailed description of the clustering procedure used is detailed in appendix A. Ultimately, we identified six clusters, each of which we were able to relate to a distinct cultural archetype, based upon the characteristics of the cluster and quotations provided by the respondents. All six of these archetypes were members of just two altitudinal groups (i.e. passive and proactive). Brief descriptions of these archetypes have been provided in table 3. In the next section, we discuss the coding and testing of the hypotheses in our study.

		Mean	SD	1	2	3	4	5	6	7
1	ACC	5.09	1.28	**0.942**						
2	AFF	5.17	1.34	0.136	**0.914**					
3	EXMOTID	6.05	0.86	0.297	0.410	**0.873**				
4	INTMOTKNO	5.41	1.09	0.544	0.199	0.288	**0.936**			
5	INDBENEFIT	5.18	1.20	0.288	0.137	0.372	0.344	**0.850**		
7	POW	3.81	1.54	0.548	0.177	0.156	0.415	0.227	**0.933**	
8	PRIM	4.35	1.50	0.391	0.204	0.244	0.264	0.147	0.376	**0.923**

Table 2: Inter-correlations among study variables
Note: Bolded values indicate the square root of AVEs; SD means standard deviation.

Attitudinal groups	**IT Cultural archetypes**	**Description**
Proactive (130 users)	Studious	The studious users were influenced by all needs and motivations used to assess IT culture (as in table 1)
	Interested	These users held intrinsic, extrinsic and affiliation needs to use IT. Alongside the studious users, the interested users are the early adopters and innovators with IS/IT systems (Rogers, 1995)
Passive (140 users)	Disciplined	In terms of their IT culture characteristics, the respondents in this cluster score significant values on all variables except power and affiliation needs.
	Dodgers	These users would naturally avoid IT usage at all cost except when there is an obvious reason or purpose to be achieved (for example to fulfill job-related activities)
	Frustrated	These users regularly experience a negative emotion (i.e. frustration) while engaging with IT within the organization. They were characterized by having self-accomplishment needs, extrinsic and intrinsic motivations to use IT.
	Constrained	Users in this cluster use IT unwillingly. However, they recognize when it is important and use IT in those unavoidable situations.

Table 3: Description of IT cultural archetypes

Data Analysis

To prepare for the regression estimations, we created separate dummy variables to account for the attitudinal groups that emerged from our dataset. All demographic variables collected were also coded as 0/1 dummy variables. Gender was coded Male (0)/Female (1); education was coded as 0 for respondents with at least a university degree, and 1 for respondents with no university degree. For the position they held in the organization, individuals in managerial positions were coded as 0 with those in non-managerial positions coded as 1. Younger users were categorized as those born in the 1980s and have grown up with digital technologies. With respect to the data we collected, they represent users within the 15 – 40 age-range and were coded as 0. On the other hand, older employees (41+ years) represent those born before the 1980s and learned to use and incorporate technology much later in life (See Prensky, 2010); they were coded as 1. DurationofUse was also coded to account for those who reported to have used some form IS/IT for less than 6 months (0). Those who reported greater than six months usage were coded as 1. Following the coding of the dataset, we applied binary logistic regression to test H1 and H2 using SPSS v. 23.

A binary logistic regression is useful when the interest is to predict a categorical dependent variable that has the possibility of taking two values (0 and 1); where 1 is the desired outcome. Since, we are interested in investigating the extent to which particular archetypal patterns influence perception of benefits realized, we used "5" as a mark-up since this indicates the respondent "somewhat agrees" on the Likert scale. Upon averaging the responses for each observation for INDBENEFIT (our dependent variable), we assigned a dummy value of 1 to values starting from "5" upwards and assigned 0 to values from "4"

downwards. Logistic regression uses a maximum likelihood estimation procedure such that the probabilities of success are the conditional probabilities of achieving the target variable based on the predictors being observed (Perlich et al. 2003). This estimation approach was deemed appropriate since the goal of our study is to investigate the how IT cultural archetypes influence the likelihood that individual benefits are actually realized. The data comfortably met the requirements for the regression analyses, with the ratio of cases to independent variables [21:1], clearly exceeding the recommended threshold value of 10:1 (Hair et al. 2010). We adopted a stepwise approach to estimate the models as this would avoid overfitting variables in the model. First, we tested all predictors (see table 4) as our baseline model (model 1). We then include the proactive and passive dummy variables to test hypotheses 1 and 2 respectively, as seen in models 2 and 3. More specifically, it can be seen from the positive coefficient for the dummy variable in model 2, that hypothesis 1 is supported. However, by contrast, the negative coefficient for the dummy variable in model 3 indicates that hypothesis 2 is not supported.

Variables	**Model 1**	**Model 2**	**Model 3**
Education	0.091	0.008	0.008
Age-group	-0.626**	-0.489	-0.489
Position	-0.622*	-0.625*	-0.625*
DurationofUse	0.844**	0.842**	0.842**
Gender	0.236	0.280	0.280
Dummy [Proactive]		0.512*	
Dummy [Passive]			-0.512*
Chi-square	12.27*	15.15*	15.15*

Table 4: Results of multilevel binomial regression models
***$p < 0.001$; **$p < 0.05$; *$p < 0.1$

Discussion and Next steps

The objective of this study is to explore how the presence of particular IT culture archetypes may influence variations of benefits realized by individuals within an organizational context. IT culture archetypes are assessed as a measure of individuals' needs and motivation to use IT at a particular point in time. We used variables collected in an online survey to cluster our dataset after which we grouped emerging IT culture archetypes into passive and proactive attitudinal groups. Following, we employed multilevel binomial logistic regression to test the effect of each attitudinal group on the likelihood that individual benefits are realized. Results of our regression tests show mixed results. While an increase in the number of IT archetypes in the proactive group is linked with the likelihood that benefits are realized among individuals in an organization, the presence of more IT culture archetypes in the passive attitudinal group reduces the likelihood that benefits will be realized among individuals in that organization (See model 3).

These findings have the potential to deliver both practical and theoretical contributions. Theoretically, it contributes to the IT culture literature by portraying how IT cultural archetypes influence benefits outcomes within organizational settings. Specifically, we demonstrate the usefulness of the IT culture as a useful theoretical lens to predict individual benefits realized. In terms of practice, the results of this study is a first step of an ongoing analyses to provide business leaders with an understanding of factors that explain why some individuals within their organization are more likely than others, to influence the realization of benefits from IS/IT investments. As business leaders are repeated being enticed to invest in new forms of IS/IT systems, there is increasing pressure to ensure that intended outcomes from the use of the systems are actually realized. In addition to previous findings on IT diffusion (Walsh et al. 2010) and IT usage (Walsh, 2014), results from this study can be used to guide business leaders further on actions to ensure benefits from IS/IT investment are actually realized. Overall, findings may be used to offer guidelines for strategic IT management to promote benefits realized among organizational members, ultimately ensure organizational benefits from often high IS/IT investments. A good understanding of how IT culture influences benefits realized not only has significance at individual level, but also at organizational level. As such, we will continue with an analysis of current and future datasets to inform our understanding of how IT culture archetypes influence benefits realized at organizational levels.

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Appendix A: Clustering Procedure

We employed cluster analysis to identify distinct IT culture patterns in our dataset. Cluster analysis has been employed in previous IS literature to offer insights on how IT management can be customized according to different IT archetypal patterns within the organization (Walsh and Gettler-Summa, 2010). Walsh et al. (2010) has also provided a comprehensive description of a range of IT culture archetypes. Guided by Hair et al. (2013), we proceeded to use a combination of hierarchical and non-hierarchical methods to cluster our dataset. According to the authors, such combination is often advisable to ensure validation and significance of the final cluster solution. To proceed, we computed six new variables equal to the average of all items for each variable we use to run our cluster analysis.

We conducted a hierarchical agglomerative clustering (HAC) and used Ward's technique to further examine the number of clusters in the dataset. Ward's technique aims to produce roughly equal cluster sizes by minimizing within-group variance (Hair et al. 2013). We inspected a line plot of the change in coefficient obtained from the resulting agglomeration schedule. Based on this procedure, we deemed a five-cluster solution to be the most descriptive of the data. We then proceeded to run the K-means clustering solution. This allowed us to assign data observations to each of the clusters we identified. Before proceeding with the interpretation of identified clusters, we ran an ANOVA test to check the null hypothesis regarding the differences in the cluster centroids. For each cluster, the mean value (centroid) for each of the six IT culture variables is provided. In contrast to Walsh and Gettler-Summa (2010) where POW was not significant to differentiate the cluster profiles, the analysis of variance in table 7 reveals that the cluster means for all six variables, are significantly different at the $p<0.001$ level. Based on the results reported in table 7, we reject the null hypothesis that objects were randomly assigned. All six variables are significantly different between the clusters. Furthermore, the *F*-values indicate that accomplishment needs had the greatest influence in the formation of the clusters. The information presented in the table below is necessary for the interpretation of the five-cluster solution.

IT culture variables	Cluster 1 (40=15%)	Cluster 2 (63=23%)	Cluster 3 (48=17%)	Cluster 4 (61=22%)	Cluster 5 (58=21%)	F statistic (*p*-value)
INTMOTKNO	4.22	6.19	4.51	5.79	5.43	51.982 (0.000)
POW	3.38	5.86	2.04	3.98	3.81	145.252 (0.000)
PRIM	3.07	5.92	4.13	4.91	4.75	55.371 (0.000)
ACC	3.97	6.00	3.13	5.10	4.87	96.327 (0.000)
EXMOTID	4.99	6.53	6.19	5.84	6.36	34.677 (0.000)
AFF	3.69	5.93	5.54	4.06	6.22	84.483 (0.000)

Standardized mean values and ANOVA results. F-values in bold are significant (p<0.001)
All variables were measured on a Likert scale of 1 to 7

Following the validation of clusters in our dataset, the next step is to provide meaningful interpretations in light of previous literature. According to Bapna et al. (2004), the results from a cluster analysis are validated by providing meaningful interpretations in the context of relevant literature. Thus guided by Walsh and Gettler-Summa's (2010) study, we proceeded to interpret the IT culture variables using 5 (somewhat agree) as a mark-up level. All variables were measured on a Likert scale from 1 (strongly disagree) to 7 (strongly agree). A level of 5 for AFF (i.e. affiliation needs) in a cluster would thus indicate that users in that cluster express significant affiliation needs to be fulfilled through IT usage. Using this approach, we compared the significant levels of needs and motivation for each clusters with characteristics that had previously been identified in the IS literature. The resulting IT culture archetypes and their attitudinal groups are shown in table 3.